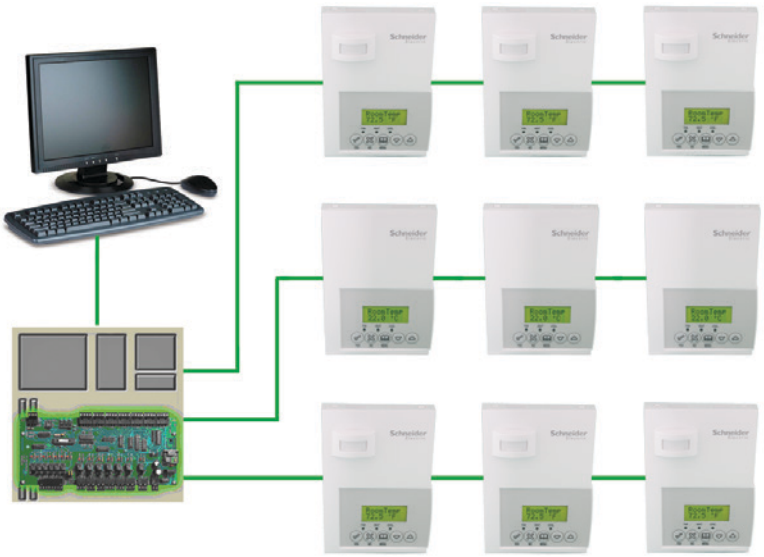
LonWorks® Integration Instructions

PIR Ready SE7600 Series Programmable
& Non-Programmable Controllers
for Commercial HVAC Applications



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Schneider Electric

SE7600 SERIES PRODUCT OVERVIEW

The SE7600 PI controller family is specifically designed for single stage and multi-stage control of heating/cooling equipment such as roof top and self-contained units. The product features an intuitive, menu-driven, back-lit LCD display, which walks users through the programming steps, making the process extremely simple. Accurate temperature control is achieved due to the product's PI time proportional control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based controllers.

SE7600 Series

All models contain two digital inputs, which can be set by the user to monitor filter status, activate a remote temporary occupancy switch, and/or used as a general purpose service indicator. In addition, depending on the model, up to three remote sensor inputs are available. All models contain a SPST auxiliary contact, which can be used to control lighting or disable the economizer function and a discharge-air sensor input. For more advanced applications, an economizer control logic has been integrated onto the controller for use with proportional damper economizer actuators.

The controllers also are compatible with the new Schneider Electric PIR cover accessories. Controllers equipped with a PIR cover provide advanced active occupancy logic, which will automatically switch occupancy levels from occupied to 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.

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 SE7600 PIR ready controllers.

Used on current released controller	APB / NXE / XIF file names	Revision Level	Associated PID
PIR Ready SE7600 Series	SE76_PIR.XIF	Rev 3.0	80:00:C5:55:00:04:04:21

This manual information is NOT to be used with the previously released SE7600 controllers.

Previously released controller	APB / NXE / XIF file names	Revision Level	Associated PID
Non-RoHS SE7600 Series	SE7600.XIF	Rev 2.0 to 2.5	80:00:C5:55:00:04:04:02
RoHS SE7600 Series	SE7600r.XIF	Rev 2.0 to 2.5	80:00:C5:55:00:04:04:12
Non-RoHS SE7600 Series	T7600.XIF	Rev 1.0	80:00:C5:55:00:04:04:0A

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CONTROLLER OBJECTS

SE7600 Space Comfort Controller Object Type #8500	
Mandatory Network Variables	
Network Variable INPUT	**Network Variable OUTPUT**
nviSpaceTemp SNVT_temp_p	nvoSpaceTemp SNVT_temp_p
	nvoUnitStatus SNVT_hvac_status
Optional Network Variables	
Network Variable INPUT	**Network Variable OUTPUT**
nviOccManCmd SNVT_occupancy	nvoEffectOccup SNVT_occupancy
nviApplicMode SNVT_hvac_mode	nvoDischAirTemp SNVT_temp_p
nviOutdoorTemp SNVT_temp_p	
nviSetpoint SNVT_temp_p	nvoEffectSetpt SNVT_temp_p
	nvoSetpoint SNVT_temp_p
Configuration Properties	
Send Heartbeat (mandatory) Temperature Setpoints (mandatory) Minimum Send Time (optional) Receive Heartbeat (optional)	
Manufacturer Network Variables	
Network Variable INPUT	**Network Variable OUTPUT**
nviTimeSet SNVT_time_stamp	nvoSccStatus SNVT_state_64
Manufacturer Configuration Properties	
Please see the manual for details. Plug-in for configuration provided.	

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SNVTS[1] AND SCPTS[2] TABLE PER MODEL

No	Sub	Point Name	Type	SE7656B5x45E	SE7605B5x45E	SE7652B5x45E	SE7600B5x45E	SE7652A5x45E	SE7600A5x45E	SE7652H5x45E	SE7600H5x45E
0		nviSpaceTemp	SNVT_temp_p	X	X	X	X	X	X	X	X
1		nviOutdoorTemp	SNVT_temp_p	X	X	X	X	X	X	X	X
2		nviOccManCmd	SNVT_occupancy	X	X	X	X	X	X	X	X
3		nviApplicMode	SNVT_hvac_mode	X	X	X	X	X	X	X	X
4		nviSetpoint	SNVT_temp_p	X	X	X	X	X	X	X	X
5		nviTimeSet	SNVT_time_stamp	X	N/A	X	N/A	X	N/A	X	N/A
6		nciDaySched[0]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
7		nciDaySched[1]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
8		nciDaySched[2]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
9		nciDaySched[3]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
10		nciDaySched[4]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
11		nciDaySched[5]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
12		nciDaySched[6]	UNVT_day_sched	X	N/A	X	N/A	X	N/A	X	N/A
13		nciSetPts	SNVT_temp_setpt	X	X	X	X	X	X	X	X
	1	occupied_cool		x	x	x	x	x	x	x	x
	3	unoccupied_cool		x	x	x	x	x	x	x	x
	4	occupied_heat		x	x	x	x	x	x	x	x
	6	unoccupied_heat		x	x	x	x	x	x	x	x
14		nciCfg1RtuHp	UNVT_cfg_1_rtu_hp	X	X	X	X	X	X	X	X
Associate with UNSE_cfg_1_rtu_hp format file											
	1	password	Unsigned-Long	x	x	x	x	x	x	x	x
	2	unoccupied_timer	Unsigned-Short	x	x	x	x	x	x	x	x
	3	anticycle	Unsigned-Short	x	x	x	x	x	x	x	x
	4	power_up_delay	Unsigned-Short	x	x	x	x	x	x	x	x
	5	temporary_occ_time	Unsigned-Short	x	x	x	x	x	x	x	x
	6	heating_stages_CPH	Unsigned-Short	x	x	x	x	x	x	x	x
	7	cooling_stages_CPH	Unsigned-Short	x	x	x	x	x	x	x	x
	8	heat_max_setpoint	SNVT_temp_p	x	x	x	x	x	x	x	x
	9	cool_min_setpoint	SNVT_temp_p	x	x	x	x	x	x	x	x
	10	OA_temp_heat_lockout	SNVT_temp_p	x	x	x	x	x	x	x	x
	11	OA_temp_cool_lockout	SNVT_temp_p	x	x	x	x	x	x	x	x
	12	calib_room_sensor	SNVT_temp_diff_p	x	x	x	x	x	x	x	x
	13	calib_outside_air_sensor	SNVT_temp_diff_p	x	x	x	x	x	x	x	x
	14	deadband	Unsigned-Short	x	x	x	x	x	x	x	x
	15	fan_mode	Enumeration Set Used: fan_mode_b-t	x	x	x	x	x	x	x	x
	16	fan_control	Enumeration Set Used: off_on_state_t	x	x	x	x	x	x	x	x
	17	fan_delay	Enumeration Set Used: off_on_state_t	x	x	x	x	x	x	x	x
	18	keypad_lockout	Enumeration Set Used: rem_lock_t	x	x	x	x	x	x	x	x
	19	proportional_band	Unsigned-Short	x	x	x	x	x	x	x	x
	20	temperature_units	Enumeration Set Used: temp_unit_t	x	x	x	x	x	x	x	x
	21	frost_protection	Enumeration Set Used: off_on_state_t	x	x	x	x	x	x	x	x
	22	menu_scroll	Enumeration Set Used: scroll_type_t	x	x	x	x	x	x	x	x

Notes

1: SNVTs: Standard Network Variables Types

2: SCPTs: Standard Configuration Parameters Types

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SNVTS AND SCPTS TABLE PER MODEL (CONT.)

No	Sub	Point Name	Type	SE7656B5x45E	SE7605B5x45E	SE7652B5x45E	SE7600B5x45E	SE7652A5x45E	SE7600A5x45E	SE7652H5x45E	SE7600H5x45E
15		nciCfg2RtuHp	UNVT_cfg_2_rtu_hp	X	X	X	X	N/A	N/A	X	X
Associate with UNSE_cfg_2_rtu_hp format file											
	1	di1_config	Enumeration Set Used: input_cfg_model_d_t	x	x	x	x	x	x	x	x
	2	di2_config	Enumeration Set Used: input_cfg_model_d_t	x	x	x	x	x	x	x	x
	3	aux_contact_config	Enumeration Set Used: aux_contact_cfg_t	x	x	x	x	x	x	x	x
	4	number_of_events	Enumeration Set Used: nb_of_events_t	x	N/A	x	N/A	x	N/A	x	N/A
	5	progresive_recovery	Enumeration Set Used: off_on_state_t	x	N/A	x	N/A	x	N/A	x	N/A
	6	a.hp_rev_valve_config	Enumeration Set Used: rev_valve_b_t	N/A	N/A	N/A	N/A	N/A	N/A	x	x
	7	a.number_of_heating_stages	Enumeration Set Used: nb_stages_t	x	x	x	x	N/A	N/A	N/A	N/A
	8	number_of_cool_or_hp_stages	Enumeration Set Used: nb_stages_t	x	x	x	x	N/A	N/A	x	x
	9	econo_min_position	SNVT_lev_percent	x	x	N/A	N/A	N/A	N/A	N/A	N/A
	10	b.hp_high_balance_point	SNVT_temp_p	N/A	N/A	N/A	N/A	N/A	N/A	x	X
	11	b.econo_changeover_setpoint	SNVT_temp_p	x	x	N/A	N/A	N/A	N/A	N/A	N/A
	12	c.hp_low_balance_point	SNVT_temp_p	N/A	N/A	N/A	N/A	N/A	N/A	x	x
	13	c.econo_mixed_air_setpoint	SNVT_temp_p	x	x	N/A	N/A	N/A	N/A	N/A	N/A
	14	d.hp_comfort_or_economy_mode	Enumeration Set Used: mode_t	N/A	N/A	N/A	N/A	N/A	N/A	x	x
	15	d.econo mechanical_cool_enable	Enumeration Set Used: off_on_state_t	x	x	N/A	N/A	N/A	N/A	N/A	N/A
	16	hp compressor_auxheat_interlock	Enumeration Set Used: off_on_state_t	N/A	N/A	N/A	N/A	N/A	N/A	x	x
16		nciHvacType	SNVT_hvac_type	X	X	X	X	X	X	X	X
17		nciSccModel	UNVT_model_numbe	X	X	X	X	X	X	X	X
	1	Controller Model		x	x	x	x	x	x	x	x
	2	Software Version		x	x	x	x	x	x	x	x
18		nvoSpaceTemp	SNVT_temp_p	X	X	X	X	X	X	X	X
19		nvoUnitStatus	SNVT_hvac_status	X	X	X	X	X	X	X	X
	1	mode		x	x	x	x	x	x	x	x
	2	heat_output_primary		x	x	x	x	x	x	x	x
	3	heat_output_secondary		N/A	N/A	N/A	N/A	N/A	N/A	x	x
	4	cool_output		x	x	x	x	x	x	x	x
	5	econo_output		x	x	N/A	N/A	N/A	N/A	N/A	N/A
	6	Fan_output		x	x	x	x	x	x	x	x
	7	in_alarm		x	x	x	x	x	x	x	x
20		nvoDischAirTemp	SNVT_temp_p	X	X	X	X	X	X	X	X
21		nvoEffectOccup	SNVT_occupancy	X	X	X	X	X	X	X	X

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SNVTS AND SCPTS TABLE PER MODEL (CONT.)

No	Sub	Point Name	Type	SE7656B5x45E	SE7605B5x45E	SE7652B5x45E	SE7600B5x45E	SE7652A5x45E	SE7600A5x45E	SE7652H5x45E	SE7600H5x45E
22		nvoSccStatus	UNVT_thermo_state_rtu UNVT_thermo_state_hp	X	X	X	X	X	X	X	X
For all non heatpump models, associate with UNVT_thermo_state_rtu											
	1	fan_output	True bit index 2	x	x	x	x	x	x	x	x
	2	cooling_stage_1	True bit index 3	x	x	x	x	x	x	x	x
	3	cooling_stage_2	True bit index 4	x	x	x	x	N/A	N/A	x	x
	4	auxiliary_contact	True bit index 5	x	x	x	x	x	x	x	x
	5	heating_stage_1	True bit index 6	x	x	x	x	x	x	x	x
	6	heating_stage_2	True bit index 7	x	x	x	x	x	x	x	x
	7	service_alarm	True bit index 12	x	x	x	x	x	x	x	x
	8	filter_alarm	True bit index 13	x	x	x	x	x	x	x	x
	9	di2_direct_status	True bit index 17	x	x	x	x	x	x	x	x
	10	di1_direct_status	True bit index 18	x	x	x	x	x	x	x	x
	11	set_clock_alarm	True bit index 22	x	N/A	x	N/A	x	N/A	x	N/A
	12	frost_protection_alarm	True bit index 23	x	x	x	x	x	x	x	x
	13	local_pir_motion	True bit index 24	x	x	x	x	x	x	x	x
	14	fan_lock_alarm	True bit index 25								
For all heatpump models, associate with UNSE_thermo_state_hp											
	1	fan_output	True bit index 2	x	x	x	x	x	x	x	x
	2	compressor_stage_1	True bit index 3	x	x	x	x	x	x	x	x
	3	compressor_stage_2	True bit index 4	x	x	x	x	N/A	N/A	x	x
	4	auxiliary_contact	True bit index 5	x	x	x	x	x	x	x	x
	5	heating_stage_1	True bit index 6	x	x	x	x	x	x	x	x
	6	reversing valve	True bit index 7	x	x	x	x	x	x	x	x
	7	service_alarm	True bit index 12	x	x	x	x	x	x	x	x
	8	filter_alarm	True bit index 13	x	x	x	x	x	x	x	x
	9	di2_direct_status	True bit index 17	x	x	x	x	x	x	x	x
	10	di1_direct_status	True bit index 18	x	x	x	x	x	x	x	x
	11	set_clock_alarm	True bit index 22	x	N/A	x	N/A	x	N/A	x	N/A
	12	frost_protection_alarm	True bit index 23	x	x	x	x	x	x	x	x
	13	local_pir_motion	True bit index 24	x	x	x	x	x	x	x	x
	14	fan_lock_alarm	True bit index 25								
23		nvoEffectSetpt	SNVT_temp_p	X	X	X	X	X	X	X	X
24		nvoSetpoint	SNVT_temp_p	X	X	X	X	X	X	X	X
25		nciSndHrtBt	SNVT_time_sec	X	X	X	X	X	X	X	X
26		nciMinOutTm	SNVT_time_sec	X	X	X	X	X	X	X	X
27		nciRcvHrtBt	SNVT_time_sec	X	X	X	X	X	X	X	X
28		nciMajVer	SCPT_maj_ver	X	X	X	X	X	X	X	X
29		nciMinVer	SCPT_min_ver	X	X	X	X	X	X	X	X
30		nciLocation	SNVT_str_asc	X	X	X	X	X	X	X	X

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INPUT NETWORK VARIABLES (NVIs) 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 or 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. If a valid value is present, it will be automatically displayed at the controller; the reading of the physical temperature sensor is ignored. Valid Range: –40 to 122°F (–40 to 50°C) Default Null (release) Value: 621.81°F (327.67°C or 0x7FFF)
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 manually control occupancy modes, or to override the scheduled occupancy. 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.

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INPUT NETWORK VARIABLES (NVIs) DESCRIPTION (CONT.)

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td rowspan="17">System Mode</td><td rowspan="17">network input
SNVT_hvac_mode
nviApplicMode</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.
Default Null Value: HVAC_AUTO.
This network variable is subject to the receive heartbeat time, nciRcvHrtBt
Valid Range:</td></tr>
<tr><td>0 = HVAC_AUTO</td></tr>
<tr><td>1 = HVAC_HEAT</td></tr>
<tr><td>2 = HVAC_MRNG_WRMUP – Not Used</td></tr>
<tr><td>3 = HVAC_COOL</td></tr>
<tr><td>4 = HVAC_NIGHT_PURGE – Not Used</td></tr>
<tr><td>5 = HVAC_PRE_COOL – Not Used</td></tr>
<tr><td>6 = HVAC_OFF</td></tr>
<tr><td>7 = HVAC_TEST – Not Used</td></tr>
<tr><td>8 = HVAC_EMERG_HEAT – Not Used</td></tr>
<tr><td>9 = HVAC_FAN_ONLY – Not Used</td></tr>
<tr><td>12 = HVAC_MAX_HEAT – Not Used</td></tr>
<tr><td>13 = HVAC_ECONOMY – Not Used</td></tr>
<tr><td>14 = HVAC_DEHUMID – Not Used)</td></tr>
<tr><td>15 = HVAC_CALIBRATE – Not Used)</td></tr>
<tr><td>0xFF = HVAC_NUL – Not Used</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 to be changed only via the network from a single analog value. (Note: the 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>Date and time</td><td>network input
SNVT_time_stamp
nviTimeSet</td><td>This input network variable is used to set the time and date of the Space Comfort Controller.
Default Null Value :
<table>
<tr><th>Sub</th><th>Name</th><th>Valid Range</th><th>Default Value</th></tr>
<tr><td>1</td><td>year</td><td>0 to 3000</td><td>0</td></tr>
<tr><td>2</td><td>month</td><td>0 to 12</td><td>0</td></tr>
<tr><td>3</td><td>day</td><td>0 to 31</td><td>0</td></tr>
<tr><td>4</td><td>hour</td><td>0 to 23</td><td>0</td></tr>
<tr><td>5</td><td>minute</td><td>0 to 59</td><td>0</td></tr>
<tr><td>6</td><td>second</td><td>0 to 59</td><td>0</td></tr>
</table></td></tr>
</table>

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OUTPUT NETWORK VARIABLES (NVOs) DESCRIPTION

All output network variables will be updated no faster than as set with the Minimum Send Time (nciMinOutTm) configuration value.

An output network variable will be transmitted immediately when its value has changed significantly. Additionally, this variable will be transmitted as a heartbeat output on a regular basis as dictated by the Maximum Send Time (nciSndHrtBt) configuration value.

<table>
<tr><th>Parameter</th><th>Variable Name</th><th colspan="3">Function</th></tr>
<tr><td>Room Temperature</td><td>network output
SNVT_temp_p
nvoSpaceTemp</td><td colspan="3">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: –40 to 122°F (–40 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.</td></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>Valid Value</td></tr>
<tr><td>01</td><td>mode</td><td>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</td></tr>
<tr><td>02</td><td>heat_output_primary</td><td>0-100%</td></tr>
<tr><td>03</td><td>heat_output_secondary</td><td>0-100%</td></tr>
<tr><td>04</td><td>cool_output:</td><td>0-100%</td></tr>
<tr><td>05</td><td>econ_output</td><td>0-100%</td></tr>
<tr><td>06</td><td>fan_output</td><td>0-100%</td></tr>
<tr><td>07</td><td>In_alarm</td><td>0 (No alarms)
1 (Alarm On)
0x7FF (Alarming disabled) – Not Used</td></tr>
<tr><td>Supply Temperature</td><td>network output
SNVT_temp_p
nvoDischAirTemp</td><td colspan="3">This output network variable is used to monitor the supply/discharge air temperature of the HVAC system.
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.</td></tr>
<tr><td rowspan="5">Effective Occupancy</td><td rowspan="5">network output
SNVT_occupancy
nvoEffectOccup</td><td colspan="3">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:</td></tr>
<tr><td colspan="3">0 = OC_OCCUPIED</td></tr>
<tr><td colspan="3">1 = OC_UNOCCUPIED</td></tr>
<tr><td colspan="3">2 = OC_BYPASS[1]</td></tr>
<tr><td colspan="3">3 = OC_STANDBY
Note: OC_BYPASS can be initiated by either nviOccManCmd or a local input. NvoEffectOccup will be in OC_BYPASS only for the duration of the ToccTime (nciGenOpts), until reinitiated by either a transition of the local input or an update to nviOccManCmd.</td></tr>
</table>

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OUTPUT NETWORK VARIABLES (NVOs) DESCRIPTION (CONT.)

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td rowspan="15">Controller's I/O status</td><td rowspan="15">network output
UNVT_thermo_state_rtu
UNVT_thermo_state_hp
nvoSccStatus</td><td>This network variable output is used to report the Space Comfort Controller inputs' and outputs' status.
<table>
<tr><th>Sub</th><th>Name</th><th>Valid value</th><th>True Bit Index</th></tr>
<tr><td>01</td><td>fan output</td><td>0 = Off
1 = On</td><td>2</td></tr>
<tr><td>02</td><td>cooling stage 1
compressor stage 1</td><td>0 = Off
1 = On</td><td>3</td></tr>
<tr><td>03</td><td>cooling stage 2
compressor stage 2</td><td>0 = Off
1 = On</td><td>4</td></tr>
<tr><td>04</td><td>auxiliary contact</td><td>0 = Off
1 = On</td><td>5</td></tr>
<tr><td>05</td><td>heating stage 1</td><td>0 = Off
1 = On</td><td>6</td></tr>
<tr><td>06</td><td>heating stage 2
reversing valve</td><td>0 = Off
1 = On</td><td>7</td></tr>
<tr><td>07</td><td>service alarm</td><td>0 = Off
1 = On</td><td>12</td></tr>
<tr><td>08</td><td>filter alarm</td><td>0 = Off
1 = On</td><td>13</td></tr>
<tr><td>09</td><td>di2 direct status</td><td>0 = Activated
1 = Not Activated</td><td>17</td></tr>
<tr><td>10</td><td>di1 direct status</td><td>0 = Activated
1 = Not Activated</td><td>18</td></tr>
<tr><td>11</td><td>set clock alarm</td><td>0 = Off
1 = On</td><td>22</td></tr>
<tr><td>12</td><td>frost protection alarm</td><td>0 = Off
1 = On</td><td>23</td></tr>
<tr><td>13</td><td>local pir motion</td><td>0 = Off
1 = On</td><td>24</td></tr>
<tr><td>14</td><td>fan lock alarm</td><td>0 = Off
1 = On</td><td>25</td></tr>
</table></td></tr>
<tr><td>Setpoint</td><td>network output
SNVT_temp_p
nvoEffectSetpt</td><td>This output network variable is used to monitor the effective temperature setpoint which may depend on nciSetpoints, nvoEffectOccup, nviSetpoint and any local setpoint adjustment. For example, if the occupancy state is unoccupied and the heat/cool state is heat, the effective setpoint would be equal to the unoccupied heating setpoint defined in nciSetpoints.
Valid Range: -40 to 100°F (-40 to 37.5°C)</td></tr>
<tr><td>Local setpoint output</td><td>network output
SNVT_temp_p
nvoSetPoint</td><td>This output network variable is used to monitor the space temperature setpoint.
Valid Range : 40°F to 100°F (4.5°C to 37.5°C)
The present value is derived by the following
OccHeat Setpoint + ((OccCool Setpoint – OccHeat Setpoint) / 2)</td></tr>
</table>

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CONFIGURATION PROPERTIES (NCIs) DESCRIPTION

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td>Schedule</td><td>network input config
UNVT_day_sched
nciDay_Sched[x]
x = 0 to 6</td><td>This configuration property defines the schedule for every day of the week (from Monday to Sunday or from day 0 to day 6). This nci is linked with the nvoEffectOccup variable.
2 or 4 events can entered depending on the nb_of_events variable.
Starting and ending time are entered in minutes, e.i. 11:59 pm is equal to 1439 minutes (23 hours * 60 min + 59 min)
Valid Range : 0 to 1439 minutes
Default values:
<table>
<tr><th>Sub</th><th>Name</th><th>Default Value</th></tr>
<tr><td>1</td><td>occupied_event_1</td><td>0</td></tr>
<tr><td>2</td><td>unoccupied_event_2</td><td>1439</td></tr>
<tr><td>3</td><td>occupied_event_3</td><td>0</td></tr>
<tr><td>4</td><td>unoccupied_event_4</td><td>1439</td></tr>
</table></td></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.
The stand-by setpoints can be modified but are not used by the controller, as it does not support Stand-By occupancy mode.
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>73.5°F (23°C)</td></tr>
<tr><td>02</td><td>standby_cool</td><td>Not used</td><td>Not used</td></tr>
<tr><td>03</td><td>unoccupied_ cool</td><td>54 to 100°F
(12 to 37.5°C)</td><td>82.5°F (28°C)</td></tr>
<tr><td>04</td><td>occupied_ heat</td><td>40 to 90°F
(4.5 to 32°C)</td><td>70°F (21°C)</td></tr>
<tr><td>05</td><td>standby_heat</td><td>Not used</td><td>Not used</td></tr>
<tr><td>06</td><td>unoccupied_ heat</td><td>40 to 90°F
(4.5 to 32°C)</td><td>61°F (16°C)</td></tr>
</table></td></tr>
</table>

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CONFIGURATION PROPERTIES (NCIs) DESCRIPTION (CONT.)

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></tr>
<tr><td rowspan="20">Controller's common configuration parameters network input config</td><td rowspan="20">UNVT_cfg_1_rtu_hp
nciCfg1RtuHpt</td><td>This configuration property defines the controller's common configuration parameters and their settings.
Valid Range and Default values:
<table>
<tr><th>Name</th><th>Valid Range</th><th>Default value</th></tr>
<tr><td>password</td><td>0 to 1045</td><td>0</td></tr>
<tr><td>unoccupied timer</td><td>0.5 to 24.0 hours</td><td>0.5</td></tr>
<tr><td>anticycle</td><td>0, 1, 2, 3, 4, or 5 minutes</td><td>2 minutes</td></tr>
<tr><td>power-up delay</td><td>10 to 120 sec.</td><td>10 sec.</td></tr>
<tr><td>temporary occ time</td><td>0, 1, 2, 3 to 12 hours</td><td>3 hours</td></tr>
<tr><td>heating stages cph</td><td>3, 4, 5, 6, 7 or 8 CPH</td><td>4 CPH</td></tr>
<tr><td>cooling stages cph</td><td>3 or 4 CPH</td><td>4 CPH</td></tr>
<tr><td>heat maximum setpoint</td><td>40 to 90°F (4.5 to 32°C)</td><td>90°F</td></tr>
<tr><td>cool minimum setpoint</td><td>54 to 100°F
(12 to 37.5°C)</td><td>54°F</td></tr>
<tr><td>oa temp heat lockout</td><td>-15 to 120°F
(-26 to 49°C)</td><td>120°F</td></tr>
<tr><td>oa temp cool lockout</td><td>-40 to 95°F
(-40 to 35°C)</td><td>-40°F</td></tr>
<tr><td>calib room sensor</td><td>±5°F (±2.5°C)</td><td>0°F</td></tr>
<tr><td>calib outdoor air sensor</td><td>±5°F (±2.5°C)</td><td>0°F</td></tr>
<tr><td>deadband</td><td>2 to 4°F with
1°F increments (1 to 2°C)</td><td>2°F</td></tr>
<tr><td>fan mode</td><td>0 = On
1 = Auto
2 = Smart</td><td>0 = On</td></tr>
<tr><td>fan control</td><td>0 = Off
1 = On</td><td>1 = On</td></tr>
<tr><td>fan delay</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td>keypad lockout</td><td>0 = No_Lockout
1 = Level_1
2 = Level_2</td><td>No_Lockout</td></tr>
<tr><td>proportional band</td><td>2 to 8 F</td><td>2 F</td></tr>
<tr><td>temperature units</td><td>0 = °C
1 = °F</td><td>°F</td></tr>
<tr><td>frost protection</td><td>0 = Off
1 = On</td><td>0 = Off</td></tr>
<tr><td>temperature scale</td><td>0 = °C
1 = °F</td><td>°F</td></tr>
</table>
</td></tr>
</table>

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CONFIGURATION PROPERTIES (NCIs) DESCRIPTION (CONT.)

Parameter	Variable Name	Function		
Controller's common configuration parameters network input config	UNVT_cfg_2_rtu_hp nciCfg2RtuHpt	This configuration property defines the controller's common configuration parameters and their settings. Valid Range and Default values:		
		Name	Valid Range	Default value
		di1 config	0 = None 1 = RemNSB 2 = RemOVR 3 = Filter 4 = Service	0 = None
		di2 config	0 = None 1 = RemNSB 2 = RemOVR 3 = Filter 4 = Service	0 = None
		aux contact config	0 = NORMALLY_ OPEN 1 = NORMALLY_ CLOSE	0
		number of events	2 or 4	2
		progressive recovery	0 = Off 1 = Active	0 = Off
		a.hp rev valve config	1 = Normally Heat 2 = Normally Cool	2
		a.number of heating stages	1 = 1 Stage 2 = 2 Stages	2
		number of cool or hp stages	1 = 1 Stage 2 = 2 Stages	2
		econo min position	0 to 100%	0%
		b.hp high balance point	34 to 90°F (1 to 32°C)	90°F
		b.econo changeover setpoint	14 to 70°F (-10 to 21°C)	55°F
		c.hp low balance point	-40 to 30°F (-40 to –1°C)	-12°F
		c.econo mixed air setpoint	50 to 90°F (10 to 32°C)	50°F
		d.hp comfort or economy mode	0 = Comfort 1 = Economy	0 = Comfort
		d.econo mechanical cool enable	0 = Off 1 = On	0 = Off
		hp compressor auxheat interlock	0 = Off 1 = On	0 = Off

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CONFIGURATION PROPERTIES (NCIs) DESCRIPTION (CONT.)

<table>
<tr><th>Parameter</th><th>Variable Name</th><th>Function</th></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>Value</th><th>Identifier</th><th>Name</th></tr>
<tr><td>0</td><td>HSE_GENERIC – Not Used</td><td>Generic</td></tr>
<tr><td>1</td><td>HSE_FAN_COIL</td><td>Fan Coil</td></tr>
<tr><td>2</td><td>HSE_VAV – Not Used</td><td>Variable Air Volume Terminal</td></tr>
<tr><td>3</td><td>HSE_HEAT_PUMP</td><td>Heat Pump</td></tr>
<tr><td>4</td><td>HSE_ROOFTOP</td><td>Rooftop Unit</td></tr>
<tr><td>5</td><td>HSE_UNIT_VENT – Not Used</td><td>Unit Ventilator</td></tr>
<tr><td>6</td><td>HSE_CHIL_CEIL – Not Used</td><td>Chilled Ceiling</td></tr>
<tr><td>7</td><td>HSE_RADIATOR – Not Used</td><td>Radiator</td></tr>
<tr><td>8</td><td>HSE_AHU – Not Used</td><td>Air Handling Unit</td></tr>
<tr><td>9</td><td>HSE_SLF_CONT – Not Used</td><td>Self-Contained Unit</td></tr>
</table></td></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>01 = SE7656B
02 = SE7652A
04 = SE7652H
06 = SE7652B
09 = SE7605B
10 = SE7600B
11 = SE7600A
12 = SE7600H</td><td>Depends 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>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>
</table>

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CONFIGURATION PROPERTIES (NCIs) DESCRIPTION (CONT.)

Parameter	Variable Name	Function
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
Location Label	network input config SNVT_str_asc nciLocation	This configuration property can optionally be used to provide more descriptive physical location information than can be provided by the Neuron Chip's 6 byte location string. The location relates to the object and not to the node. Valid Range: Any NULL terminated ASCII string of 31 bytes total length

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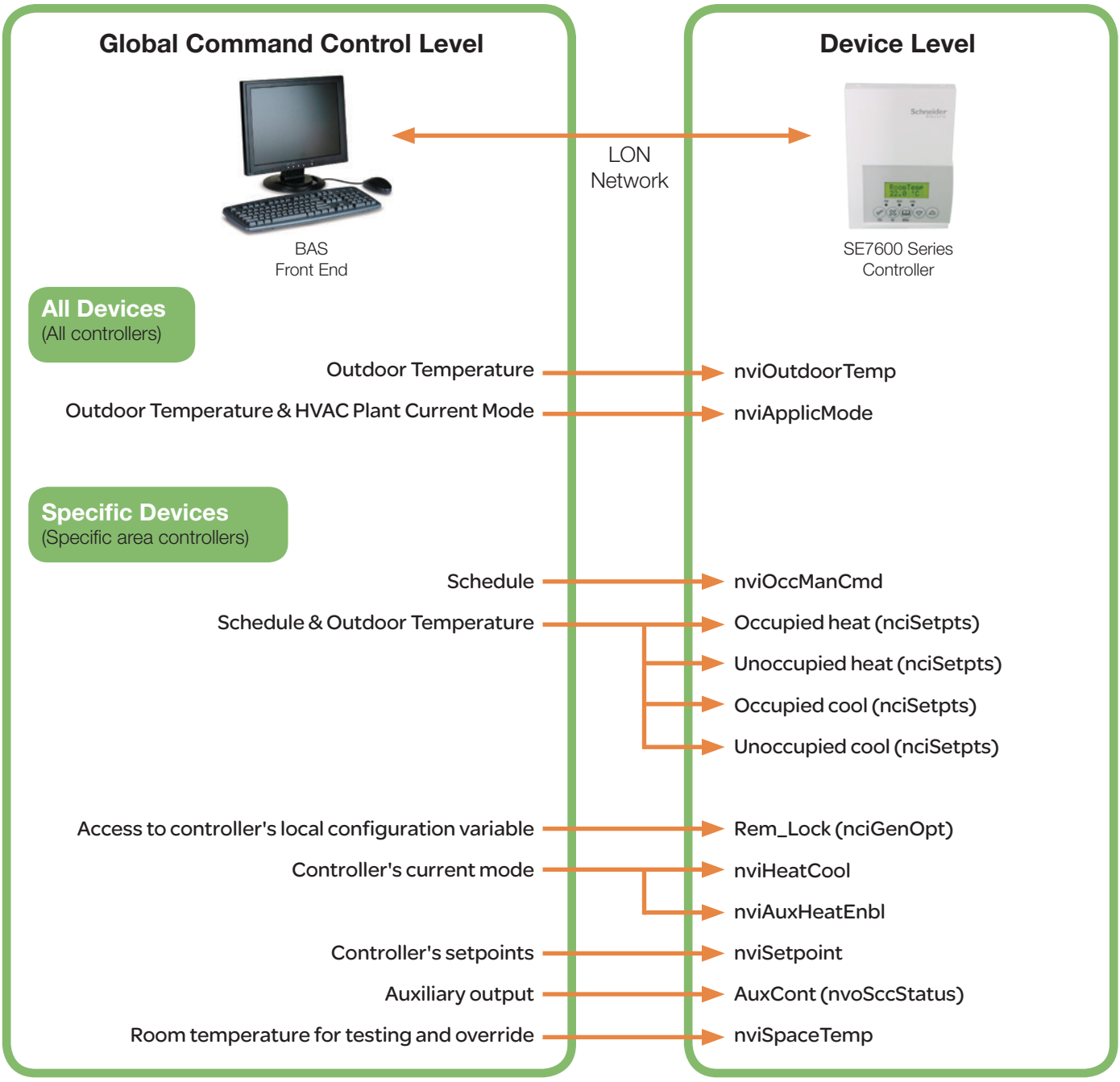
INTEGRATION – GLOBAL COMMANDS



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SE7600 INTEGRATION – GRAPHICAL USER INTERFACE (GUI) OBJECTS

Objects that should typically be used in a GUI:

- nvoSpaceTemp
- occupied_heat (nciSetpts)
- unoccupied_heat (nciSetpts)
- occupied_cool (nciSetpts)
- unoccupied_cool (nciSetpts)
- nvoDischAirTemp
- nvoEffectOccup
- heat_output_primary (nvoUnitStatus)
- cool_output (nvoUnitStatus)
- fan (nvoSccStatus)
- cool_1 (nvoSccStatus)
- cool_2 (nvoSccStatus)
- heat_1 (nvoSccStatus)
- heat_2 (nvoSccStatus)
- service_alarm (nvoSccStatus)
- filter_alarm (nvoSccStatus)
- d2_direct (nvoSccStatus)
- d1_direct (nvoSccStatus)
- frostpro_alarm (nvoSccStatus)
- econ_output (nvoUnitStatus)

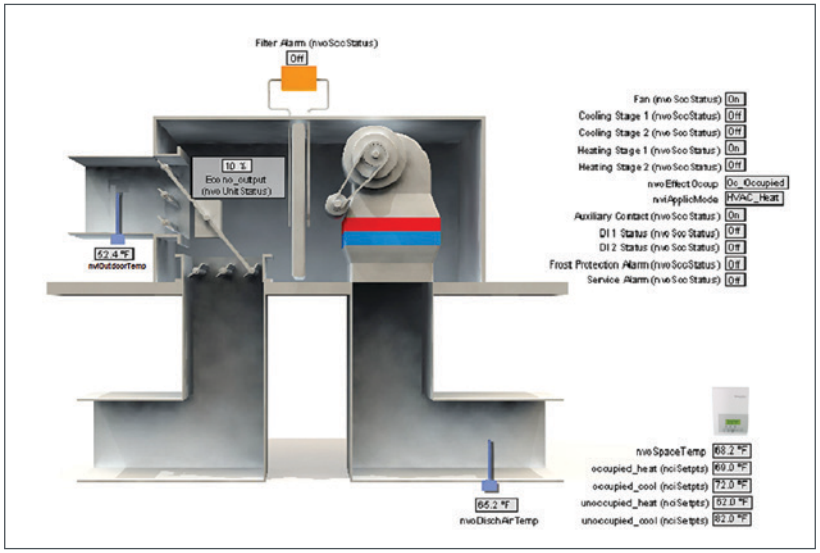

Figure-1 GUI Example - SE7600X

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CONFIGURATION PROPERTY OBJECTS

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

nciCfg1RtuHp	nviDaySchedule[2]
nciSetpoints	nviDaySchedule[3]
nciCfg2RtuHp	nviDaySchedule[4]
nviDaySchedule[0]	nviDaySchedule[5]
nviDaySchedule[1]	nviDaySchedule[6]

WIRING GUIDE

Overview

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

A summary of network specifications are listed below.

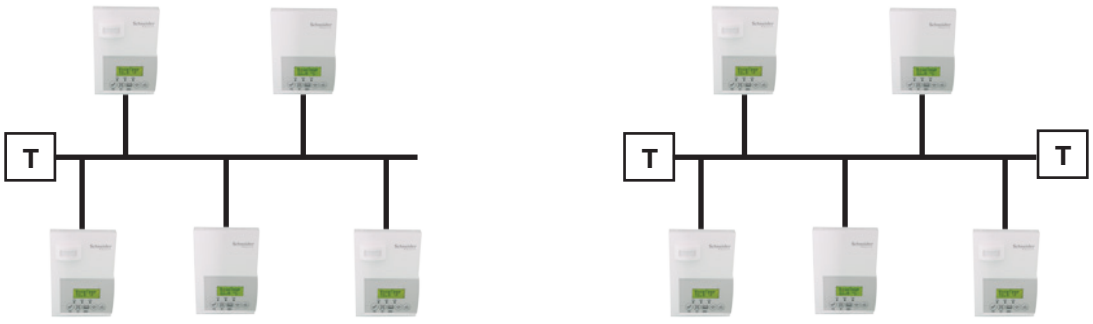
Table-1 Schneider Electric LON Network Specifications

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 networks 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.

Network Configuration

The Echelon® network is designed to support free topology wiring and will accommodate bus, star, loop, mixed or any of these topologies. Echelon® devices can be located at any point along the network wiring. Figures 3 and 4 present five network configurations. Actual termination will vary by application.



Singly-terminated Bus Configuration

Doubly-terminated Bus Configuration

Figure-3 Network Bus Configurations

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Network Configuration (cont.)

Star Configuration

Loop Configuration

Mixed Configuration

Figure-4 Network Star, Loopand Mixed Configurations

Maximum Number of Devices

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

Maximum Cable Length

The maximum length of a chain is related to its transmission speed. The longer the chain, the slower the speed will be. Using proper cable, Echelon® supports a baud rate of 78 kilobits per second for distances up to 1600 feet (500 m) in free topology and 8800 feet (2700 m) in bus topology with double terminations. If your maximum network length is more than 1600 feet (500 m) or 8800 ft (2700 m), 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. Repeaters 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, use a LonWorks® router instead of a repeater.

Terminators

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

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Terminators (cont.)

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 = 105 ±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 = 0.1 F, 10%, Metalized Polyester, 100V

Resistor = 470k ±5%, 1/4W

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-5 shows a network connection example and the location of the Status LED. This Status LED may help in troubleshooting network problems.

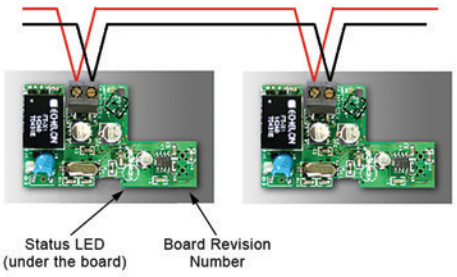

Figure-5 LON Network Module Details

Table-2 LON Module Diagnostic LED

Status LED Action	Explanation
Continuously ON	The Echelon® communication module has no valid application loaded in its memory.
Flashing at a rate of 1/2Hz	The Echelon® communication module has an application loaded in its memory but is not configured. When an Echelon® communication module is in the not configured state, the application is not running. This is the default state when the devices are shipped. A network management tool should be used to configure the module and integrate the device to a LonWorks® network.
Continuously OFF	The Echelon® communication module has an application loaded into its memory and the application is running.

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.

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SOFTWARE FILES (cont.)

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\Schneider-Electric. The name of the file is: SE7xxxReadme.txt

Plug-Ins File: LNS Plug-Ins simplifies start-up, maintenance, and configuration and reduces 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\Schneider Electric\SER76_PIR. The name of the file is: Readme.txt.
- All the latest software files can be downloaded from Schneider Electric's web site at www.Schneider-Electric.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 obtaining 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 SE7600 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.

Manual Identification

The Neuron ID of a device also can be entered manually through a commissioning or service tool. The 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.

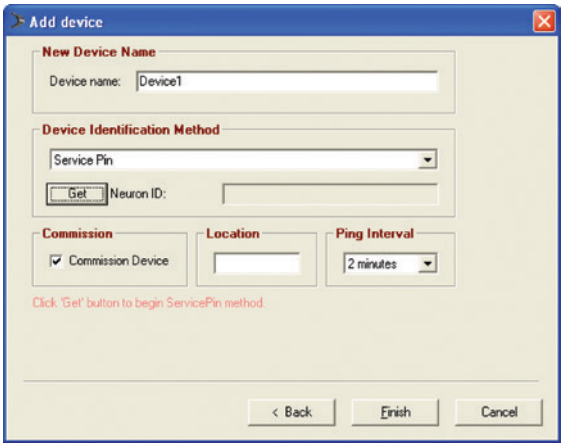

Figure-6 Service Pin Request Through a Commissioning Tool

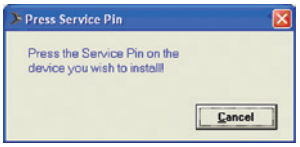

Figure-7 Press Service PIN Prompt

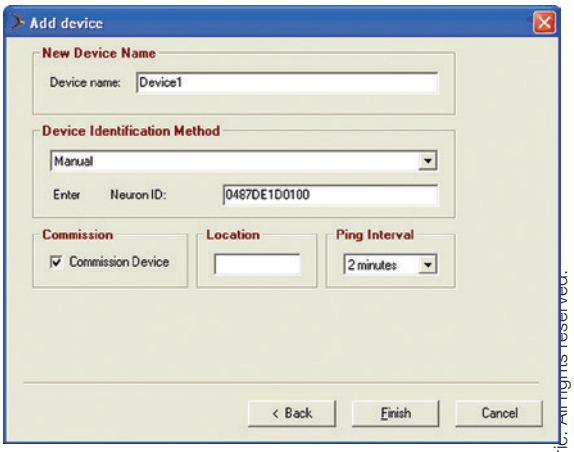

Figure-8 Maual Neuron ID Request

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TIPS AND THINGS YOU NEED TO KNOW

- To operate nviAuxOut (auxiliary output) from the network, Aux contact configuration (Auxcont nciGenOpt) must 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 heartbeat parameter of a Tridium front-end should be set at the slowest configuration possible so that nviTimeStamp updates correctly.
- With any LNS Tools, nviTimeStamp should be set to refresh everyday or on power-up.
- For nciMultOpt, Schneider Electric strongly recommends using either one of the following format files:

  For Roof Top models: UNVT_rt_opts#US or UNSE_rt_opts#SI

  For Heat Pump models: UNVT_hp_opts#US or UNSE_hp_opts#SI

TROUBLESHOOTING

Table-3 Troubleshooting

Error / Fault	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 must be installed as specified in this document.
	The LON cable runs are broken.	Locate the break and correct the wiring.
	The controller does not have power.	Apply power to the controller.

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