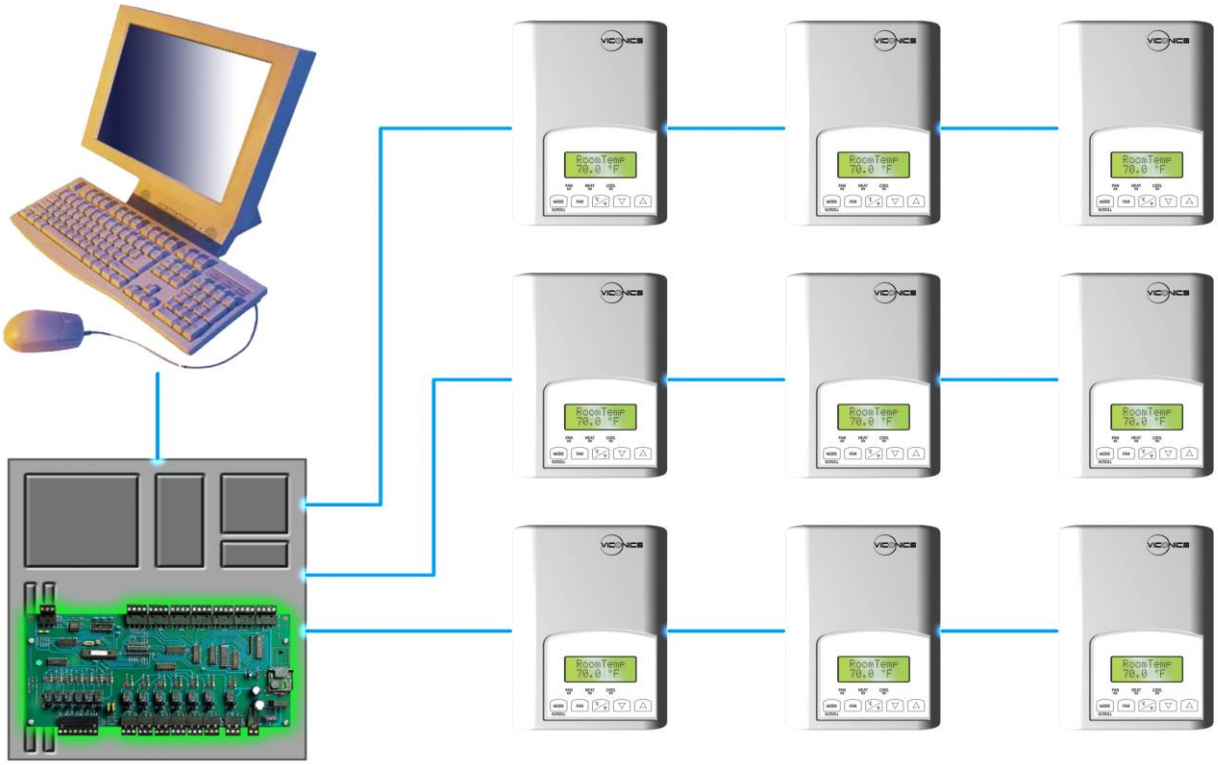
PIR Ready VT72xx & VT(R)73xx Series
24 Vac Fan Coil and Zoning Controllers
For Commercial and Lodging HVAC Applications

LonWorks Integration Manual
ITG-VT(R)72_73-PIR-LON-E08

(028-6008 R8 Issue Date: January 17, 2013)



VT7200X Series Product Overview

The VT7200 PI controller 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 controllers. 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.

Fig.1 - VT7200 Series

VT73xxX Series Product Overview

The VT7300 PI controller family is specifically designed for fan coil control. The product features a backlit LCD display with dedicated function menu buttons 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 controllers.

Models are available for On/Off, 3 point floating and analog 0 to 10 Vdc control and can control up to three fan speeds. Three additional inputs are also provided for monitoring and / or various advanced functions.

All models feature configurable System and Fan button functions to meet all possible applications. They all contain an SPST auxiliary switch that can be used to control lighting or auxiliary reheat.

VT73x5X Lodging *VT73x0X Commercial*

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

The controllers are also compatible with the new Viconics PIR cover accessories. Controllers 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 controllers can be ordered with or without a factory installed PIR cover.

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

- Detailed information on the controller (VT7200X5x00x), is available on document: *LIT-VT7200-PIR-Exx.*
- Detailed information on the controller (VT73xxX5x00x), is available on document: *LIT-VT7300-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

PID History Revision Table

XIF, APB and NXE File Names and Corresponding PIDs. This manual information is to be used only with the current released VT7200X & VT73xxX PIR ready controllers.

Used on current released controller	APB / NXE / XIF file names	Revision Level	Associated PID
PIR Ready VT7200 / VT7300 Series	VT72_73_PIR.XIF	Rev 3.0	80:00:C5:55:00:04:04:20

This manual information is ***NOT*** to be used only with the previously released VT7200X & VT73xxX controllers.

Previously released controller	APB / NXE / XIF file names	Revision Level	Associated PID
Non-RoHS VT7200 / VT7300 Series	T7X-FC.XIF	Rev 1.0 to 1.3	80:00:C5:55:00:04:04:0B
RoHS VT7200 / VT7300 Series	T7X-FCr.XIF	Rev 1.0 to 1.3	80:00:C5:55:00:04:04:1B
RoHS PIR VT7200 / VT7300 Series **	T7X-FC-PIR.XIF	Rev 2.0	80:00:C5:55:00:04:04:1D

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

1: SNVTs: Standard Network Variables Types
2: SCPTs: Standard Configuration Parameters Types

No	Sub	Point Name	Snivet Type Enumeration and Signature Type	VTR7300A5x00E	VTR7350A5x00E	VTR7305A5x00E	VTR7355A5x00E
N/A: Not applicable on this model							
0		**nviSpaceTemp**	SNVT_temp_p	X	X	X	X
1		**nviOutdoorTemp**	SNVT_temp_p	X	X	X	X
2		**nviSetpoint**	SNVT_temp_p	X	X	X	X
3		**nviSpaceRH**	SNVT_lev_percent	N/A	X	N/A	X
4		**nviFanSpeedCmd**	SNVT_switch	X	X	X	X
5		**nviOccManCmd**	SNVT_occupancy	X	X	X	X
6		**nviApplicMode**	SNVT_hvac_mode	X	X	X	X
7		**nviHeatCool**	SNVT_hvac_mode	X	X	X	X
10		**nviRemLockout**	UNVT_count	X	X	X	X
11		**nviDhumiLCK**	SNVT_switch	N/A	X	N/A	X
12		**nvoSpaceTemp**	SNVT_temp_p	X	X	X	X
13		**nvoDischAirTemp**	SNVT_temp_p	X	X	X	X
14		**nvoSpaceRH**	SNVT_lev_percent	N/A	X	N/A	X
15		**nvoEffectOccup**	SNVT_occupancy	X	X	X	X
16		**nvoUnitStatus**	SNVT_hvac_status	X	X	X	X
	1	mode		x	x	x	x
	2	heat_output_primary		x	x	x	x
	4	cool_output		x	x	x	x
	6	fan_output		x	x	x	x
	7	in_alarm		x	x	x	x
17		**nvoSccStatus**	UNVT_thermo_state_vtr	X	X	X	X
Associate with UNVT_thermo_state_vtr format file							
	1	bi1_status	True bit index 2	x	x	x	x
	2	bi2_status	True bit index 1	x	x	x	x
	3	rui1_ status	True bit index 47	x	x	x	x
	4	rbi2_ status	True bit index 48	x	x	x	x
	5	dehumidification_active	True bit index 7	N/A	x	N/A	x
	6	cool_valve_status	True bit index13	x	x	x	x
	7	heat_valve_status	15	x	x	x	x
	8	fan_low	True bit index 21	x	x	x	x
	9	fan_med	True bit index 22	x	x	x	x
	10	fan_high	True bit index 23	x	x	x	x
	11	window_opened	True bit index 24	x	x	x	x
	12	service_alarm	True bit index 28	x	x	x	x
	13	filter_alarm	True bit index 29	x	x	x	x
	14	local_pir_motion	True bit index 39	x	x	x	x
18		**nvoTerminalLoad**	SNVT_lev_percent	X	X	X	X
19		**nciSetpoints**	SNVT_temp_setp	X	X	X	X
	1	occupied_cool		x	x	x	x
	2	standby_cool		x	x	x	x
	3	unoccupied_cool		x	x	x	x
	4	occupied_heat		x	x	x	x
	5	standby_heat		x	x	x	x
	6	unoccupied_heat		x	x	x	x

No	Sub	Point Name	Snivet Type Enumeration and Signature Type t	VTR7300A5x00E	VTR7350A5x00E	VTR7305A5x00E	VTR7355A5x00E
20		**nciCfg4FcuZn**	UNVT_cfg_2_fcu_zn	X	X	X	X
		Associate with UNVT_cfg_2_fcu_zn format file					
	0	bi1_config	Enumeration Set Used: input_cfg_model_a_t	x	x	x	x
	1	bi2_config	Enumeration Set Used: input_cfg_model_b_t	x	x	x	x
	2	rui1_config	Enumeration Set Used: input_cfg_model_e_t	x	x	x	x
	3	rbi2_config	Enumeration Set Used: input_cfg_model_f_t	x	x	x	x
	4	Fan_ctrl	fan_ctrl_t	x	x	x	x
	5	calib_room_sensor	SNVT_temp_diff_p	x	x	x	x
	6	room_humidity_display	Enumeration Set Used: off_on_state_t	N/A	x	N/A	x
	7	dehumidification_setpoint	SNVT_lev_percent	N/A	x	N/A	x
	8	dehumumidification_hysterisis	SNVT_lev_percent	N/A	x	N/A	x
	9	dehumidification_max_cooling	SNVT_lev_percent	N/A	x	N/A	x
	10	calib_room_humidity_sensor	SNVT_lev_percent	N/A	x	N/A	x
21		**nciCfg3FcuZn**	UNVT_cfg_1_fcu_zn	X	X	X	X
		Associate with UNVT_cfg1_fcu_zn format file					
	0	password	Unsigned-Long	x	x	x	x
	1	Cool_CPH	unsigned short	x	x	x	x
	2	Heat_CPH	unsigned short	x	x	x	x
	3	Cool_NO_NC	aux_contact_cfg_t	x	x	x	x
	4	Heat_ NO_NC	aux_contact_cfg_t	x	x	x	x
	5	menu_scroll	Enumeration Set Used: scroll_type_t	x	x	x	x
	6	auto_mode	Enumeration Set Used: off_on_state_t	x	x	x	x
	7	temperature_scale	Enumeration Set Used: temp_unit_t	x	x	x	x
	8	pipe_number_main_out_config	Enumeration Set Used: pipe_system_t	x	x	x	x
	9	sequence_of_operation	Enumeration Set Used: seq_operation_vtr_t	x	x	x	x
	10	fan_menu_sequence	Enumeration Set Used: fan_sequence_t	x	x	x	x
	11	heat_maximum_setpoint	SNVT_temp_p	x	x	x	x
	12	cool_minimum_setpoint	SNVT_temp_p	x	x	x	x
	13	heat_demand_limit	SNVT_lev_percent	x	x	x	x
	14	cool_ demand_limit	SNVT_lev_percent	x	x	x	x
	15	deadband	Unsigned-Short	x	x	x	x
	16	setpoint_type	Enumeration Set Used: permanent_temporary_t	x	x	x	x
	17	setpoint_function	Enumeration Set Used: setpts_func_t	x	x	x	x
	18	temporary_occ_time	Unsigned-Short	x	x	x	x
	19	proportional_band	Unsigned-Short	x	x	x	x
	20	pulsed_heat_enable	off_on_state_t	x	x	x	x
	21	fan_mode	Enumeration Set Used: fan_mode_t	x	x	x	x
	22	auto_fan	Enumeration Set Used: auto_fan_t	x	x	x	x
	23	pir_standby_time	Unsigned-Short	x	x	x	x
	24	pir_unoccupied_time	Unsigned-Short	x	x	x	x
22		**nciSccModel**	UNVT_model_info_2	X	X	X	X
Associate with UNVT_model_info_2 format file							
	1	Controller Model		x	x	x	x
	2	Controller Software Version		x	x	x	x
23		**nciHvacType**	SNVT_hvac_type	X	X	X	X
24		**nciSndHrtBt**	SNVT_time_sec	X	X	X	X
25		**nciMinOuttM**	SNVT_time_sec	X	X	X	X
26		**nciRcvHrtBt**	SNVT_time_sec	X	X	X	X
27		**nciMajVer**	SCPT_maj_ver	X	X	X	X
28		**nciMinVer**	SCPT_min_ver	X	X	X	X

No	Sub	Point Name	Snivet Type Enumeration and Signature Type	VT7200C5x00E	VT7200F5x00E	VT7300A5x00E	VT7300C5x00E	VT7350C5x00E	VT7305A5x00E	VT7305C5x00E	VT7355C5x00E	VT7300F5x00E	VT7350F5x00E	VT7305F5x00E	VT7355F5x00E
N/A: Not applicable on this model															
0		**nviSpaceTemp**	SNVT_temp_p	X	X	X	X	X	X	X	X	X	X	X	X
1		**nviOutdoorTemp**	SNVT_temp_p	X	X	X	X	X	X	X	X	X	X	X	X
2		**nviSetpoint**	SNVT_temp_p	X	X	X	X	X	X	X	X	X	X	X	X
3		**nviSpaceRH**	SNVT_lev_percent	N/A	N/A	N/A	N/A	X	N/A	N/A	X	N/A	X	N/A	X
4		**nviFanSpeedCmd**	SNVT_switch	N/A	N/A	X	X	X	X	X	X	X	X	X	X
5		**nviAuxHeatEnable**	SNVT_switch	X	X	X	X	X	X	X	X	X	X	X	X
6		**nviOccManCmd**	SNVT_occupancy	X	X	X	X	X	X	X	X	X	X	X	X
7		**nviApplicMode**	SNVT_hvac_mode	X	X	X	X	X	X	X	X	X	X	X	X
8		**nviHeatCool**	SNVT_hvac_mode	X	X	X	X	X	X	X	X	X	X	X	X
9		**nviRemLockout**	UNVT_count	X	X	X	X	X	X	X	X	X	X	X	X
10		**nviDhumiLCK**	SNVT_switch	N/A	N/A	N/A	N/A	X	N/A	N/A	X	N/A	X	N/A	X
11		**nviAuxOut**	SNVT_switch	X	X	X	X	X	X	X	X	X	X	X	X
12		**nvoSpaceTemp**	SNVT_temp_p	X	X	X	X	X	X	X	X	X	X	X	X
13		**nvoDischAirTemp**	SNVT_temp_p	X	X	X	X	X	X	X	X	X	X	X	X
14		**nvoSpaceRH**	SNVT_lev_percent	N/A	N/A	N/A	N/A	X	N/A	N/A	X	N/A	X	N/A	X
15		**nvoEffectOccup**	SNVT_occupancy	X	X	X	X	X	X	X	X	X	X	X	X
16		**nvoUnitStatus**	SNVT_hvac_status	X	X	X	X	X	X	X	X	X	X	X	X
	1	mode		x	x	x	x	x	x	x	x	x	x	x	x
	2	heat_output_primary		x	x	x	x	x	x	x	x	x	x	x	x
	4	cool_output		x	x	x	x	x	x	x	x	x	x	x	x
	6	fan_output		N/A	N/A	x	x	x	x	x	x	x	x	x	x
	7	in_alarm		x	x	x	x	x	x	x	x	x	x	x	x
17		**nvoSccStatus**	UNVT_thermo_state_fc	X	X	X	X	X	X	X	X	X	X	X	X
	1	bi1_status	True bit index 2	x	x	x	x	x	x	x	x	x	x	x	x
	2	bi2_status	True bit index 1	x	x	x	x	x	x	x	x	x	x	x	x
	3	ui3_ status	True bit index 0	x	x	x	x	x	x	x	x	x	x	x	x
	4	dehumidification_active	True bit index 7	N/A	N/A	N/A	N/A	X	N/A	N/A	X	N/A	X	N/A	X
	5	state_terminal_bo1	True bit index 13	x	x	x	x	x	x	x	x	x	x	x	x
	6	state_terminal_bo2	True bit index 12	x	x	x	x	x	x	x	x	x	x	x	x
	7	state_terminal_bo3	True bit index 15	x	x	x	x	x	x	x	x	x	x	x	x
	8	state_terminal_bo4	True bit index 14	x	x	x	x	x	x	x	x	x	x	x	x
	9	state_terminal_bo5	True bit index 20	x	x	x	x	x	x	x	x	x	x	x	x
	10	fan_low	True bit index 21	x	x	x	x	x	x	x	x	x	x	x	x
	11	fan_med	True bit index 22	x	x	x	x	x	x	x	x	x	x	x	x
	12	fan_high	True bit index 23	x	x	x	x	x	x	x	x	x	x	x	x
	13	window_opened	True bit index 24	x	x	x	x	x	x	x	x	x	x	x	x
	14	service_alarm	True bit index 28	x	x	x	x	x	x	x	x	x	x	x	x
	15	filter_alarm	True bit index 29	x	x	x	x	x	x	x	x	x	x	x	x
	16	local_pir_motion	True bit index 39	x	x	x	x	x	x	x	x	x	x	x	x
18		**nvoTerminalLoad**	SNVT_lev_percent	X	X	X	X	X	X	X	X	X	X	X	X
19		**nciSetpoints**	SNVT_temp_setp	X	X	X	X	X	X	X	X	X	X	X	X
	1	occupied_cool		x	x	x	x	x	x	x	x	x	x	x	x
	2	standby_cool		x	x	x	x	x	x	x	x	x	x	x	x
	3	unoccupied_cool		x	x	x	x	x	x	x	x	x	x	x	x
	4	occupied_heat		x	x	x	x	x	x	x	x	x	x	x	x
	5	standby_heat		x	x	x	x	x	x	x	x	x	x	x	x
	6	unoccupied_heat		x	x	x	x	x	x	x	x	x	x	x	x

No	Sub	Point Name	Snivet Type Enumeration and Signature Type t	VT7200C5x00E	VT7200F5x00E	VT7300A5x00E	VT7300C5x00E	VT7350C5x00E	VT7305A5x00E	VT7305C5x00E	VT7355C5x00E	VT7300F5x00E	VT7350F5x00E	VT7305F5x00E	VT7355F5x00E
20		**nciCfg2FcuZn**	UNVT_cfg_2_fcu_zn	X	X	X	X	X	X	X	X	X	X	X	X
Associate with UNVT_cfg_2_fcu_zn format file															
	1	bi1_config	Enumeration Set Used: input_cfg_model_a_t	x	x	x	x	x	x	x	x	x	x	x	x
	2	bi2_config	Enumeration Set Used: input_cfg_model_b_t	x	x	x	x	x	x	x	x	x	x	x	x
	3	ui3_config	Enumeration Set Used: input_cfg_model_c_t	x	x	x	x	x	x	x	x	x	x	x	x
	4	room_humidity_display	Enumeration Set Used: off_on_state_t	N/A	N/A	N/A	N/A	x	N/A	N/A	x	N/A	x	N/A	x
	5	dehumidification_setpoint	SNVT_lev_percent	N/A	N/A	N/A	N/A	x	N/A	N/A	x	N/A	x	N/A	x
	6	dehumumidification_hysterisis	SNVT_lev_percent	N/A	N/A	N/A	N/A	x	N/A	N/A	x	N/A	x	N/A	x
	7	dehumidification_max_cooling	SNVT_lev_percent	N/A	N/A	N/A	N/A	x	N/A	N/A	x	N/A	x	N/A	x
	8	calib_room_humidity_sensor	SNVT_lev_percent	N/A	N/A	N/A	N/A	x	N/A	N/A	x	N/A	x	N/A	x
22		**nciSccModel**	UNVT_model_info_2	X	X	X	X	X	X	X	X	X	X	X	X
Associate with UNVT_model_info_2 format file															
	1	Controller Model		x	x	x	x	x	x	x	x	x	x	x	x
	2	Controller Software Version		x	x	x	x	x	x	x	x	x	x	x	x
23		**nciHvacType**	SNVT_hvac_type	X	X	X	X	X	X	X	X	X	X	X	X
24		**nciSndHrtBt**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
25		**nciMinOuttM**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
26		**nciRcvHrtBt**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
27		**nciMajVer**	SCPT_maj_ver	X	X	X	X	X	X	X	X	X	X	X	X
28		**nciMinVer**	SCPT_min_ver	X	X	X	X	X	X	X	X	X	X	X	X

No	Sub	Point Name	Snivet Type Enumeration and Signature Type t	VT7200C5x00E	VT7200F5x00E	VT7300A5x00E	VT7300C5x00E	VT7350C5x00E	VT7305A5x00E	VT7305C5x00E	VT7355C5x00E	VT7300F5x00E	VT7350F5x00E	VT7305F5x00E	VT7355F5x00E
21		**nciCfg1FcuZn**	UNVT_cfg_1_fcu_zn	X	X	X	X	X	X	X	X	X	X	X	X
Associate with UNVT_cfg1_fcu_zn format file															
	1	password	Unsigned-Long	x	x	x	x	x	x	x	x	x	x	x	x
	2	control_type	Enumeration Set Used: clrl_type_t	x	N/A	N/A	x	x	N/A	x	x	N/A	N/A	N/A	N/A
	3	floating_actuator_time	Unsigned-Short	x	N/A	x	x	x	x	x	x	N/A	N/A	N/A	N/A
	4	cycles_per_hour	Unsigned-Short	N/A	N/A	x	x	x	x	x	x	N/A	N/A	N/A	N/A
	5	reverse_or_direct_acting_output	Enumeration Set Used: da_ra_type_t	N/A	x	N/A	N/A	N/A	N/A	N/A	N/A	x	x	x	x
	6	menu_scroll	Enumeration Set Used: scroll_type_t	x	x	x	x	x	x	x	x	x	x	x	x
	7	auto_mode	Enumeration Set Used: off_on_state_t	N/A	N/A	x	x	x	x	x	x	x	x	x	x
	8	temperature_scale	Enumeration Set Used: temp_unit_t	x	x	x	x	x	x	x	x	x	x	x	x
	9	pipe_number_main_out_config	Enumeration Set Used: pipe_system_t	x	x	x	x	x	x	x	x	x	x	x	x
	10	sequence_of_operation	Enumeration Set Used: seq_operation_t	x	x	x	x	x	x	x	x	x	x	x	x
	11	fan_menu_sequence	Enumeration Set Used: fan_sequence_t	N/A	N/A	x	x	x	x	x	x	x	x	x	x
	12	heat_maximum_setpoint	SNVT_temp_p	x	x	x	x	x	x	x	x	x	x	x	x
	13	cool_minimum_setpoint	SNVT_temp_p	x	x	x	x	x	x	x	x	x	x	x	x
	14	calib_room_sensor	SNVT_temp_diff_p	x	x	x	x	x	x	x	x	x	x	x	x
	15	deadband	Unsigned-Short	x	x	x	x	x	x	x	x	x	x	x	x
	16	setpoint_type	Enumeration Set Used: permanent_temporary_t	x	x	x	x	x	x	x	x	x	x	x	x
	17	setpoint_function	Enumeration Set Used: setpts_func_t	N/A	N/A	x	x	x	x	x	x	x	x	x	x
	18	temporary_occ_time	Unsigned-Short	x	x	x	x	x	x	x	x	x	x	x	x
	19	proportional_band	Unsigned-Short	x	x	x	x	x	x	x	x	x	x	x	x
	20	aux_contact_config	Enumeration Set Used: aux_contact_model_a_t	x	x	x	x	x	x	x	x	x	x	x	x
	21	reheat_time_base	Enumeration Set Used: reheat_option_t	x	x	x	x	x	x	x	x	x	x	x	x
	22	fan_mode	Enumeration Set Used: fan_mode_t	N/A	N/A	x	x	x	x	x	x	x	x	x	x
	23	auto_fan	Enumeration Set Used: auto_fan_t	N/A	N/A	x	x	x	x	x	x	x	x	x	N/A
	24	pir_standby_time	Unsigned-Short	x	x	x	x	x	x	x	x	x	x	x	x
	25	pir_unoccupied_time	Unsigned-Short	x	x	x	x	x	x	x	x	x	x	x	x
22		**nciSccModel**	UNVT_model_number	X	X	X	X	X	X	X	X	X	X	X	X
	1	Controller Model		x	x	x	x	x	x	x	x	x	x	x	x
	2	Software Version		x	x	x	x	x	x	x	x	x	x	x	x
23		**nciHvacType**	SNVT_hvac_type	X	X	X	X	X	X	X	X	X	X	X	X
24		**nciSndHrtBt**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
25		**nciMinOuttM**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
26		**nciRcvHrtBt**	SNVT_time_sec	X	X	X	X	X	X	X	X	X	X	X	X
27		**nciMajVer**	SCPT_maj_ver	X	X	X	X	X	X	X	X	X	X	X	X
28		**nciMinVer**	SCPT_min_ver	X	X	X	X	X	X	X	X	X	X	X	X

Input Network Variables (nvi's) Description

Parameter	Variable Name	Function
Room Temperature	network input SNVT_temp_p **nviSpaceTemp**	➢ This input network variable provides a network remote temperature value to the controller. 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.
Outdoor Air Temperature	network input SNVT_temp_p **nviOutdoorTemp**	➢ This input network variable provides outdoor air temperature information to the controller 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)
Occupied Cool & Heat Setpoints	network Input SNVT_temp_p **nviSetpoint**	➢ 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
Room Humidity	network input SNVT_lev_percent **nviSpaceRH**	➢ This input network variable is the measured room humidity in percent monitored by the controller. ➢ Valid Range: 5 to 90% ➢ Default Null Value: +163.835 (0x7FFF) ➢ This network variable is subject to the Receive HeartBeat Time, nviRcvHrtBt

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Fan Mode</td><td>network input
SNVT_switch
nviFanSpeedCmd</td><td>
➢ This input network variable is used to connect an external fan speed switch to the node or to allow any supervisory device to override the fan speed controlled by the node's control algorithm.
➢ This input is used in conjunction with FanMenu bit in nciGenOpts.
➢ Default Null Value: AUTO (state = 0xFF)
➢ Valid Range:
<table>
<tr><th>Fan Menu Value</th><th>State</th><th>Value</th><th>Equivalent Percent</th><th>Requested Speed</th></tr>
<tr><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>Off - Not Used</td></tr>
<tr><td></td><td>1</td><td>0</td><td>0%</td><td>Off - Not Used</td></tr>
<tr><td></td><td>1</td><td>1 to 66</td><td>0.5 to 33%</td><td>Low</td></tr>
<tr><td></td><td>1</td><td>67 to 133</td><td>33.5 to 66.5%</td><td>Medium</td></tr>
<tr><td></td><td>1</td><td>134 to 200</td><td>67 to 100%</td><td>High</td></tr>
<tr><td></td><td>1</td><td>201 to 255</td><td>100%</td><td>3 – Not Used</td></tr>
<tr><td></td><td>0xFF</td><td>N/A</td><td>N/A</td><td>Auto – Not Used</td></tr>
<tr><td>1</td><td>0</td><td>n/</td><td>N/A</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>0</td><td>0%</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>0 to 100</td><td>0.5 to 50%</td><td>Low</td></tr>
<tr><td></td><td>1</td><td>101 to 200</td><td>50.5 to 100%</td><td>High</td></tr>
<tr><td></td><td>1</td><td>201 to 255</td><td>100%</td><td>2 – Not Used</td></tr>
<tr><td></td><td>0xFF</td><td>N/A</td><td>N/A</td><td>Auto – Not Used</td></tr>
<tr><td>2</td><td>0</td><td>N/A</td><td>N/A</td><td>Off - Not Used</td></tr>
<tr><td></td><td>1</td><td>0</td><td>0%</td><td>Off - Not Used</td></tr>
<tr><td></td><td>1</td><td>1 to 66</td><td>0.5 to 33%</td><td>Low</td></tr>
<tr><td></td><td>1</td><td>67 to 133</td><td>33.5 to 66.5%</td><td>Medium</td></tr>
<tr><td></td><td>1</td><td>134 to 200</td><td>67 to 100%</td><td>High</td></tr>
<tr><td></td><td>1</td><td>201 to 255</td><td>100%</td><td>3 – Not Used</td></tr>
<tr><td></td><td>0xFF</td><td>N/A</td><td>N/A</td><td>Auto</td></tr>
<tr><td>3</td><td>0</td><td>n/</td><td>N/A</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>0</td><td>0%</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>0 to 100</td><td>0.5 to 50%</td><td>Low</td></tr>
<tr><td></td><td>1</td><td>101 to 200</td><td>50.5 to 100%</td><td>High</td></tr>
<tr><td></td><td>1</td><td>201 to 255</td><td>100%</td><td>2 – Not Used</td></tr>
<tr><td></td><td>0xFF</td><td>N/A</td><td>N/A</td><td>Auto</td></tr>
<tr><td>4</td><td>0</td><td>n/</td><td>N/A</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>0</td><td>0%</td><td>Off – Not Used</td></tr>
<tr><td></td><td>1</td><td>1 to 200</td><td>0.5 to 100%</td><td>On (High)</td></tr>
<tr><td></td><td>1</td><td>201 to 255</td><td>100%</td><td>On – Not Used</td></tr>
<tr><td></td><td>0xFF</td><td>N/A</td><td>N/A</td><td>Auto</td></tr>
</table>
</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:
<table>
<tr><th>State</th><th>Value</th><th>Auxiliary Heat Operation</th></tr>
<tr><td>0</td><td>N/A</td><td>Disabled – Not Used</td></tr>
<tr><td>1</td><td>0 %</td><td>Disabled</td></tr>
<tr><td>1</td><td>1 to 99%</td><td>Partially Enabled – Not Used</td></tr>
<tr><td>1</td><td>100%</td><td>Enabled</td></tr>
<tr><td>0xFF</td><td>N/A</td><td>Enabled (invalid)</td></tr>
</table>
</td></tr>
</table>

Parameter	Variable Name	Function
Occupancy Command	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 controller. ➢ 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 controller may they be a local input or a PIR cover. ** OC_NUL command will release the controller 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 nviHeatCool 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>Remote Lockout</td><td>network input
SNVT_count
nviRemLockout</td><td>➢ This network variable input is used to enable or disable user access to controller
➢ Default Null Value: Level 0.
➢ Valid Range:
<table>
<tr><th>Level</th><th>Occupied Temperature Setpoints</th><th>System Mode Settings</th><th>Fan Mode Settings</th><th>Unoccupied Override</th></tr>
<tr><td>0</td><td>Yes access</td><td>Yes access</td><td>Yes access</td><td>Yes access</td></tr>
<tr><td>1</td><td>Yes access</td><td>Yes access</td><td>Yes access</td><td>No access</td></tr>
<tr><td>2</td><td>Yes access</td><td>No access</td><td>No access</td><td>Yes access</td></tr>
<tr><td>3</td><td>Yes access</td><td>No access</td><td>No access</td><td>No access</td></tr>
<tr><td>4</td><td>No access</td><td>No access</td><td>No access</td><td>Yes access</td></tr>
<tr><td>5</td><td>No access</td><td>No access</td><td>No access</td><td>No access</td></tr>
</table></td></tr>
<tr><td>Dehumidification Lockout</td><td>network input
SNVT_switch
nviDhumiLCK</td><td>➢ This network variable input is used to enable or disable dehumidification
➢ Default Null Value: Dehumidification not allowed
➢ Set value to 100% for both On & Off state
➢ Valid Range:
State =0 = Dehumidification not allowed (Controller’s default value)
State = 1 = Dehumidification allowed</td></tr>
<tr><td>Auxiliary Contact Remote Control</td><td>network input
SNVT_switch
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 (Controller’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 value of the input. ➢ Valid Range: 14 to 122°F (-10 to 50°C) ➢ The value 621.07°F (327.67°C or 0x7FFF) will be sent as an invalid value in case of a sensor failure.
Supply Temperature	network output SNVT_temp_p **nvoDischAirTemp**	➢ 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**	➢ This output network variable indicates the space humidity in percent. ➢ Valid Range: 0 to 100%. ➢ The value 0x7FFF = +163.835% will be set as an invalid value to indicate a humidity sensor failure.
Effective 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_AUTO 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**

<table>
<tr><th>Parameter</th><th>Variable Name</th><th colspan="4">Function</th></tr>
<tr><td rowspan="9">Unit Status network output</td><td rowspan="9">SNVT_hvac_status
nvoUnitStatus</td><td>Sub</td><td>Name</td><td colspan="2">Valid Value</td></tr>
<tr><td></td><td></td><td colspan="2">HVAC_FAN_ONLY – Not Used
HVAC_MAX_HEAT – Not Used</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">0-100%, 0x7FFF (Invalid)</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>Controller’s I/O status</td><td>network output UNVT_thermo_ state_fc
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 colspan="2"></td><td>Sub</td><td>Name</td><td>Valid value</td><td>True Bit Index</td></tr>
<tr><td colspan="2"></td><td>01</td><td>bi1 status</td><td>0 = activated
1 = not activated</td><td>2</td></tr>
<tr><td colspan="2"></td><td>02</td><td>bi2 status</td><td>0 = activated
1 = not activated</td><td>1</td></tr>
<tr><td colspan="2"></td><td>03</td><td>ui3 status</td><td>0 = activated
1 = not activated</td><td>0</td></tr>
<tr><td colspan="2"></td><td>04</td><td>dehumidification active</td><td>0 = Off
1 = On</td><td>7</td></tr>
<tr><td colspan="2"></td><td>05</td><td>state terminal bo1</td><td>0 = Off
1 = On</td><td>13</td></tr>
<tr><td colspan="2"></td><td>06</td><td>state terminal bo2</td><td>0 = Off
1 = On</td><td>12</td></tr>
<tr><td colspan="2"></td><td>07</td><td>state terminal bo3</td><td>0 = Off
1 = On</td><td>15</td></tr>
<tr><td colspan="2"></td><td>08</td><td>state terminal bo4</td><td>0 = Off
1 = On</td><td>14</td></tr>
<tr><td colspan="2"></td><td>09</td><td>state terminal bo5</td><td>0 = Off
1 = On</td><td>20</td></tr>
<tr><td colspan="2"></td><td>10</td><td>fan low</td><td>0 = Off
1 = On</td><td>21</td></tr>
<tr><td colspan="2"></td><td>11</td><td>fan med</td><td>0 = Off
1 = On</td><td>22</td></tr>
<tr><td colspan="2"></td><td>12</td><td>fan high</td><td>0 = Off
1 = On</td><td>23</td></tr>
<tr><td colspan="2"></td><td>13</td><td>window opened</td><td>0 = No alarm
1 = Alarm on</td><td>24</td></tr>
<tr><td colspan="2"></td><td>14</td><td>service alarm</td><td>0 = No alarm
1 = Alarm on</td><td>28</td></tr>
<tr><td colspan="2"></td><td>15</td><td>filter alarm</td><td>0 = No alarm
1 = Alarm on</td><td>29</td></tr>
<tr><td colspan="2"></td><td>16</td><td>local pir motion</td><td>0 = No motion
1 = Motion</td><td>39</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 Model Options</td><td>network input config

UNVT_cfg_2_fcu_zn
NciCfg2FcuZn</td><td>➢ This configuration property defines the space humidity 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>bi1 config</td><td>0 = None
1 = Rem NSB
2 = Motion NO
3 = Motion NC
4 = Window</td><td>0 = None</td></tr>
<tr><td>02</td><td>bi2 config</td><td>0 = None
1 = Door Dry
2 = Override
3 = Filter
4 = Service</td><td>0 = None</td></tr>
<tr><td>03</td><td>ui3 config</td><td>0 = None
1 = COC/NH
2 = COC/NC
3 = COS
4 = SS</td><td>0 = None</td></tr>
<tr><td>04</td><td>room humidity display</td><td>0 = Not active
1 = Active</td><td>0 = Not active</td></tr>
<tr><td>05</td><td>dehumidification setpoint</td><td>30 to 100% RH</td><td>50% RH</td></tr>
<tr><td>06</td><td>dehumidification hysterisys</td><td>2 to 20% RH</td><td>5% RH</td></tr>
<tr><td>07</td><td>dehumidification max cooling</td><td>20 to 100% RH</td><td>100% RH</td></tr>
<tr><td>08</td><td>calib room humidity sensor</td><td>-15 to +15% RH</td><td>0% RH</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Controller Common Configuration Parameters</td><td>network input config

UNVT_cfg_1_fcu_zn
nciCfg1FcuZn</td><td>➢ This configuration property defines the controller’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>password</td><td>0 to 1000</td><td>0</td></tr>
<tr><td>02</td><td>control type</td><td>0 = On/Off Control
1 = Floating Control</td><td>0 = On/Off Control</td></tr>
<tr><td>03</td><td>floating actuator time</td><td>0.5 to 9 minutes (0.5 increments)</td><td>1.5 minutes</td></tr>
<tr><td>04</td><td>cycles per hour</td><td>3, 4, 5, 6, 7 and 8 CPH</td><td>4 CPH</td></tr>
<tr><td>05</td><td>reverse or direct acting output</td><td>0 = Direct Acting (DA)
1 = Reverse Acting (RA)</td><td>0 = Direct Acting (DA)</td></tr>
<tr><td>06</td><td>temperature scale</td><td>0 = °C
1 = °F</td><td>°F</td></tr>
<tr><td>07</td><td>auto mode</td><td>0 = Not Active
1 = Active</td><td>1 = Active</td></tr>
<tr><td>08</td><td>temperature scale</td><td>0 = °C
1 = °F</td><td>°F</td></tr>
<tr><td>09</td><td>pipes number main out config</td><td>2 = 2 pipe
4 = 4 pipe</td><td>4 pipe</td></tr>
<tr><td>10</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>11</td><td>fan menu</td><td>0 = Low-Med-High
1 = Low-High
2 = Low-Med-High-Auto
3 = Low-High-Auto
4 = On-Auto</td><td>4 = On-Auto</td></tr>
<tr><td>12</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>13</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>14</td><td>calib room sensor</td><td>± 5°F (±2.5°C)</td><td>0°C</td></tr>
<tr><td>15</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>16</td><td>setpoint type</td><td>0 = Permanent
1 = Temporary</td><td>0</td></tr>
<tr><td>17</td><td>setpoint function</td><td>0 = Dual Setpoints
1 = Attached Setpoints</td><td>0 = Dual Setpoints</td></tr>
<tr><td>18</td><td>temporary occ time</td><td>0, 1, 2, 3, up to 24 hours</td><td>2 hours</td></tr>
</table></td></tr>
</table>

Parameter	Variable Name	Function			
Controller Common Configuration Parameters	network input config UNVT_cfg_1_fcu_zn **nciCfg1FcuZn**	➢ This configuration property defines the controller's common configuration parameters and their settings. ➢ Valid Range and Default values:			
		Sub	Name	Valid Range	Default value
		19	proportional band	3 to 10 F	3 F
		20	aux contact config	0 = Aux Contact used for reheat 1 = Aux NO with occupancy 2 = Aux NC with occupancy 3 = Aux NO with occupancy & Fan On 4 = Aux NC with occupancy & Fan On 5 = Remote control nviAuxOut	0
		21	reheat time base	0 = 15 minutes 1 = 10 seconds	0
		22	fan mode	0 = Low 1 = Med 2 = High 3 = Auto 4 = On	Depending on Fan Menu Selected
		23	auto fan	0 = Auto Speed 1 = Auto Speed and Auto Demand	0 = Auto Speed
		24	pir stand-by timer	0.5 to 24.0 Hours	0.5 Hours
		25	pir unoccupied timer	0.0 to 24.0 Hours	0.0 Hours

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Controller's model number</td><td>network input config UNVT_model_info_2 nciSccModel</td><td>➢ This configuration property defines model number and software version of the controller
➢ 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>Controller Model</td><td>60 = VT7200C
61 = VT7200F
41 = VT7300A
42 = VT7305A
43 = VT7350C
44 = VT7300C
45 = VT7355C
46 = VT7305C
47 = VT7350F
48 = VT7300F
49 = VT7355F
50 = VT7305F</td><td>Depend on model being used</td></tr>
<tr><td>02</td><td>Software Version</td><td>Unsigned short</td><td>Controller dependent</td></tr>
</table></td></tr>
<tr><td>HVAC Unit-Type Identifier</td><td>network input config SNVT_hvac_type nciHvacType</td><td>➢ This configuration property helps the user identify the type of equipment being monitored.
➢ Valid Range:
<table>
<tr><th>Sub</th><th>Identifier</th><th>Name</th></tr>
<tr><td>0</td><td>HVT_GENERIC – Not Used</td><td>Generic</td></tr>
<tr><td>1</td><td>HVT_FAN_COIL</td><td>Fan Coil</td></tr>
<tr><td>2</td><td>HVT_VAV – Not Used</td><td>Variable Air Volume Terminal</td></tr>
<tr><td>3</td><td>HVT_HEAT_PUMP– Not Used</td><td>Heat Pump</td></tr>
<tr><td>4</td><td>HVT_ROOFTOP – Not Used</td><td>Rooftop Unit</td></tr>
<tr><td>5</td><td>HVT_UNIT_VENT – Not Used</td><td>Unit Ventilator</td></tr>
<tr><td>6</td><td>HVT_CHIL_CEIL – Not Used</td><td>Chilled Ceiling</td></tr>
<tr><td>7</td><td>HVT_RADIATOR – Not Used</td><td>Radiator</td></tr>
<tr><td>8</td><td>HVT_AHU – Not Used</td><td>Air Handling Unit</td></tr>
<tr><td>9</td><td>HVT_SLF_CONT – Not Used</td><td>Self-Contained Unit</td></tr>
</table></td></tr>
<tr><td>Maximum Send Time</td><td>network input config SNVT_time_sec nciSendHrtBt</td><td>➢ 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)</td></tr>
<tr><td>Minimum Send Time</td><td>network input config SNVT_time_sec nciMinOutTm</td><td>➢ 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)</td></tr>
<tr><td>Minimum Receive Time</td><td>network input config SNVT_time_sec nciRcvHrtBt</td><td>➢ 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)</td></tr>
<tr><td>Hardware or Software revisions</td><td>network input config SCPT_maj_ver nciMajVer</td><td>➢ This configuration property defines the major module hardware and software revisions.
➢ Valid Range: 0 to 255</td></tr>
<tr><td>Hardware or Software revisions</td><td>network input config SCPT_min_ver nciMinVer</td><td>➢ This configuration property defines the minor module hardware and software revisions.
➢ Valid Range: 0 to 255</td></tr>
</table>

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

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

Integration – Global Commands

The following figure shows, which objects from the controller, can be monitored and commanded from the BAS front-end.

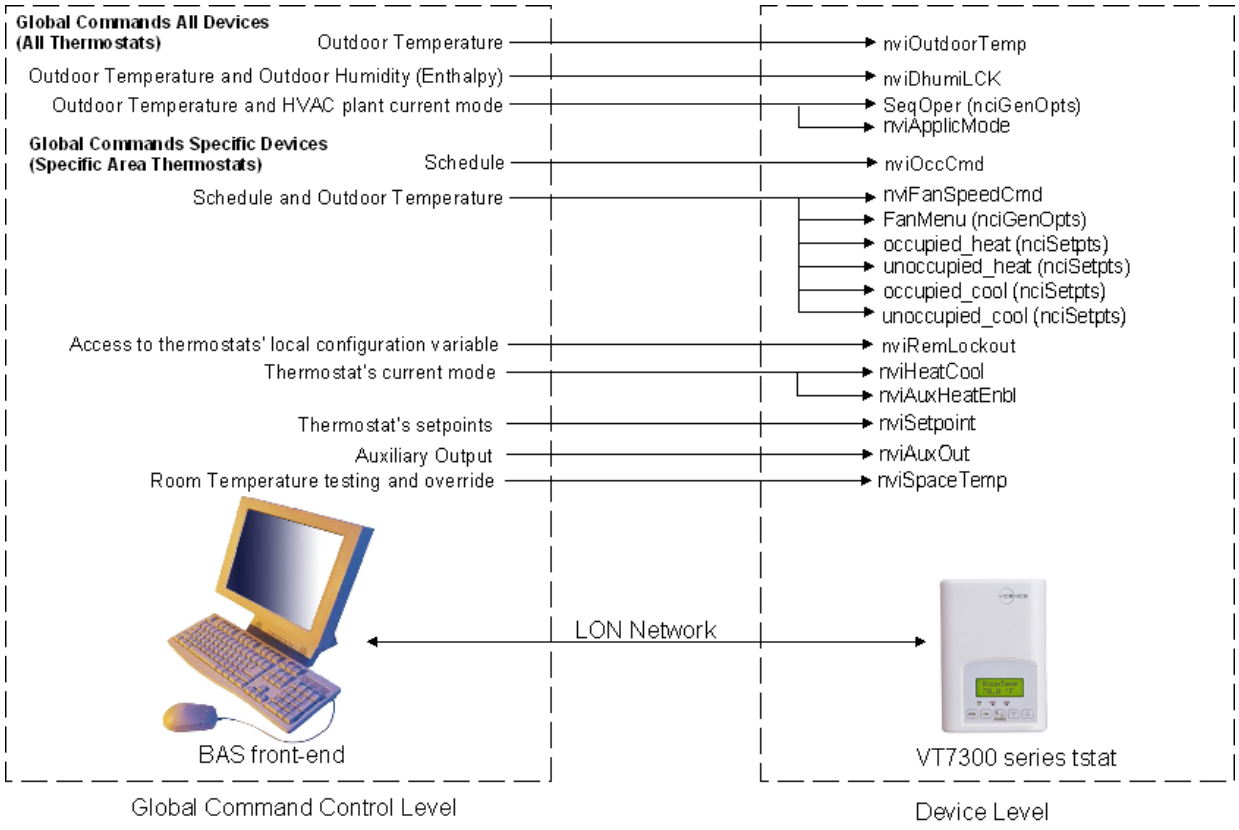
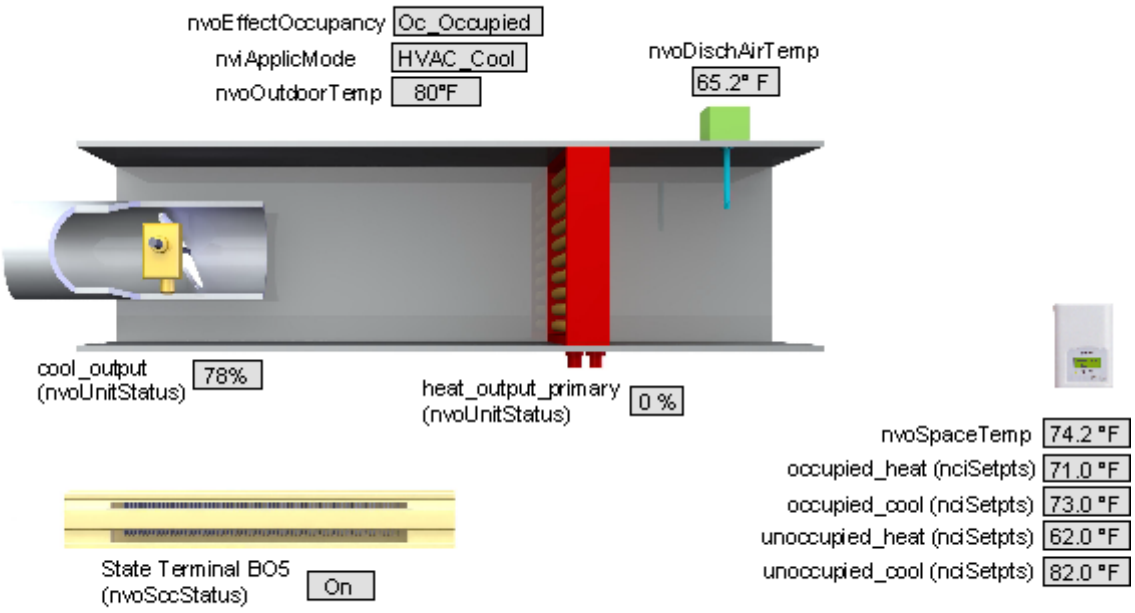


Figure 1: Global commands from a BAS front-end to a VT7300 series tstat

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)

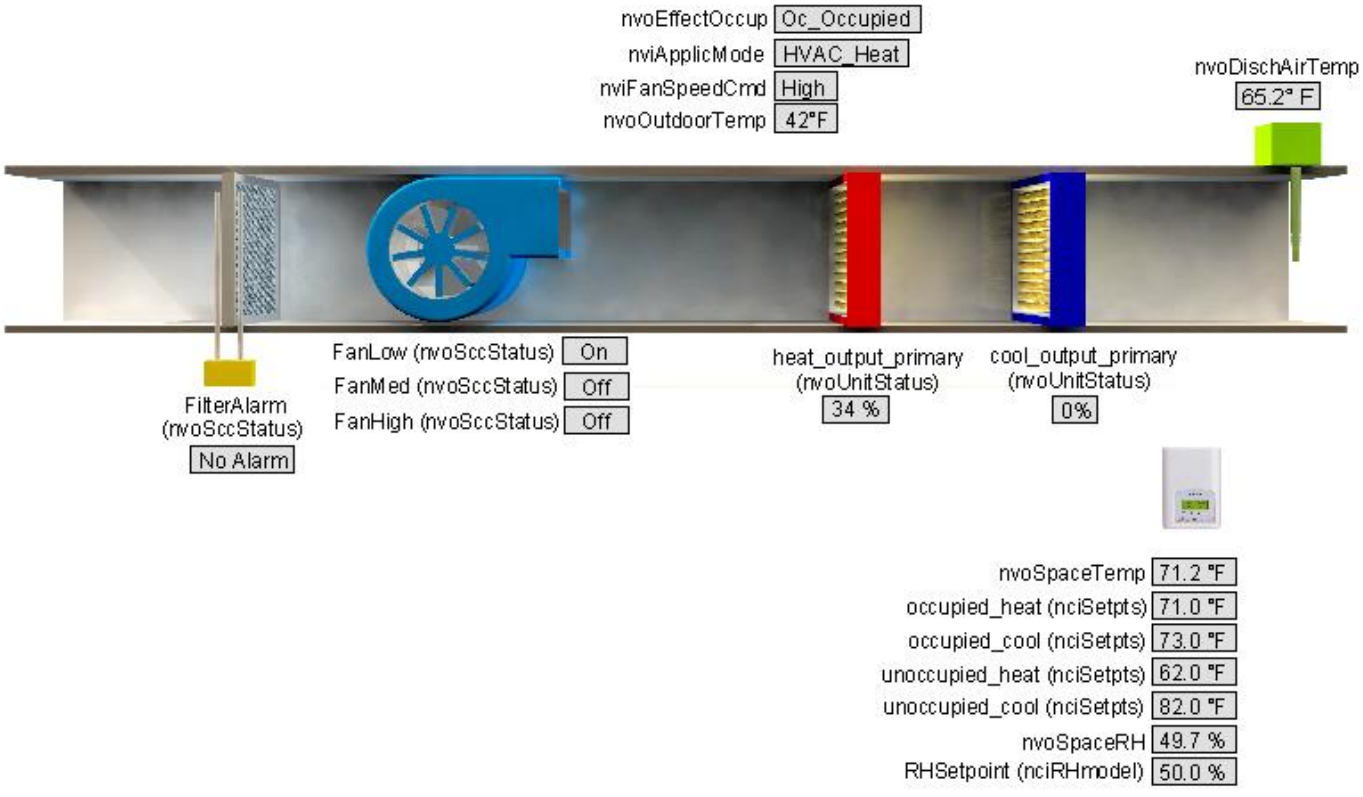


Graphical User Interface (GUI) example of a zoning controller

VT73xxX 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);
- nvoSpaceRH
- RHsetpoint (nciRHmodel);
- nvoOutdoorTemp
- nvoDischAirTemp
- nviOccManCmd
- nvoEffectOccup
- heat_output_primary (nvoUnitStatus)
- cool_output (nvoUnitStatus)
- ServiceAlarm (nvoSccStatus)
- FilterAlarm (nvoSccStatus)
- WindowOpened (nvoSccStatus)



Graphical User Interface (GUI) example of a Fan-Coil system

Configuration Property Objects

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

- nciCfg1FcuZn;
- nciCfg2FcuZn;
- 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

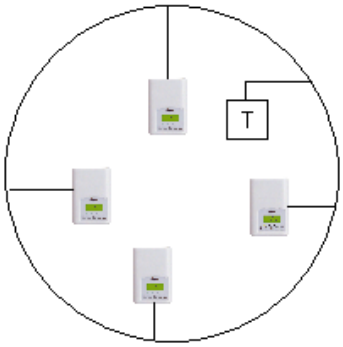
The Echelon network is designed to support free topology wiring and will accommodate bus, star, loop or any of these topologies. Echelon devices can be located at any point along the network wiring.

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



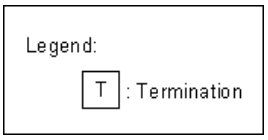


Figure 3.4 Loop Topology

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.

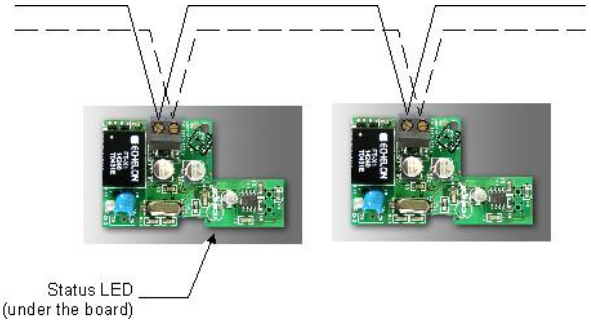


Figure 4: Network connections and location of the Status LED on a LON module

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 Un-configured
➢ Flashing at a rate of 1/2Hz	The device has an application loaded in its memory but is Un-configured. When a device is in the un-configured 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 controllers 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: LNS 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

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 VT7300 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

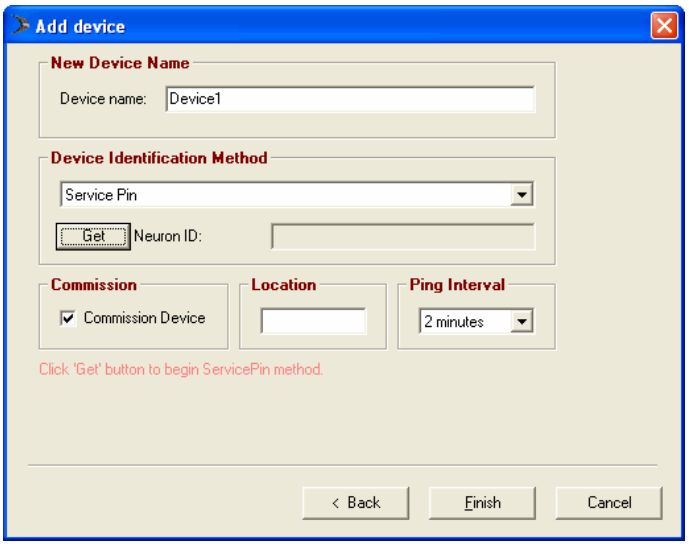


Figure 6: Service Pin request through a commissioning tool

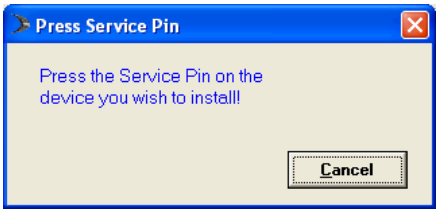


Figure 7: Service Pin request through a commissioning tool

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.

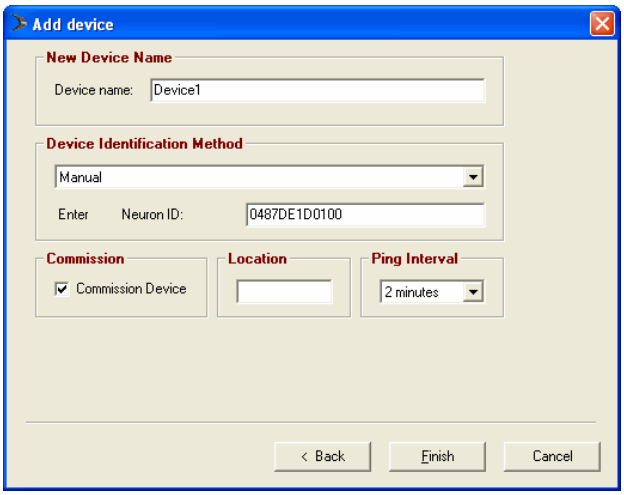


Figure 8: Manual Neuron ID request

Tips And Things You Need To Know

- In order to operate nviAuxOut (auxiliary output) from the network, Aux contact configuration (Auxcont nciGenOpt) needs to be set as “Network Controlled”;
- 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 15 for all the details;

Troubleshooting Section

Error / Trouble Condition	Possible Cause	Solution
Controller 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 EIA-485 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 controller does not have power	Apply power to the controller