

# T7350 Commercial Programmable Thermostat

**SYSTEM ENGINEERING**

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# INTRODUCTION

## Device Description

The T7350H is a LONMARK® certified thermostat that provides networking capability in a LONWORKS® system using a transformer-coupled Free Topology Transceiver (FTT). See Fig. 1.

The T7350H communicates with many LONMARK® devices including the following:

- Other T7350H Communicating Commercial Thermostat devices.
- T7300F/Q7300H Commercial Thermostat/Communicating Subbase.
- Excel 15 S7760A Command Display.
- Excel 10 W7750A,B,C Constant Volume Air Handler Unit (CVAHU) Controller.
- Excel 15 W7760A, B, C Building & Plant Managers.
- Excel 10 W7751B, D, F, H, J Variable Air Volume Terminal Unit Controllers.
- Excel 10 W7752D, E, F, G Fan Coil Unit controllers.
- Excel 10 W7753A Unit Ventilator Controller.
- Excel 10 W7762A,B Hydronic Controllers.
- Excel 10 W7763C, D, E Chilled Ceiling Controllers.

## Control Application

The T7350H programmable communicating Thermostat controls commercial single zone heating, ventilating and air conditioning (HVAC) equipment through staged and modulating outputs. The T7350H consists of a two piece assembly with a thermostat cover and subbase. The thermostat cover includes the keypad and display for 7-day programming. Calendar programming is available through a direct connect PDA (Configuration Tool) or network (LONSPEC™ with model T7350H) tool configuration. The subbase includes equipment control, inputs and network connections. The subbase mounts on the wall and the thermostat cover mounts to the subbase. In addition, the T7350H model can communicate local sensor data, schedule information, master clock operations and accept configuration and override instructions to or from other devices/tools in a LONWORKS® network. Fig. 9 shows a typical T7350H application in a three-stage heat and two-stage cool heat pump system. For additional hookups, see Fig. 10 through 12.

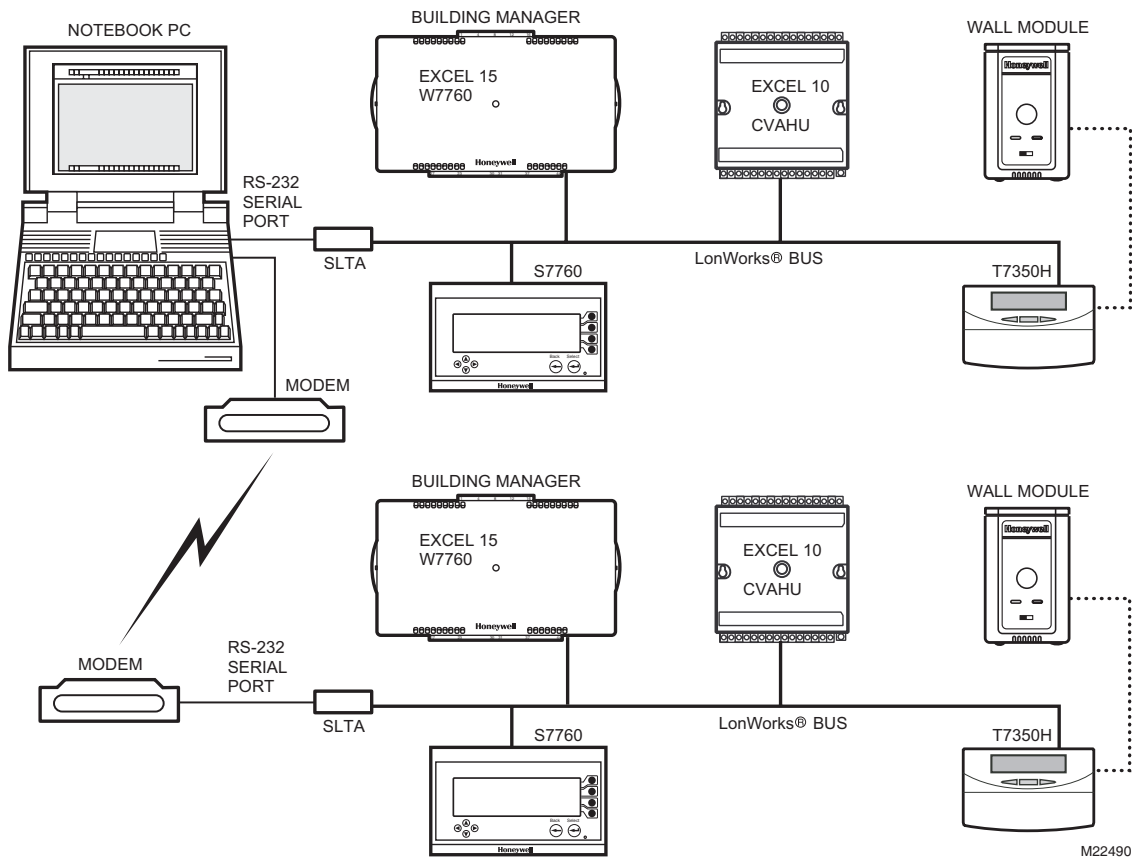


Fig. 1. Typical T7350H LONWORKS® network diagram.

## Network Control Provided

The T7350H communicates with other network devices, or nodes, for sharing data such as local inputs. Through the network, a Command Display (S7760) is used to view or modify T7350H operational modes including:

- Weekly Schedule.
- Holiday Schedule.
- Room Temperature SetPoints (Occupied, Unoccupied, Standby).
- Manual Occupancy Override.
- Temperature Setpoints.
- Update Time Clock.

Network connected Workstations and Configuration Tools are used to view and modify additional T7350 operational modes:

- Command Fan operating mode (On, Auto)
- Command Application mode (Auto, Off, Heating, Cooling)

By using network messaging, the T7350H may share the following local inputs with other T7350, T7300/Q7300, XL15 or XL10 network connected devices:

- Room Humidity and Temperature.
- Outdoor Air Temperature.
- Occupancy Sensor.
- Unoccupied Bypass User Input.

Network messaging also supports distribution of local user commands and operational states from a single T7350H. That is, network connected T7350H and XL10 devices can be configured to follow the local user commands and states from a single (master) T7350H. These local T7350 commands include the following:

- Application mode (Auto, Off, Heating, Cooling).
- Occupancy (Occupied, Unoccupied, Bypass, Standby).
- Bypass (unoccupied override).
- Setpoint.
- Time synchronization from a T7350H designated as network master clock.
- Master Time Scheduling of Occupied, Unoccupied and Standby states.

## MODELS

**Table 1. T7350 Communicating Thermostat Models.**

Model	Applications	Maximum Stages <sup>a</sup>		Features
		Heat	Cool	
T7350H1009	Conventional or Heat Pump	3 (2) <sup>b</sup>	3 (4) <sup>b</sup>	Humidity, Occupancy, Outdoor, Discharge Air Capability
T7350H1017	Modulating	2 modulating, 2 <sup>c</sup> relay		Humidity, Occupancy, Outdoor, Discharge Air Capability, 4-20 mA output (2-10 Vdc with 500 ohm resistor)

<sup>a</sup> All models are down-selectable and can be configured to control fewer stages than the maximum allowed.

<sup>b</sup> Heat pump applications for these models have a maximum of two heat stages and two cool stages.

<sup>c</sup> One extra stage (of either heat or cool) can be configured using the auxiliary relay.

## Products Covered

This System Engineering manual describes how to apply the T7350H Communicating Thermostat and related accessories to typical applications. Devices include:

- T7350H Commercial Communicating Thermostat.
- Excel 15 W7760A or B Building Manager.
- Excel 15 W7760C Plant Manager.
- Excel 10 Controllers including: W7750, W7751, W7752, W7753, W7762.

Other products:

- Q7760A Serial LonTalk<sup>®</sup> Adapter.
- Q7740A,B FTT Repeater.
- 209541B FTT Termination Module.

See Table 2 for additional products.

**Table 2. Additional Products.**

Part Number	Product Description	Comments
R8242A	Contactors, 24 Vac coil, DPDT.	
AT72D, AT88A ...	24vac Transformers.	
T7770A-D	Wall Modules	
T7771	Wall Module with active display.	
4074EYD	Wallplate for T7770 Wall Modules.	For covering an existing hole in a wall
AK3798	Single pair network cable, U.L. Type CMR	
AK3797	Single pair network cable plenum rated, U.L. Type CMP	
AK3799	Double pair network cable plenum rated, U.L. Type CMP	

## Applicable Literature

The following list of documents contains general information related to the T7350H Communicating Commercial Thermostats.

**Table 3. Applicable Literature**

Form No.	Title
63-1299	T7350 Commercial Programmable Thermostat Spec Data
62-0195	T7350 Commercial Programmable Thermostat Installation Instructions
63-2605	T7350 Commercial Programmable Thermostat Product Data
74-2976	Excel LONSPEC™ ZL7760A Specification Data
74-2937	Excel LONSPEC™ ZL7760A User's Guide
74-3123	Light Commercial Building Solution System Communication Guide
74-2697	T7770A, B, C, D, E, F, G Wall Module Specification Data
95-7538	T7770A, B, C, D, E, F, G Wall Module Installation Instructions
63-2617	T7771 Wall Module Product Data
74-2972	S7760A Command Display Specification Data.
74-2858	Q7740A,B FTT Repeater Specification Data.
95-7555	Q7740A,B FTT Repeater Installation Instructions.
74-2954	Q7760A SLTA-10 Serial LonTalk® Adapter Specification Data.
95-7511	Q7760A SLTA-10 Serial LonTalk® Adapter Installation Instructions.
95-7554	209541B Termination Module Installation Instructions

## ABBREVIATIONS AND DEFINITIONS

**Application**—A special use Building Control function.

**Binding**—The process of logically connecting network variables in one node to network variable(s) in other node(s). Binding is performed by a network management Tool (such as

LONSPEC™) that writes the binding information into the EEPROM memory of all the neuron's involved. The binding information is saved in the network image of each neuron.

**Building Manager**—A LONMARK® certified device that can be used to monitor and control HVAC equipment and other miscellaneous loads in a distributed network.

**Command Display**—A device that can be used to monitor data and change parameters of network connected devices.

**CVAHU**—Excel 10 Constant Volume Air Handler Unit Controller.

**Excel 10s**—A family of application - specific HVAC controllers such as the Excel 10 CVAHU and Excel 10 VAV.

**HVAC**—Heating, Ventilating and Air Conditioning.

**I/O**—Input/Output.

**LCBS**—Light Commercial Building Solution. These systems are configured with the LONSPEC™ network tool and monitored with a Workstation such as LonStation®. Many LCBS networks include the W7760B & C plant managers. Routers (including Q7751A) are not supported by the LCBS network configuration LONSPEC™ tool.

**LONSPEC™-ZL7760A**—A network connected tool which configures, commissions, calibrates and monitors the Honeywell Light Commercial Building Solution Q7300, T7350H, Excel 10 and Excel 15 family of controllers.

**LONSTATION™**—A low-cost, easy-to-use Light Commercial Building Solution workstation that provides advanced building control capabilities for small to medium-size buildings.

**LONWORKS® Network**—A data network based on neurons communicating with each other using the LonTalk® protocol.

**Mandatory Mechanisms/Objects/Network Variables**—Mandatory mechanisms and network variables that are implemented in all the Excel 10 devices.

**NamedObjects**—These objects are visible on the network as functional independent entities and are accessed by name. Typical examples of NamedObjects are Controllers, ControlLoops and LogicFunction blocks contained in devices such as the XL5a or XL15b.

**Network Management Node**—A LONWORKS® node that is responsible for configuring the network, installing the nodes, binding the network variables between nodes, and general network diagnostics.

**Network Variables**—A class of variables defined in Neuron C that allows communication over the LONWORKS® network to other nodes on the network. An output network variable in one node can be bound to a corresponding input network variable(s) in other node(s). Changing the value of the output network variable in one node causes the new value to be automatically communicated to the bound input network variable(s) in other node(s). When an input network variable is updated, a nv\_update\_occurs and the event is posted at the receiving node(s) so that the application program can take action based on the change. A network management node (for example XL15A or XL15C) that explicitly reads and/or writes the network variable can also poll network variables. Network variables can contain one data field (one or two bytes) or multiple data fields (a structure).

**Neuron**—Refers to the Echelon® semiconductor device which implements the LONWORKS® protocol on a network connected device such as the T7350H Honeywell controller.

**Node**—A device implementing layers one through six of the LonTalk® protocol including a Neuron® Chip, transceiver, memory, and support hardware.

**Notebook PC**—Portable personal computer.

**PDA**—Personal Digital Assistant. In the case of the T7350 product this is a hand held electronic device operating with the Palm OS. A Honeywell provided PDA application program is used to configure the T7350 thermostat using a direct RS232 connection. Before purchasing a PDA, check the latest Configuration software release note for a list of qualified PDA models. Network connected T7350H models can be configured without a PDA using LONSPEC™.

**Programmable Controller**—A controller that has a variable number of control loops of different types and is user programmed to execute an application. The user can select the number and type of control loops. The user also has the capability of generating new types of control loops. Some examples of Honeywell programmable controllers include the XL15A and XL15B.

**Recovery Mode or Recovery Period**—The time in unoccupied periods when the temperature control is adjusting the control setpoint so that the space temperature reaches the occupied setpoint when the schedule change occurs.

**RIO**—Excel 10 Remote Input/Output device.

**RTC**—Real Time Clock.

**Schedule**—The structure that defines the occupancy states and the time of the changes between these states. In the case of the T7350, schedules are organized around a eight day weekly structure including an extra day for designated holidays. Holidays are scheduled by yearly calendar events.

**SGPU**—Significant Event Notification and Guaranteed Periodic Update.

**SGPUC**—Significant Event Notification and Guaranteed Periodic Update with Change Field.

**SLTA**—Serial LonTalk® Adapter. Adapts the transformer coupled LonTalk® messages to the RS-232 Serial Port.

**SNVT**—Standard Network Variable Type.

**SCPT**—Standard Configuration Parameter Type.

**XL15A**—W7760A Honeywell building level controller.

**XL15B**—W7760B Honeywell building level controller.

**XL15C**—W7760C Honeywell plant level controller.

## Performance Specifications

### IMPORTANT

*The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit might not exactly match listed specifications. This product is tested and calibrated under closely controlled conditions; minor performance differences can be expected if those conditions are changed.*

**Models:** See Table 4.

**Dimensions:** See Fig. 2.

**Finish (color):** Trident White.

**Batteries:** No batteries required.

**Table 4. T7350 Thermostat Features.**

Model	Applications	Maximum Stages <sup>a</sup>		Features	Auxiliary Relay	LONWORKS® Capability?
		Heat	Cool			
T7350H1009	Conventional or Heat Pump	3 (2) <sup>b</sup>	3 (4) <sup>b</sup>	Humidity, Occupancy, Outdoor, Discharge Air Capability	Isolated Normally Open	Yes
T7350H1017	Modulating	2 modulating, 2 <sup>c</sup> relay		Humidity, Occupancy, Outdoor, Discharge Air Capability, 4-20 mA output (2-10 Vdc with 500 ohm resistor)		Yes

<sup>a</sup> All models are down-selectable and can be configured to control fewer stages than the maximum allowed.

<sup>b</sup> Heat pump applications for these models have a maximum of two heat stages and two cool stages.

<sup>c</sup> One extra stage (of either heat or cool) can be configured using the auxiliary relay.

**Mounting Means:**

Mounts on subbase.  
 Subbase Mounts On:  
 Wall: Using two 5/8 in. long #6-32 screws (included).  
 Outlet Box: Using sheet metal screws.

**Throttling Range for Modulating Outputs:**

Automatically adjusts based on heat/cool stages. Manually adjustable with PDA.

**Clock Accuracy (at 77°F [25°C]):** ±1 min./month (30 days).

**Minimum Stage Operation Time (fixed):**

Minimum On  
 Heat: 1 minutes.  
 Cool: 3 minutes.  
 Minimum Off (Cool and Heat Pump): 1 minute.

**Electrical Ratings:**

Power: 24 Vac, 50/60 Hz.; 20 to 30 Vac, 50/60 Hz.  
 Input:  
 Temperature: 20K ohms.  
 Humidity: 0-10 Vdc.  
 Outdoor: 3000 PTC.  
 Discharge Air: 20K ohms.  
 Occupancy Sensor: Dry contact switching 30 Vdc at 1 mA.  
 All Relay Outputs (at 30 Vac):  
 Running: 1.5A maximum.  
 Inrush: 7.5A maximum.  
 Modulating Output: 4 to 20 mA with 510 ohm maximum terminating resistance.  
 System Current Draw (without load):  
 5 VA maximum at 30 Vac, 50/60 Hz.

NOTE: Relays are N.O. Single-Pole, Single-Throw (SPST).

**Outdoor Sensor Wiring:** Requires 18 gauge wire.

**Humidity Ratings:** 5% to 90% RH, noncondensing.

**Emergency Heat Indication:**

Display indicates when Emergency Heat is activated (Em).

**Temperature:**

Ratings:  
 Operating Ambient: 30°F to 110°F (-1°C to 43°C).  
 Shipping: -30°F to +150°F (-34°C to +66°C).  
 Display Accuracy: ±1°F (±1°C).  
 Setpoint:  
 Range:  
 Heating: 40°F to 90°F (4°C to 32°C).  
 Cooling: 45°F to 99°F (7°C to 37°C).  
 Deadband: 2°F (1°C).  
 Default Settings: See Table 5.

**Loss of Power:** The thermostat maintains programmed times and temperatures for the life of the product. Clock and day information is retained for a minimum of 48 hours.

NOTE: To achieve the 48-hour power-loss clock retention, the T7350 must be powered for at least 5 minutes.

**Communicating Model T7350H:**

Connection Terminals for the LONWORKS® Bus.  
 Network jack for quick access by personal computer based tools.  
 Communications service-pin pushbutton to simplify startup.  
 LONMARK® Functional Profile: 8500\_20 Space Comfort Controller.  
 LONMARK® SCC Object Type: 8504 Rooftop See Fig. 3.  
 LONMARK® Program Identifier: 80:00:0C:55:04:03:04:2E.  
 LONMARK® Application Interoperability: version 3.3  
 Honeywell LONMARK® Plug-In file downloads:  
<http://plugin.ge51.honeywell.de/index.htm#>

**PDA System Requirements:**

Palm OS: 3.5.x to 5.2.1  
 Dynamic Heap: 256K bytes.  
 Free RAM Space: 1000K bytes.  
 Serial Communications: RS232.

**Approvals:**

European Community Mark (CE) Listed.  
 UL 873 Recognized, NEC Class 2.  
 FCC Part 15 subpart J Class A.  
 cUL.

**Table 5. Default Setpoints.**

Control	Occupied	Not Occupied	Standby
Heating	70°F (21°C)	55°F (13°C)	67°F (19°C)
Cooling	75°F (24°C)	85°F (29°C)	78°F (26°C)

**Accessories:**

Duct Discharge Air Sensors: C7041B (6 or 12 in.), C7041C (18 in.), C7041J (12 ft averaging), C7770A (8 in. probe).  
 Outdoor Air Sensors: C7089A, C7170A, C7031G2014 (weatherproof).  
 Temperature Sensors (Remote): C7772A, T7770A1006, T7770B1046, T7770C1044, T7770D1000, T7771.  
 Economizer Logic Modules: W6210, W6215, W7210, W7212, W7215, W7459.  
 Humidity Sensors: H7625A,B; H7635A,B,C, H7655B.  
 PDA Units: Palm™ V, M125, and i705 handhelds; TRGPro™ handheld; ZIRE™ 71 handheld; TUNGSTEN™ T handheld.  
 Others:  
 209541B FTT network termination module.  
 209651A Vertical Mounting Hardware Wallplate Adapter (Trident white).  
 50000083-001 Thermostat Interface Module (TIM).  
 50000452-001 Troubleshooting Cable.  
 AK3797 Single pair network cable plenum rated, U.L. Type CMP.  
 AK3798 Single pair network cable, U.L. Type CMR.  
 AK3799 Double pair network cable plenum rated, U.L. Type CMP.  
 Q7740A FTT network 2-way repeater.  
 Q7740B FTT network 4-way repeater.  
 TG511, TG512 Universal Versaguard™ Thermostat guards.

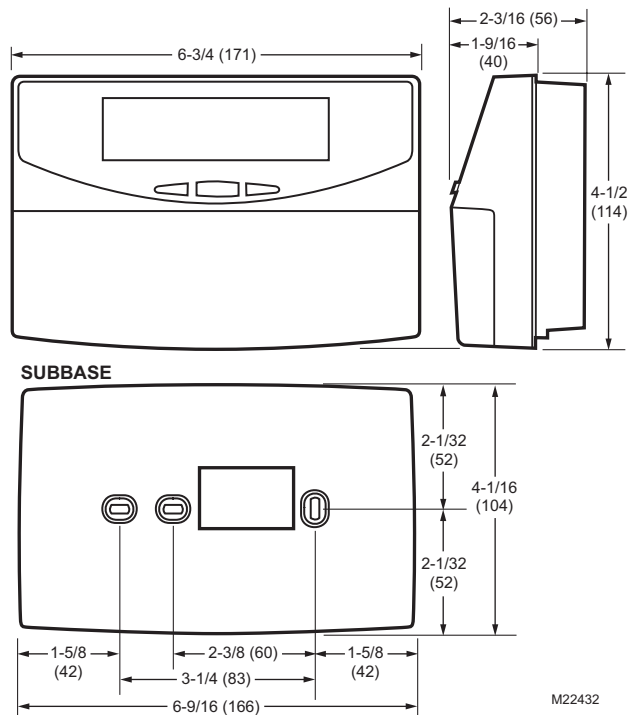


Fig. 2. Dimensions of thermostat and subbase in in. (mm).

## Communications

The T7350H provides networking capability in a LONWORKS<sup>®</sup> system using a Free Topology Transceiver (FTT) transformer-coupled communications port running at 78 kilobits per second (kbs). The transformer-coupled communications interface offers a much higher degree of common-mode noise rejection while ensuring dc isolation. LONWORKS<sup>®</sup> FTT networks are very flexible and convenient to install and maintain, but it is imperative that the network layout be carefully planned and accurate documentation created and maintained. This aids in compliance verification and future expansion of the network. It also minimizes unknown or inaccurate wire run lengths, node-to-node (device-to-device) distances, node counts, total wire length, inaccurate repeater/router locations, and misplaced or missing terminations. LONWORKS<sup>®</sup> networks can be configured in a variety of ways; refer to the E-Bus FTT Network Wiring Guidelines, form 74-2865, for a complete description of network topology rules and maximum network wire length. If longer runs are required, add a Q7740A 2-way or Q7740B 4-way repeater to extend the LONWORKS<sup>®</sup> Bus length. Q7751A routers are not supported on LCBS LONSPEC<sup>™</sup> configured systems. Approved cable types for LONWORKS<sup>®</sup> Bus communications wiring are Level IV, 22 AWG (0.34 sq mm) plenum or non-plenum rated unshielded, twisted pair, solid or stranded conductor wire. Refer to Table 2 for a list of Honeywell network cable part numbers. Other Echelon<sup>®</sup> approved cable may also be used. Run communications wiring in a conduit, if needed, with non-switched 24 Vac or sensor wiring. The Free Topology Transceiver (FTT) communications LONWORKS<sup>®</sup> Bus supports a polarity insensitive, free topology wiring scheme that, in turn, supports star, loop, and/or bus wiring.

# LONMARK® Functional Profile

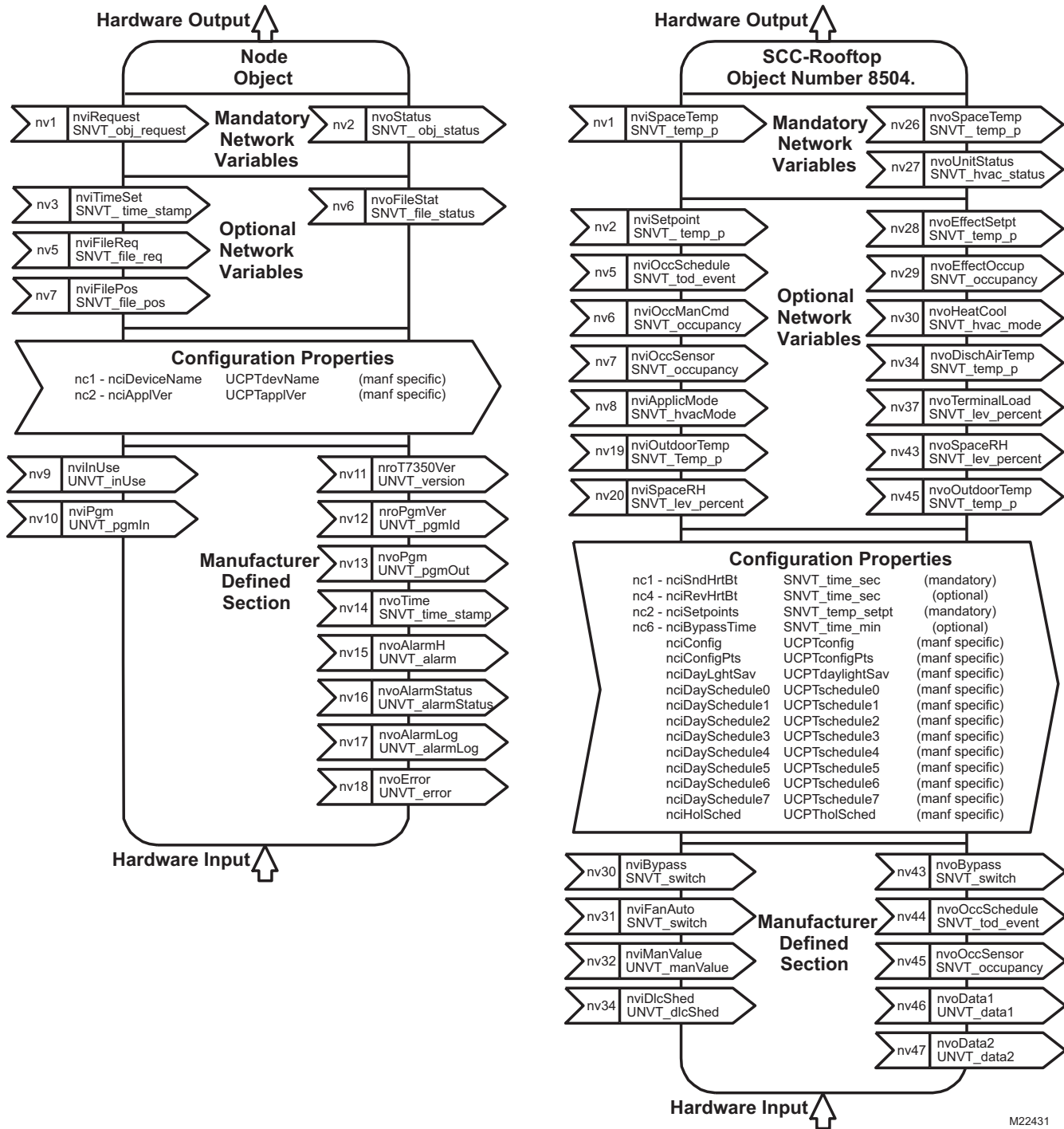


Fig. 3. T7350H LONMARK® Space Comfort Controller Rooftop Object (8504) with Node Object.



## NETWORK CONFIGURATIONS

The T7350H can be configured to perform a variety of activities in which data is sent to and/or received from other nodes on the LONWORKS® network. Information that can be shared with other network devices includes:

- Current year, month, day, hour, minute, second.
- System mode (HEAT, COOL, AUTO, OFF, EM HEAT).
- Current fan setting (ON, AUTO).
- Space temperature.
- Space relative humidity.
- Discharge air temperature.
- Outdoor air temperature.
- Occupancy sensor status.
- Terminal load.
- Current setpoint.
- Occupied/Unoccupied schedule commands.
- Current occupancy status.
- Occupancy schedule including current occupancy state, next state and time in minutes until next scheduled change of occupancy state.
- Relay status (heat/cool stages and fan).
- Alarm status.
- Alarm log including the last five alarms.
- Device Error status.
- Bypass state (multiple XL10 devices follow the bypass operation of a master device).

A network configuration tool is used to configure the T7350H Thermostats and other nodes with which the T7350H interacts. The following is a brief description of the configurable features that can be commanded over the network:

- **Time Master:**  
When a T7350H is designated as the network time master, the current time of day and date is synchronized across the network every minute. The LONSPEC™ T7350H General Screen can be used to configure a T7350H as the Network Time Master. Whenever the time of day or date of the time master is changed, it automatically adjusts all the other network devices (T7350H, Q7300 & XL15A) bound to the time master. When a T7350H is controlled by a time master, the local day light saving schedule is disabled. The Day Light Saving option on all time master recipients should be disabled. This prevents erroneous time changes (local daylight savings switchover) during temporary network outages.

Source	Destination
T7350H.nvoTime or XL15a.nvoTimeOut Q7300.nvoTime	T7350H.nviTimeSet or XL15a.nviTimeIn Q7300.nviTime

- **Time Schedule:**  
The occupancy schedule used by a T7350H may reside locally in that device or remotely in another schedule device (T7350H, XL15a, XL15b or T7300/Q7300). Local schedules can be created and modified using the T7350H keypad, a direct connected PDA, a network connected configuration tool (LONSPEC™) or Command Display. External schedules can also be modified using the keypad of the master schedule device, or with a network connected configuration tool or Workstation. When a T7350H receives scheduling information over the network,

the user is not prevented from making local schedule changes at the recipient thermostat. Local schedule changes (at a recipient device) have no effect on the scheduling commands received from the master device. When a T7350H is designated as a master schedule device, it sends its schedule information (current state, next state, time until next change of state) to the appropriate T7350H(s) which, in turn, overrides any existing internal time schedule. The T7350H Thermostat can provide master scheduling information to multiple Excel 10 devices. One T7350H shares the schedule information (current state, next state, time until next change of state) with the designated Excel 10 devices.

Source	Destination
T7350H.nvoOccSchedule or XL15a.nvoTodEventCmd[i] Q7300.nvoOccSchedulei	T7350H.nviOccSchedule or XL10.nviTodEvent XL15c.nviTodEventIn[i]

- **System Mode Settings:**  
System mode settings (HEAT, COOL, AUTO, OFF, EM HEAT) can be commanded by a remote T7350H or other compatible XL10 device. A one to many network binding can be used to command multiple devices from a single unit. In addition, a network connected Workstation can be used to change the System Mode.

Command Source	Command Destination
T7350H.nvoHeatCool or Workstation	T7350H.nviApplicMode

- **Fan Settings:**  
Fan settings (ON, AUTO) can be changed from a network connected Workstation.

Source	Destination
Workstation or Network Tool	T7350H.nviFanAuto

- **Outdoor Air Temperature Sharing:**  
If a valid outdoor air temperature value is received at the T7350H OAT network variable input, that value will be used in the T7350H. The local OAT sensor of the T7350H is ignored until the network sensor fails.

Source	Destination
T7350H.nviOutdoorTemp or XL10.nvoOdTemp XL15c.nvoOdTemp	T7350H.nvoOutdoorTemp or XL10.nviOdTemp XL15c.nviOdTemp

- **Discharge Air Temperature Sharing:**  
The discharge air temperature value can be shared with other devices on the network. Note that the T7350H does not accept a network discharge air temperature input.

Source	Destination
T7350H.nvoDischAirTemp	XL15c.nviDATemp

- **Space Temperature Sharing:**  
If a valid space temperature value is received at the T7350H Space Temperature network variable input, that

value will be used in the T7350H as the primary controlled variable. The local space temperature sensor of the T7350H is ignored until the network sensor fails.

Source	Destination
T7350H.nvoSpaceTemp or XL10.nvoSpaceTemp	T7350H.nviSpaceTemp

- **Space Humidity Sharing:**  
If a valid humidity value is received at the T7350H Space Humidity network variable input, that value will be used in the T7350H as the humidity control variable. The local space humidity sensor of the T7350H is ignored until the network sensor fails.

Source	Destination
T7350H.nvoSpaceRH	T7350H.nviSpaceRH or XL15c.nviRARH

- **Current Setpoint Sharing:**  
If a valid setpoint value is received at T7350H nviSetpoint, that value will be used by the T7350H as the center setpoint. The heat and cool setpoints are then calculated from this value and are used in the T7350H as the occupied setpoints. During unoccupied periods, nviSetpoint is ignored.

Source	Destination
T7350H.nvoEffectSetpt or XL10.nvoEffectSetpt	T7350H.nviSetpoint

- **Occupancy Sensor Sharing:**  
If a valid value is received at the T7350H occupancy sensor network variable input, that value will be used in the T7350H as the occupancy sensor. The local T7350H occupancy sensor is ignored until the network sensor fails.

Source	Destination
T7350H.nvoOccSensor or XL10.nvoSensorOcc NetworkSensor	T7350H.nviOccSensor

NOTE: The occupancy or motion sensor is active whenever the device is scheduled "Occupied" and a remote or network occupancy sensor is configured.

The T7350H effective occupancy is determined in Table 6.

**Table 6. T7350H Effective Occupancy.**

Schedule Occupancy	Occupancy/Motion Sensor Contact	Effective Occupancy
Occupied	Open	Standby
Occupied	Closed	Occupied
Standby	NA	Standby
Unoccupied	NA	Unoccupied

- **Occupancy Bypass:**  
Any internal or external scheduled unoccupied state in the T7350H is overridden by a network occupancy bypass command. Bypass is a method to command unoccupied override over the network from another controller (typically a T7350H or XL10). The source controller manages the bypass timing.

Source	Destination
T7350H.nvoBypass or XL10.nvoBypass XL15a.nvoBypass[i] XL15c.nvoBypass[i]	T7350H.nviBypass

- **Manual occupancy:**  
Provides a method to command the occupancy state from a network workstation. Effective occupancy override works on a "last in wins" basis. That is, the last occupancy override command received from any source determines the override state. The workstation can command occupied, unoccupied, standby, bypass, or not active (null). There are several ways to return the device to normal schedule operation.
  1. Power failure reset at the T7350H.
  2. Workstation issues a "not active" (null) network command to T7350H.nviOccManCmd.
  3. User activates "Temporary Occupied" button on the local keyboard. This can be followed by a "Run Schedule" local command.
  4. If manual occupancy is commanded to bypass and the bypass timer times out.

Source	Destination
Workstation Command Display XL15b	T7350H.nviOccManCmd

## APPLICATION STEPS

### Overview

The application steps shown in Table 7 are guidelines for configuring the T7350H in a LONWORKS® Bus network and explain the network role of the T7350H.

**Table 7. Application Steps.**

Step	Description
1	Plan the system.
2	Determine required network devices.
3	Lay out communications and power wiring.
4	Prepare wiring diagrams.
5	Order equipment.
6	Configure T7350.
7	Troubleshooting.

Refer to the Light Commercial Building Solution System Communication Guide form 71-3123 and the E-Bus Wiring Guidelines, form 74-2865 for a complete description of network topology rules. Prepare Wiring Diagrams, for wiring details. Plan to configure each controller. Refer to the Excel LONSPEC™ User Guide, form 74-2937, to configure the T7350H, XL15 and XL10 Controllers.

### Step 1. Plan the System

Plan the use of the T7350H Thermostat according to the job requirements. Determine the location and functionality of each device. Verify the sales estimate for the number of other controllers and devices required. Check the number and type of other required accessories. When planning the system layout, consider potential expansion possibilities for future growth. Planning is very important if HVAC systems and controllers are to be added in future projects.

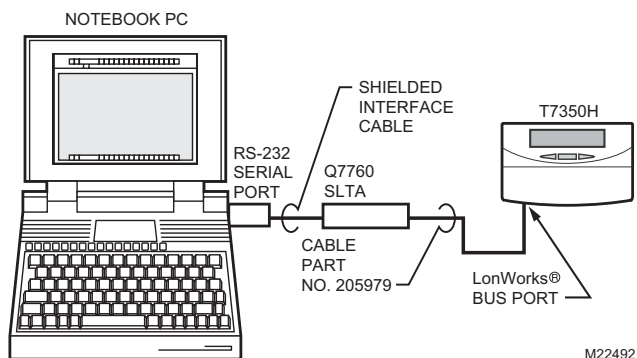


Fig. 4. Connecting personal computer to LonWorks® bus.

### Step 2. Determine Required Network Devices

A maximum of 60 nodes can communicate on a single LONWORKS® Bus segment. Each LONWORKS® Bus device comprises one node. If more than 60 nodes are needed, a Q7751A Router or Q7740 Repeater is necessary. A router or repeater allows up to 120 controller nodes per network, divided between two LONWORKS® Bus segments. Please note that routers are not supported by the LCBS LONSPEC™ system configuration tool. Refer to the Light Commercial Building Solution System Communication Guide form 71-3123 for LCBS details. Refer to the E-Bus Wiring Guidelines, form 74-2865, for a complete description of network topology rules and maximum wire lengths. A 209541B Termination Module may be required. Refer to the Excel 10 FTT Termination Module Installation Instructions form, 95-7554.

### Step 3. Layout Communications and Power Wiring:

#### LONWORKS® Bus Layout

The communications LONWORKS® Bus, is a 78-kilobit network that uses transformer isolation and differential Manchester encoding. The Free Topology Transceiver (FTT) LONWORKS® communications Bus supports a polarity insensitive, free topology wiring scheme, refer to the E-Bus Wiring Guidelines form, 74-2865, for a complete description of LONWORKS® network topology rules. Fig. 5 shows T7350H devices connected in a typical free topology LONWORKS® network.

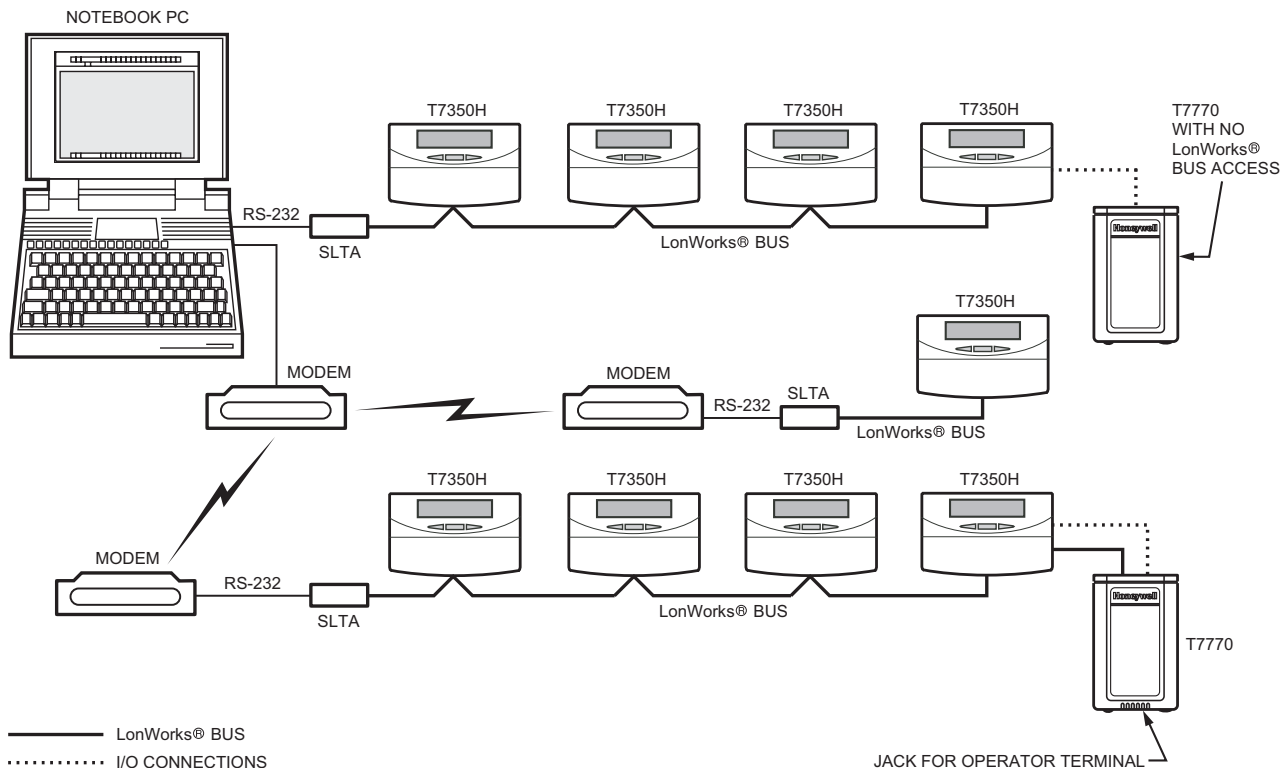


Fig. 5. Typical topology for T7350 devices in LONWORKS® network.

## Cable Termination

The FTT network segment requires termination for proper data transmission performance. Use a 209541B Termination Module to connect two of the three termination module wires to the LONWORKS® Bus terminals. Refer to LONWORKS® Bus Wiring Guidelines form 74-2865 for details.

## Singly Terminated Network Segment

In a singly terminated topology segment, only one termination is required and can be placed anywhere on the segment. Singly terminated segments use the yellow and brown wires. If the network topology requires a singly terminated termination module at a T7350H, connect the singly terminated module wiring on the appropriate terminals as shown in Fig. 6.

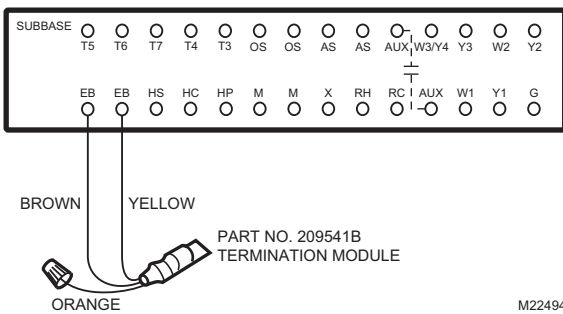


Fig. 6. Singly terminated LonWorks® bus termination module.

## Doubly Terminated Daisy-Chain Network Segment

In a doubly terminated daisy-chained topology segment, two terminations are required, one at each end of the topology segment. Doubly terminated segments use the orange and brown wires. If the network topology requires a doubly terminated module at a T7350H (T7350H is the first or last device on the network cable) connect the termination module wiring on the appropriate terminals as shown in Fig. 7. For additional wiring information, refer to the E-Bus Wiring Guidelines, form 74-2865, and the Excel 10 FTT Termination Module Installation Instructions, form 95-7554.

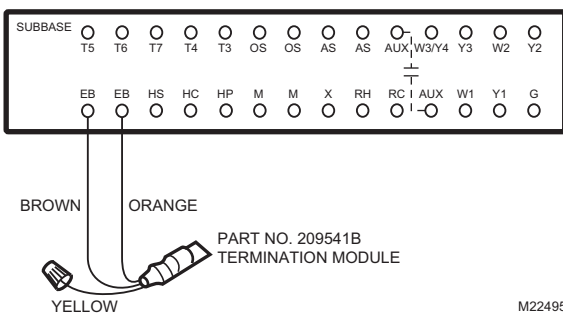


Fig. 7. Doubly terminated LonWorks® bus termination modules.

## CAUTION

**Electrical Shock or Equipment Damage Hazard.**  
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.

## IMPORTANT

All wiring must agree with applicable codes, ordinances and regulations.

1. Loosen subbase terminal screws and connect system wires.

NOTE: Maximum (and recommended) wire size is 18-gauge. Do not use wire smaller than 22-gauge. Follow equipment manufacturer wiring instructions when available. Refer to the Wiring Diagram section for typical hookups. A letter code is located near each terminal for identification. Refer to the Specifications section, Tables 8 and 9 for terminal designations.

2. Securely tighten each terminal screw.
3. Push excess wire back into the hole in the wall.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.

## Wiring Details

LONWORKS® network cable should be wired separately from the power and I/O wires when installing T7350H models. If this is not possible, use a minimum of 4 in. (102 mm) separation between split ferrite cores (Fair-Rite 0443164151, www.fair-rite.com) to ensure compliance with Class B limits (does not apply to Class A limits). See Fig. 8 to apply ferrite cores to LONWORKS® Bus input and output.

## Step 4. Prepare Wiring Diagrams

Fig. 9 through 12 show T7350 terminal arrangements and provide detailed wiring diagrams. Reference these diagrams to prepare the site-specific job drawings.

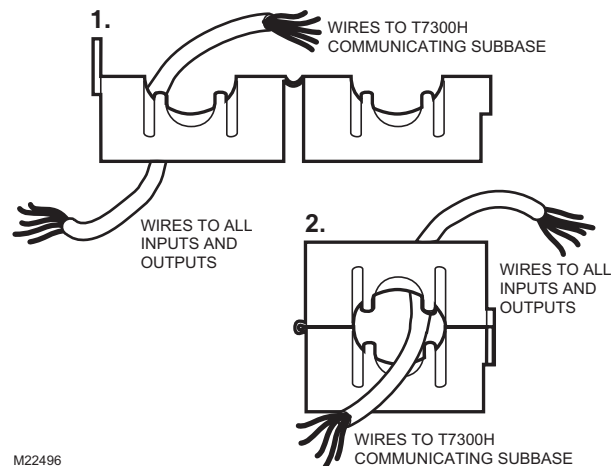
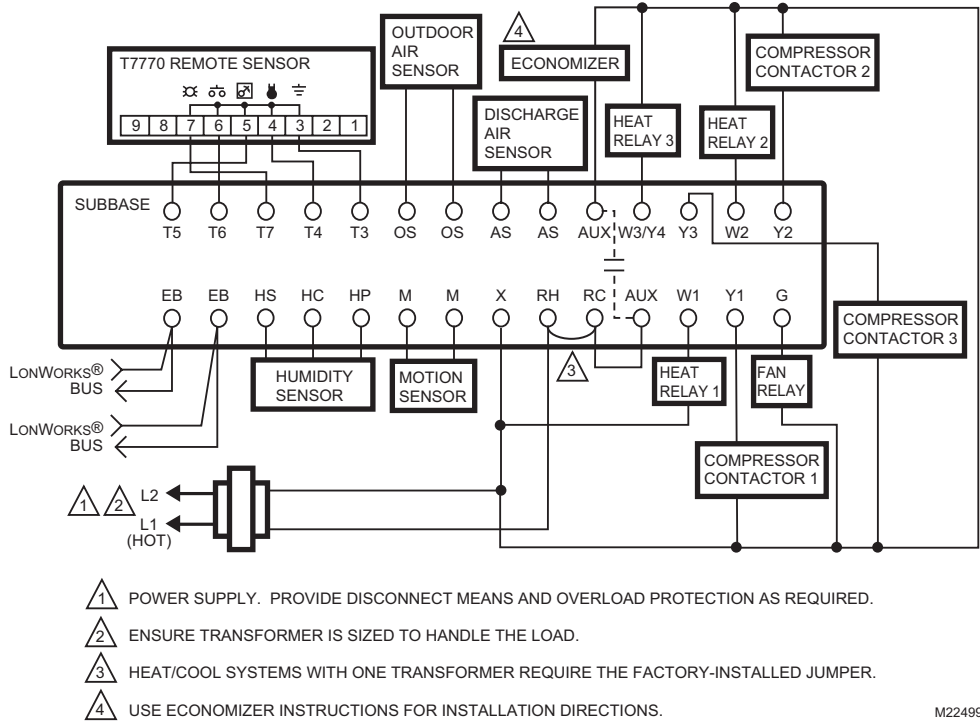
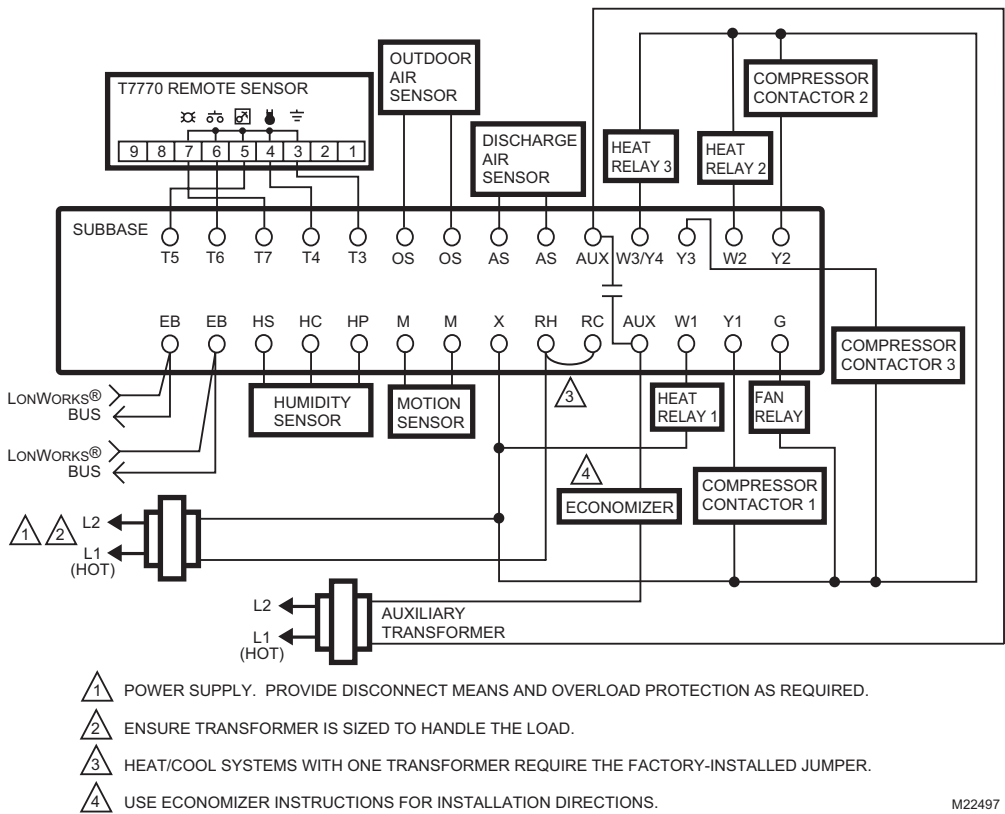


Fig. 8. Ferrite core wires from T7350H to LONWORKS® inputs and outputs.



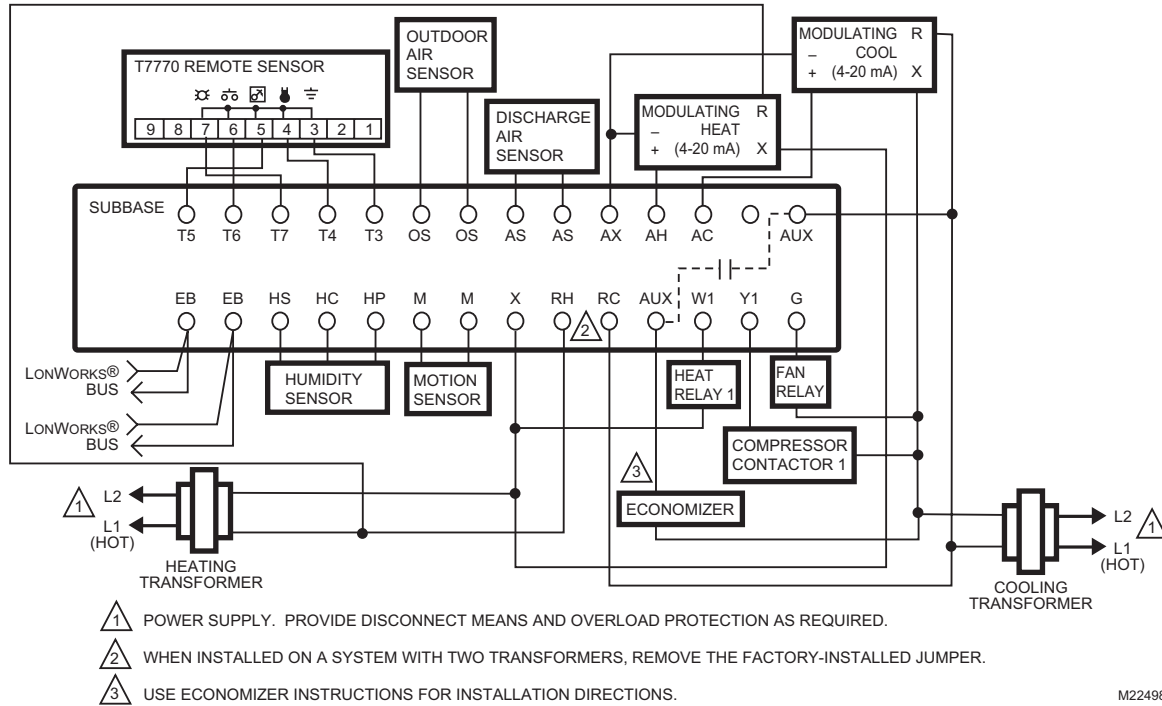
M22499

**Fig. 9. Typical hookup of T7350H1009 in three-stage heat and three-stage cool conventional system with one transformer.**



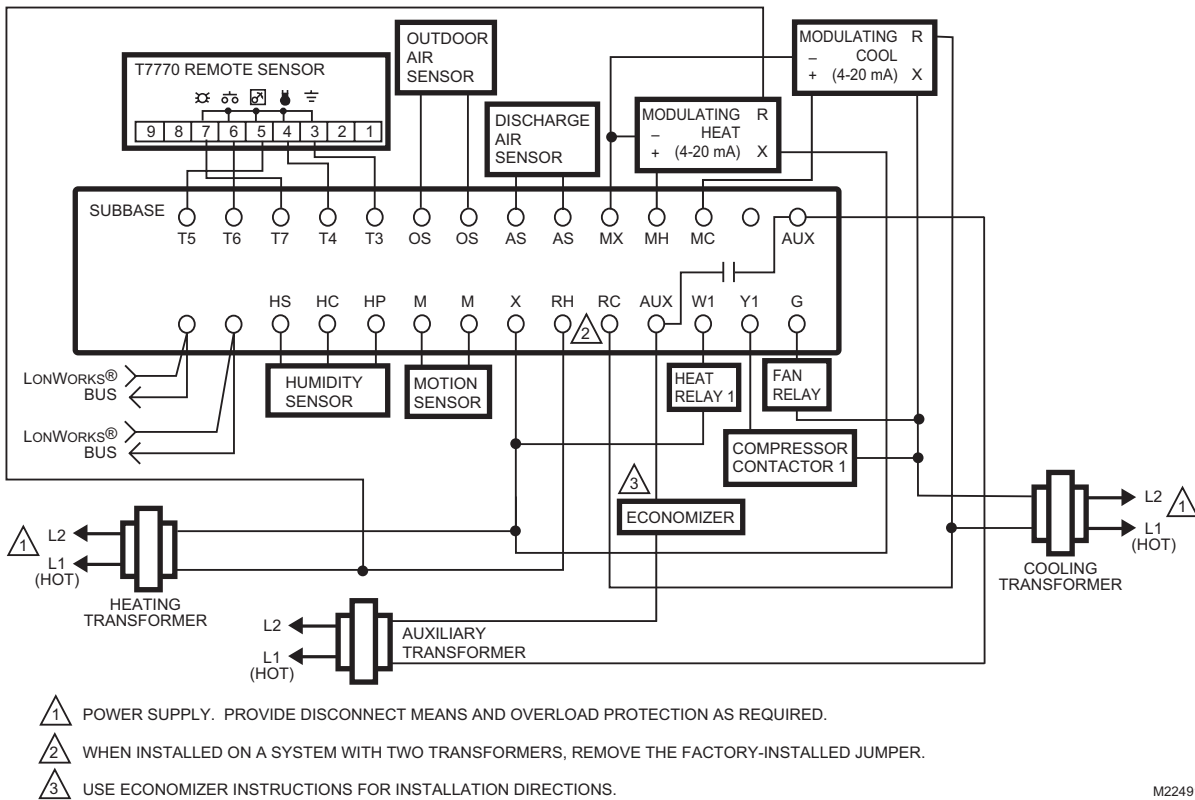
M22497

**Fig. 10. Typical hookup of T7350H1009 with auxiliary transformer.**



M22498

**Fig. 11. Typical hookup of T7350H1017 for system with two independent heat stages (one modulating), two independent cool stages (one modulating), and two transformers.**



M22491

**Fig. 12. Typical hookup of T7350H1017 for system with two independent heat stages (one modulating), two independent cool stages (one modulating), and three transformers.**

## General Considerations

Table 8 lists wiring types, sizes and distances for the T7350 and Excel 10 products. The T7350 terminal strip accepts 18 through 22 AWG (0.82 to 0.34 sq. mm) wire.

**Table 8. Field Wiring Reference.**

Wire Function	Recommended Wire Size (Minimum)	Specification or Requirement	Honeywell Part Number	Distance (Maximum)
Digital Outputs: W Y G AUX X	18 AWG (0.82 sq mm) five wire cable bundle.	Standard thermostat wire.	AK3726	1000 feet.
Modulating Outputs: MX MH MC	18 AWG (0.82 sq mm)	1 pair per output.	AK3757C, AK3744C, AK3741A, AK3702x	1000 feet.
Remote Humidity Sensor: HS HC HP	18 to 22 AWG (0.82 to 0.34 sq mm)	3 wires.	AK3746C, AK3724, AK3703x	500 feet.
Discharge Air Temperature Sensor: AS	18 to 22 AWG (0.82 to 0.34 sq mm)	1 pair.	AK4606ABE, AK4628AWH, AK3702x, AK3741A, AK3744C, AK3757C	1000 feet.
Outdoor Air Temperature Sensor: OS	18 AWG (0.82 sq mm)	1 pair.	AK3757C, AK3744C, AK3741A, AK3702x	500 feet.
Motion Sensor: M	18 to 22 AWG (0.82 to 0.34 sq mm)	1 pair.	AK4606ABE, AK4628AWH, AK3702x, AK3741A, AK3744C, AK3757C	1000 feet.
Wall Module connections: T3-T7	18 to 22 AWG (0.82 to 0.34 sq mm)	Twisted pair wire is recommended for wire runs longer than 100 ft. The number of pairs depends on the model and functions selected.	AK4606ABE, AK4628AWH, AK3702x, AK3741A, AK3744C, AK3757C, AK3726	1000 feet.
Power Wiring to: X RH RC	18 to 14 <sup>1</sup> AWG (0.82 to 2.0 sq mm) use heavier wire for longer runs.	NEC Class II, 140°F (60°C) rating.	AK3702x, AK3741A, AK3744C, AK3757C, AK3712x, AK3754	Limited by line-loss effects on power consumption.
LONWORKS® Bus (Non-Plenum).	22 AWG (0.34 sq mm)	Nema Level IV U.L. Type CMR Twisted pair stranded conductor, nonshielded.	AK3798 (1 pair)	Refer to E-bus Wiring Guidelines Users Guide 74-2865 for maximum length and generic cable specifications.
LONWORKS® Bus (Plenum Rated).	22 AWG (0.34 sq mm)	Nema Level IV U.L. Type CMP Twisted pair stranded conductor, nonshielded.	AK3797 (1 pair) AK3799 (2 pair)	—

NOTE: 1. The X, RH and RC terminals will accept 14 to 22 AWG. 14 and 16 AWG should be avoided since the stiff cable interferes with the cover to subbase installation.

Table 9. Honeywell Cable Details.

Honeywell Part Number	Size (AWG)	Number of wires	Jacket	Plenum Rated	Description
AK3798	22	2	Yes	No	E-bus cable.
AK3797	22	2	Yes	Yes	E-bus cable.
AK3799	22	4	Yes	Yes	E-bus cable.
AK4606ABE	22	2	Yes	No	Beige jacket.
AK4628AWH	22	2	Yes	Yes	White jacket.
AK3702x	18	2	No	No	—
AK3741A	18	2	Yes	No	—
AK3744C	18	2	Yes	Yes	Red jacket.
AK3757C	18	2	Yes	Yes	White jacket.
AK3703x	18	3	No	No	—
AK3724	18	3	Yes	No	Tan jacket.
AK3746C	18	3	Yes	Yes	Tan jacket.
AK3726	18	5	Yes	No	Tan jacket.
AK3712x	16	2	No	No	TFN
AK3754	14	2	No	No	TFN



## Step 5. Order Equipment

After compiling a bill of materials through completion of the previous application steps, refer to Table 10, Ordering Information.

**Table 10. Ordering Information.**

Part Number	Product Description	Comments
T7350H1009	Communicating Thermostat with three heating and three cooling digital outputs.	<ul style="list-style-type: none"> <li>Optional heat pump control.</li> <li>Isolated auxiliary digital output.</li> </ul>
T7350H1017	Communicating Thermostat with two modulating outputs, one heating and one cooling digital output.	<ul style="list-style-type: none"> <li>Isolated auxiliary digital output.</li> </ul>
T7771A	Remote Temperature Sensor.	<ul style="list-style-type: none"> <li>Pushbutton setpoint adjustment with LED indicators.</li> <li>Occupied/unoccupied override (bypass) with LED.</li> <li>LONWORKS® Bus jack.</li> </ul>
T7770A1006	Remote Wall Module.	<ul style="list-style-type: none"> <li>Basic model with room temperature sensor.</li> </ul>
T7770B1046	Remote Wall Module.	<ul style="list-style-type: none"> <li>± setpoint change.</li> </ul>
T7770C1044	Remote Wall Module.	<ul style="list-style-type: none"> <li>± setpoint change.</li> <li>OCC button and LED.</li> </ul>
T7770D1000	Remote Wall Module.	<ul style="list-style-type: none"> <li>OCC button and LED.</li> </ul>
AK3798	LONWORKS® Bus (Non-Plenum), 1 pair.	—
AK3797	LONWORKS® Bus (Plenum rated), 1 pair.	—
AK3799	LONWORKS® Bus (Plenum rated), 2 pair.	—
209541B	FTT Network Termination Module.	—
H7625 H7635	Remote Humidity Sensors	—
C7089A C7170A, C7031G2014	Outdoor Air Sensors.	—
C7041B C7041C C7041J C7770A	Duct Discharge Air Sensors: 6 inch probe. 18 inch probe. 150 inch averaging. 6 inch probe.	—
50000452-001	Troubleshooting Cable.	One Troubleshooting Cable required for each installation technician.
50000083-001	Thermostat Interface Module (TIM).	One TIM required for each installation technician. Note that a network tool such as LONSPEC™ eliminates the need for a TIM.
PDA	Qualified Palm OS PDA.	One PDA required for each installation technician. Refer to the PDA Configuration Software for an up-to-date list of qualified PDA hardware. Note that a network tool such as LONSPEC™ eliminates the need for a PDA.
50000314-001	PDA Configuration Software.	One Configuration software package can be used to program multiple PDAs. Note that a network tool such as LONSPEC™ eliminates the need for a PDA.

## Step 6. Configure T7350

Use Excel LONSPEC™ Software to configure the T7350H Thermostat for specific applications. The Excel LONSPEC™ User's Guide, form 74-2937, provides software operation instructions for this personal computer based application.

## Step 7. Troubleshooting

Table 11. Troubleshooting Information.

Symptom	Possible Cause	Action
Display will not come on.	Thermostat is not being powered.	Check that X terminal is connected to the system transformer. Check for 24 Vac between X and RH terminals. If missing 24 Vac: <ul style="list-style-type: none"> <li>• Check if circuit breaker is tripped; if so, reset circuit breaker.</li> <li>• Check if system fuse is blown; if so, replace fuse.</li> <li>• Check if the HVAC equipment power switch is in the Off position; if so, set to the On position.</li> <li>• Check wiring between thermostat and HVAC equipment. Replace broken wires and tighten loose connections.</li> </ul> If 24 Vac is present, proceed with troubleshooting.
Temperature display is incorrect.	Room temperature display has been recalibrated.	Use PDA or LONSPEC™ configuration software to recalibrate as desired.
	Thermostat is configured for °F or °C display.	Press both <i>Run Schedule</i> and <i>Copy</i> , then reconfigure the display.
	Bad thermostat location.	Relocate the thermostat.
Temperature settings will not change. (Example: Cannot set heating higher or cooling lower.)	Display shows three dashes and a degree sign (all systems shut down).	T7350 is set for remote sensing and sensor is missing or circuit is either open or shorted.
	Upper or lower temperature limits were reached.	Check the temperature setpoints: <ul style="list-style-type: none"> <li>• Heating limits are 40 to 90°F (7 to 31°C)</li> <li>• Cooling limits are 45 to 99°F (9 to 37°C)</li> </ul>
	Occupied setpoint temperature range stops were configured.	Using a PDA or LONSPEC™, check setpoint stops. If necessary, reconfigure the stop(s).
Room temperature is out of control.	Keypad is locked. When a locked key is pressed, LOCKED appears momentarily on the LCD.	<ul style="list-style-type: none"> <li>• Use PDA or LONSPEC™ (Set, Display) to unlock keypad.</li> <li>• Press both <i>Run Schedule</i> and <i>Copy</i>, then change keypad lock level.</li> </ul>
	Remote temperature sensing is not working.	Check all remote sensors.
Heat will not come on.	No power to the thermostat.	Check that X terminal is connected to the system transformer. Check for 24 Vac between X and RH terminals. If missing 24 Vac: <ul style="list-style-type: none"> <li>• Check if circuit breaker is tripped; if so, reset circuit breaker.</li> <li>• Check if system fuse is blown; if so, replace fuse.</li> <li>• Check if the HVAC equipment power switch is in the Off position; if so, set to the On position.</li> <li>• Check wiring between thermostat and HVAC equipment. Replace broken wires and tighten loose connections.</li> </ul> If 24 Vac is present, proceed with troubleshooting.
	Thermostat minimum off time is activated.	<ul style="list-style-type: none"> <li>• Wait up to five minutes for the system to respond.</li> <li>• Use PDA or LONSPEC™ to configure heating response.</li> </ul>
	System selection is set to Off or Cool.	Set system selection to Heat or Auto.

Table 11. Troubleshooting Information. (Continued)

Symptom	Possible Cause	Action
Cooling will not come on.	No power to the thermostat.	Check that X terminal is connected to the system transformer. Check for 24 Vac between X and RH terminals. If missing 24 Vac: <ul style="list-style-type: none"> <li>• Check if circuit breaker is tripped; if so, reset circuit breaker.</li> <li>• Check if system fuse is blown; if so, replace fuse.</li> <li>• Check if the HVAC equipment power switch is in the Off position; if so, set to the On position.</li> <li>• Check wiring between thermostat and HVAC equipment. Replace broken wires and tighten loose connections.</li> </ul> If 24 Vac is present, proceed with troubleshooting.
	Thermostat minimum off time is activated.	<ul style="list-style-type: none"> <li>• Wait up to five minutes for the system to respond.</li> <li>• Use PDA or LONSPEC™ to configure cooling response.</li> </ul>
	System selection is set to Off or Heat.	Set system selection to Cool or Auto.
System indicator (flame: heat, snowflake: cool) is displayed, but no warm or cool air is coming from the registers.	The call for heat or cool is not yet given.	Check if any stage indicators (dots next to the system indicator) are displayed. With no display of stage indicators, no call for cool/heat is yet given. For the modulating T7350H1017 only: Check the information screens. MODHEAT or MODCOOL percentages of zero and 100 indicate an extreme signal from the given terminal.
	Conventional heating equipment turns the fan on only after the furnace has warmed to a setpoint.	Wait one minute after seeing the on indicator and then check the registers.
	Heating or cooling equipment is not operating.	Verify operation of heating or cooling equipment in self-test.

## APPENDIX A - NETWORK TOOLS & WORKSTATIONS

Table 12. T7350H Operational Support.

Network Tools & Workstations Summary of T7350H Operational Support	LONSPEC™	LONSTATION™	W7760B - XL15B	Cmd Display - S7760	CARE	LNS Plugin	DataMon
Device Configuration	X				X	X	
View & Modify Weekly Schedule	X	X		X	X	X	
View & Modify Holiday Schedule	X	X		X	X	X	
Data Monitoring	X	X	X	X	X	X	
Command Outputs to Manual Value	X	X			X	X	
Override System Delays	X	X			X	X	
Room Temperature Calibration	X				X	X	
Command Occupancy Override	X	X	X	X	X	X	
Command Fan Operation (On Auto)	X	X			X	X	
Command System Mode (off, auto, heat, cool)	X	X			X	X	
View & Modify Temperature Setpoints	X	X	X	X	X	X	
Report T7350 alarm data	X	X	X	X			
Network Time Scheduler for T7350 Devices			X				
Generate Trend & Log files with T7350 data			X				
User defined T7350 analog & digital alarms			X				
Update T7350 Time Clock	X	X	X	X	X	X	
Set T7350 as network Time Master	X						
View T7350 Cover Firmware Version	X	X					X
Update T7350 Cover Firmware							X
View T7350H SubBase Firmware Version	X	X					X
Update T7350H SubBase Firmware							X

## APPENDIX B - NETWORK ALARM REPORTING

**Table 13. T7350H Alarm Change of State Event.**

A T7350H alarm change of state event is reported by the manufacturer defined output network variable nvoAlarmH.

nvoAlarmH Field	Description
subnet	The LONWORKS® subnet number in the domain entry to which nvoAlarmH is bound. If nvoAlarmH is not bound, it reports domain index 0. 0: Invalid subnet (power up value) 1-255: Subnet number
node	The LONWORKS® node number in the domain entry to which nvoAlarmH is bound. If nvoAlarmH is not bound, it reports domain index 0. 0: Invalid entry (power up value) 1-127: Node number
type	The alarm type being issued. 0: AT_NO_ALARM (power up value) 1: AT_INVALID_SUBBASE_TYPE 2: AT_NETWORK_COMM_FAIL 3: AT_SENSOR_FAIL 4: AT_INVALID_IO_CONFIG 5: AT_COVER_COMM_FAIL 6: AT_COVER_SUBBASE_MISMATCH <u>Return to Normal Codes</u> -127: AT_rtnINVALID_SUBBASE_TYPE -126: AT_rtnNETWORK_COMM_FAIL -125: AT_rtnSENSOR_FAIL -124: AT_rtnINVALID_IO_CONFIG -123: AT_rtnCOVER_COMM_FAIL -122: AT_rtnCOVER_SUBBASE_MISMATCH -1: AT_ALARM_NOTIFY_DISABLED

**Table 14. T7350 Current Alarm Status.**

The T7350 current alarm status is reported by the manufacturer defined output network variable nvoAlarmStatus.

nvoAlarmStatus Field	Description
coverCommFail	Communications between the cover and sub-base. 0: No alarm (power up value). 1: The communications between the thermostat cover assembly and the sub-base has failed in one or both directions. The data from the cover to the sub-base has not been received for at least 90 seconds, or data from the sub-base is not updating the cover assembly.
invalidIOConfig	Output configuration error. 0: No alarm (power up value). 1: The number of outputs configured exceeds the capability of the sub-base to support them. Considers sub-base type, heat pump/conventional application, maxCoolStgs, maxHeatStgs.
sensorFail	Sensor failure. 0: No alarm (power up value). 1: One of the analog sensors on the cover assembly has failed or is out of range (high or low).
networkCommFail	Network Communications Failure. 0: No alarm (power up value). 1: One of the bound network input network variables is not being updated periodically. This alarm may be caused by a failed node or a damaged LONWORKS NETWORK cable.
invidSubBaseTyp	Sub-base type error. 0: No alarm (power up value). 1: The detected sub-base type is not supported by the firmware version of the cover assembly.

**Table 15. Identifying Five Most Recent T7350 Alarms.**

The five most recent T7350 alarms are identified in the manufacturer defined output network variable nvoAlarmLog.

nvoAlarmLog Field	Description
alarm1	Alarm log: Most recent alarm. <u>Alarm Codes</u> 0: AT_NO_ALARM (power up value) 1: AT_INVALID_SUBBASE_TYPE 2: AT_NETWORK_COMM_FAIL 3: AT_SENSOR_FAIL 4: AT_INVALID_IO_CONFIG 5: AT_COVER_COMM_FAIL 6: AT_COVER_SUBBASE_MISMATCH <u>Return to Normal Codes</u> -127: AT_rtnINVALID_SUBBASE_TYPE -126: AT_rtnNETWORK_COMM_FAIL -125: AT_rtnSENSOR_FAIL -124: AT_rtnINVALID_IO_CONFIG -123: AT_rtnCOVER_COMM_FAIL -122: AT_rtnCOVER_SUBBASE_MISMATCH -1: AT_ALARM_NOTIFY_DISABLED
alarm2	Alarm log: 2 <sup>nd</sup> most recent alarm. 0: No alarm (power up value).
alarm3	Alarm log: 3 <sup>rd</sup> most recent alarm. 0: No alarm (power up value).
alarm4	Alarm log: 4 <sup>th</sup> most recent alarm. 0: No alarm (power up value).
alarm5	Alarm log: Oldest alarm. 0: No alarm (power up value).

## APPENDIX C - NETWORK ERROR REPORTING

**Table 16. Reporting T7350H Errors.**

T7350H errors are reported through the manufacturer defined output network variable, nvoError.

<b>nvoError Field</b>	<b>Description</b>
errLoclSpaceSensr	Local space temperature sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errRemtSpaceSensr	Remote space temperature sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errNetSpaceSensr	Network space temperature sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured by the thermostat to function but is not being updated by either the bound network sensor or by the subbase (faulty subbase).
errLoclHumSensr	Local Humidity sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errRemtHumSensr	Remote Humidity sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errNetHumSensr	Network Humidity sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured by the thermostat to function but is not being updated by either the bound network sensor or by the subbase (faulty subbase).
errRemtOdSensr	Remote Outdoor air sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errNetOdSensr	Network Outdoor air sensor not working. 0: Sensor value is OK. (power up value) 1: Sensor is configured by the thermostat to function but is not being updated by either the bound network sensor or by the subbase (faulty subbase).
errRemtSetPt	Remote wall module set point is out of range or disconnected. 0: Value is OK. (power up value) 1: Remote wall module set point is configured to function and is out of range or disconnected.
errDischSensr	Discharge sensor out of range or disconnected. 0: Sensor value is OK. (power up value) 1: Sensor is configured to function and is out of range or disconnected.
errIOConfig	Output configuration error. Considers sub-base type, heat pump / conventional application. maxCoolStgs, maxHeatStgs. 0: The outputs configuration is consistent with the sub-base type selected (power up value) 1: The number of outputs configured exceeds the capability of the sub-base to support them.
errSubBaseType	Sub-base type error. 0: The sub-base is a valid sub-base type (power up value) 1: The detected sub-base type is not supported by the firmware version of the cover assembly.
errUnused1	Not currently used
errSelfTest	Self test failure. Upon factory test power up, a self test of memory is performed. If external RAM, EEPROM, or application FLASH memory fails the test, nvoError.errSelfTest is set. This bit is intended for use in production testing. Field devices should ignore this bit. 0: Passed the test 1: Failed the test
errCoverCommFail	Communications between the cover and sub-base 0: No error (power up value) 1: The communications between the thermostat cover assembly and the sub-base has failed in one or both directions. The data from the cover to the sub-base has not been received for at least 90 seconds, or data from the sub-base is not updating the cover assembly.

**Table 16. Reporting T7350H Errors. (Continued)**

T7350H errors are reported through the manufacturer defined output network variable, nvoError.

<b>nvoError Field</b>	<b>Description</b>
errSubBaseVerMismatch	Sub-base/cover firmware mismatch. 0: Sub-base and cover firmware are compatible. (power up value) 1: The firmware version in the sub-base is unable to communicate correctly with the firmware version of the cover assembly. The cover assembly Public Interface number of the sub-base is not compatible with the Public Interface number of the sub-base. That is nroT7350Ver.commVer does not match the version supported by the sub-base. Communications with the sub-base is turned off.
errNviSpaceTemp	nviSpaceTemp network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviOccSchedule	nviOccSchedule network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure).
errNviOccSensor	nviOccSensor network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviApplicMode	nviApplicMode network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviOutdoorTemp	nviOutdoorTemp network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviSpaceRH	nviSpaceRH network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviBypass	nviBypass network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)
errNviDlcShed	nviDlcShed (Demand Limit Control Shed signal) network variable is: 0: either not bound or is bound and being updated periodically (power up value) 1: bound and not being updated periodically (communications or source node failure)



## APPENDIX D - NETWORK ACCESS TO LOCAL SENSOR DATA

**Table 17. T7350H Reports Local Sensor Data.**

The T7350H reports local sensor data using the following output network variables.

Nv Name	LonSpec Reference Name	Description
nvoDischAirTemp	Discharge Temperature Out	The current discharge air temperature. The sensor value source is configured by nciConfig.dischAirSensor. A value of 327.67 means the sensor is not functioning correctly or is out of range. 327.67: Power up value
nvoOccSensor	Occupancy Sensor Out	Status of occupancy sensor 0: OC_OCCUPIED 1: OC_UNOCCUPIED -1: OC_NUL (not configured and power up value)
nvoOutdoorTemp	Outdoor Temperature Out	The current outdoor temperature. The sensor value source is specified by nciConfig.oDAirSensor. A value of 327.67 means the sensor is not functioning correctly or is out of range. 327.67: Power up value
nvoSpaceRH	Space Humidity Out	The current space humidity. The sensor value source is specified by nciConfig.humiditySensor. A value of 163.84 means the sensor is not functioning correctly or is out of range. 163.84: Power up value
nvoSpaceTemp	Space Temperature Out	The current space temperature. The sensor value source is specified by nciConfig.spaceSensor. A value 327.67 means the sensor is not functioning correctly or is out of range. 327.67: power up value

## APPENDIX E - SCHEDULING NETWORK DEVICES

A T7350H can be used to time schedule the following Honeywell controllers:

- Another T7350H.
- T7300/Q7300.
- XL15C application objects (Control loops/StartStop loops).
- XL10 controllers.

A single T7350 can be configured to schedule all (up to 119) of the compatible controllers connected to the same network. This is accomplished by a one to many binding from the source T7350 to the destination controller or object.

T7350.nvoOccSchedule > XL10.nviOccSchedule.

LONSPEC™ automatically implements these NV bindings based on the selection of Unscheduled Objects (XL10(s), Q7300(s), T7300H(s) and XL15cAP(s) located on the LONSPEC™ T7350 Scheduling Screen.

## APPENDIX F - NETWORK MASTER CLOCK

A T7350H can be used as the network time master for the following network connected Honeywell controllers:

- Another T7350H.
- T7300/Q7300.
- XL15A.

This is accomplished by a one to many binding from the source T7350H to the destination controller. The following is an example NV binding of one T7350H as a time master to another.

T7350H.nvoTime > T7350H.nviTimeSet

LONSPEC™ automatically implements these NV bindings based on the selection of Network Time Master check box on the T7350 General configuration screen. The Day Light Saving Start and Stop Month on all time master recipients should be configured to None (invalid). This prevents erroneous time changes during temporary network outages.

## APPENDIX G - NETWORK CONNECTIONS TO OTHER LCBS DEVICES

**Table 18. Network Connections to XL15A AP Inputs.**

T7350H Network Variable Outputs can be used as inputs to XL15A application objects.

<b>XL15A Application Object</b>	<b>Application Input</b>	<b>Source T7350H Network Variable</b>	<b>Network Variable Field</b>
Analog Alarm	Selected Analog Value	nvoSpaceTemp	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
Digital Alarm	Selected Digital Value	nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
		nvoData2	RelayCool1
		nvoData2	RelayFan
		nvoData2	dehumidActive
Bypass Logs	Select Bypass Object	nvoEffectOccup	
Run Times	Select Point Name	nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
		nvoData2	RelayCool1
		nvoData2	RelayFan
Trends	Trend Pt	nvoSpaceTemp	
		nvoEffectSetpt	
		nvoEffectOccup	
		nvoHeatCool	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	HeatStgsOn
		nvoData1	CoolStgsOn
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2

**Table 18. Network Connections to XL15A AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15A application objects.

XL15A Application Object	Application Input	Source T7350H Network Variable	Network Variable Field
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
		nvoData2	RelayCool1
		nvoData2	RelayFan
		nvoData2	dehumidActive
DLC Demand Limit Control	Override If	nvoSpaceTemp	
		nvoEffectSetpt	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
Analog Logic Function	Analog Input	nvoSpaceTemp	
		nvoEffectSetpt	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
Digital Logic Function	Digital Input	nvoAlarmStatus	CoverCommFail
		nvoAlarmStatus	InvalidIOConfig
		nvoAlarmStatus	SensorFail
		nvoAlarmStatus	networkCommFail
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
		nvoError	ErrLoclHumSensr
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp

**Table 18. Network Connections to XL15A AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15A application objects.

XL15A Application Object	Application Input	Source T7350H Network Variable	Network Variable Field
		nvoError	errnviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
		nvoData2	RelayCool1
		nvoData2	RelayFan
		nvoData2	dehumidActive
Control Loop	LoopDisable	nvoAlarmStatus	CoverCommFail
		nvoAlarmStatus	InvalidIOConfig
		nvoAlarmStatus	SensorFail
		nvoAlarmStatus	networkCommFail
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
		nvoError	ErrLoclHumSensr
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp
		nvoError	errnviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
nvoData2	RelayCool1		

**Table 18. Network Connections to XL15A AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15A application objects.

XL15A Application Object	Application Input	Source T7350 Network Variable	Network Variable Field
		nvoData2	RelayFan
		nvoData2	dehumidActive
Control Loop	MainSensor ResetSensor	nvoSpaceTemp	nvoSpaceTemp
		nvoEffectSetpt	nvoEffectSetpt
		nvoDischAirTemp	nvoDischAirTemp
		nvoTerminalLoad	nvoTerminalLoad
		nvoSpaceRH	nvoSpaceRH
		nvoOutdoorTemp	nvoOutdoorTemp
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
Start/Stop Loop	LoopDisable	nvoAlarmStatus	CoverCommFail
		nvoAlarmStatus	InvalidIOConfig
		nvoAlarmStatus	SensorFail
		nvoAlarmStatus	networkCommFail
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
		nvoError	ErrLoclHumSensr
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp
		nvoError	errnviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
nvoData2	RelayCool1		
nvoData2	RelayFan		
nvoData2	dehumidActive		

**Table 19. Network Connections to XL15A AP Outputs.**

T7350H Network Variable Inputs can be connected to XL15A application outputs.

<b>XL15A Application Object</b>	<b>Application Output</b>	<b>Destination T7350H Network Variable</b>	<b>Network Variable Field</b>
Network Time Schedule	Scheduled Device List	nviOccSchedule	
DLC	External Load Assignment	nviDlcShed	

**Table 20. Network Connections to XL15C AP Inputs.**

T7350H Network Variable Outputs can be used as inputs to XL15C application objects.

<b>XL15C Application Object</b>	<b>Application Input</b>	<b>Source T7350H Network Variable</b>	<b>Network Variable Field</b>
Math Functions: Min, Max, Avg, Sqrt Add, Subt, Mult, Div	Analog Input	nvoSpaceTemp	
		nvoEffectSetpt	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
		nvoData1	HeatStgsOn
		nvoData1	CoolStgsOn
		nvoData1	BypassTime
		nvoOccSensor	
		nvoEffectOccup	
Math Functions: Network Special SNVT_temp_p		nvoSpaceTemp	
		nvoEffectSetpt	
		nvoDischAirTemp	
		nvoOutdoorTemp	
Math Functions: Network Special SNVT_lev_percent		nvoSpaceRH	
		nvoTerminalLoad	
Logic Loop	ACDO Analog Input DCAO Analog Input	nvoSpaceTemp	
		nvoEffectSetpt	
		nvoDischAirTemp	
		nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
		nvoData1	HeatStgsOn
		nvoData1	CoolStgsOn
		nvoData1	BypassTime
		nvoOccSensor	
		nvoEffectOccup	
nvoHeatCool			

**Table 20. Network Connections to XL15C AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15C application objects.

XL15C Application Object	Application Input	Source T7350H Network Variable	Network Variable Field
		nvoData2	stagesActive
Logic Loop	DCAO Digital Input OR Digital Input AND Digital Input	nvoAlarmStatus	CoverCommFail
		nvoAlarmStatus	InvalidIOConfig
		nvoAlarmStatus	SensorFail
		nvoAlarmStatus	networkCommFail
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
		nvoError	ErrLoclHumSensr
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp
		nvoError	errnviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
nvoData2	RelayHeat2		
nvoData2	RelayCool2		
nvoData2	Relay Aux		
nvoData2	RelayHeat1		
nvoData2	RelayCool1		
nvoData2	RelayFan		
nvoData2	dehumidActive		
Control Loop	SetPtOverride Digital Input LoopDisable Bypass Input OccupancySensor	nvoAlarmStatus	CoverCommFail
		nvoAlarmStatus	InvalidIOConfig
		nvoAlarmStatus	SensorFail
		nvoAlarmStatus	networkCommFail
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
nvoError	ErrLoclHumSensr		

**Table 20. Network Connections to XL15C AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15C application objects.

XL15C Application Object	Application Input	Source T7350H Network Variable	Network Variable Field
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp
		nvoError	errmviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
nvoData2	RelayCool1		
nvoData2	RelayFan		
nvoData2	dehumidActive		
Control Loop	MainSensor	nvoSpaceTemp	
	ResetSensor	nvoEffectSetpt	
	RecoverySensor	nvoDischAirTemp	
	LimitAnalogInput	nvoTerminalLoad	
		nvoSpaceRH	
		nvoOutdoorTemp	
		nvoData1	PercentCmdHeat
		nvoData1	PercentCmdCool
		nvoData1	HeatStgsOn
		nvoData1	CoolStgsOn
		nvoData1	BypassTime
		nvoOccSensor	
		nvoEffectOccup	
		nvoHeatCool	
		nvoData2	stagesActive
	Start/Stop Loop	LoopDisable Bypass	nvoAlarmStatus
nvoAlarmStatus			InvalidIOConfig
nvoAlarmStatus			SensorFail
nvoAlarmStatus			networkCommFail



**Table 20. Network Connections to XL15C AP Inputs. (Continued)**

T7350H Network Variable Outputs can be used as inputs to XL15C application objects.

XL15C Application Object	Application Input	Source T7350H Network Variable	Network Variable Field
		nvoAlarmStatus	InvalidSubBaseType
		nvoError	errLoclSpaceSensr
		nvoError	ErrRemtSpaceSensr
		nvoError	ErrNetSpaceSensr
		nvoError	ErrLoclHumSensr
		nvoError	ErrRemtHumSensr
		nvoError	errNetHumSensr
		nvoError	ErrRemtOdSensr
		nvoError	ErrNetOdSensr
		nvoError	ErrRemtSetPt
		nvoError	ErrDischSensr
		nvoError	errIOConfig
		nvoError	errSubBaseType
		nvoError	errSubBaseVerMisMatch
		nvoError	errNviSpaceTemp
		nvoError	errNviOccSchedule
		nvoError	errNviOccSensor
		nvoError	errnviApplicMode
		nvoError	errnviOutdoorTemp
		nvoError	errnviSpaceRH
		nvoError	errNviBypass
		nvoError	errNviDLCShed
		nvoData2	RelayHeat3
		nvoData2	RelayCool3
		nvoData2	RelayHeat2
		nvoData2	RelayCool2
		nvoData2	RelayAux
		nvoData2	RelayHeat1
		nvoData2	RelayCool1
		nvoData2	RelayFan
		nvoData2	dehumidActive

## S7760 - Command Display

A network connected Command display can be configured (by LonSpec) to implement the following T7350H functions:

View and Modify Schedules:

- Occupied, Unoccupied and Standby setpoints<sup>1</sup>
- weekly schedule
- holiday schedule

NOTE: If a T7350H is connected to a wall module with set-point adjustment, the user will not be allowed to change occupied setpoints through Command Display.

Command manual occupancy, Annunciate T7350H alarms, Monitor T7350H data:

- Room Temperature
- Active Room Temperature SetPoint
- Occupancy Status
- Operating Mode
- Discharge Air Temperature
- Space Humidity
- Outdoor Temperature
- Heat Stages Active
- Cool Stages Active
- Heat Modulating Output Position
- Cool Modulating Output Position
- Bypass Minutes Remaining
- Auxiliary Relay Status
- Fan Status

## APPENDIX H - T7350H NETWORK VARIABLE SUMMARY

Table 21. T7350H Network Variable Summary.

Nv Name	LONSPEC™ Ref Name	Class	Description
nciAppVer	Application version	CONFIG	<p>Application type: identifies the current application number for this device given by a tool. 0: (Default).</p> <p>Increment: increased by one whenever any configuration parameter changed by PDA or thermostat keyboard. <b>LONSPEC™</b> and <b>LONSTATION™</b> does not change this field. 0: (Default).</p> <p>Time Stamp: indicates the last change to the device application configuration. The time stamp meets the ANSI C time stamp requirement specifying the number of seconds elapsed since midnight (0:00:00), January 1, 1970. It is represented in the Intel Format. If the T7350 keyboard or the PDA Config Tool updates any configuration parameters, the time is incremented. 0: (Default).</p> <p>Version Number: identifies the version number of the application for this device. If the T7350 keyboard or the PDA Config Tool updates any configuration parameters, is incremented. 0: (Default).</p>
nciBypassTime	Bypass Time	CONFIG	Temporary Occupied Override duration in minutes. 180: (Default).
nciConfig	NA	FTP CONFIG	Thermostat configuration parameters.
nciConfigPts	NA	FTP CONFIG	Thermostat operating setpoint values for the control algorithms contained in the Thermostat application code.
nciDayLghtSav	NA	FTP CONFIG	Daylight-saving start and end calendar schedule.
nciDaySchedule0	NA	FTP CONFIG	Event time schedule for Sunday.
nciDaySchedule1	NA	FTP CONFIG	Event time schedule for Monday.
nciDaySchedule2	NA	FTP CONFIG	Event time schedule for Tuesday.
nciDaySchedule3	NA	FTP CONFIG	Event time schedule for Wednesday.
nciDaySchedule4	NA	FTP CONFIG	Event time schedule for Thursday.
nciDaySchedule5	NA	FTP CONFIG	Event time schedule for Friday.
nciDaySchedule6	NA	FTP CONFIG	Event time schedule for Saturday.
nciDaySchedule7	NA	FTP CONFIG	Event time schedule for designated Holiday.
nciDeviceName	Device Name	CONFIG	Device Name is an 18 character field used to identify the device uniquely as one device at the site or project. The content of Device Name is maintained by a management node. If Device Name is all ASCII blanks, it is considered un-configured by Honeywell tools. ASCII blanks: (Default)
nciHolSched	NA	FTP CONFIG	Holiday calendar schedule.

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nciRcvHrtBt	Controller Receive Time	CONFIG	Receive heartbeat time (seconds) for all failure detect heartbeat network variables in this node. 0: Disable failure (Default). 300: Typical value in Honeywell system.
nciSetpoints	Setpoint Config	CONFIG	Heating and Cooling SetPoints in Celsius engineering units. Occupied cool set-point. 23.9 C: (Default)  Standby cool set-point. 25.6 C: (Default).  Unoccupied cool set-point. 29.4 C: (Default).  Note: It is required that: UnoccCl>=OccCl>=OccHt+1.11 C. UnoccCl>=StdByCl>=StdByHt+1.11 C. If the above criteria is not met, then the nciSetpoints received over the LONWORKS network will not be accepted, and all the current controlling set points will be restored from the thermostat.  Occupied heat set-point. 21.1 C: (Default).  Standby heat set-point. 19.4 C: (Default).  Unoccupied heat set-point. 12.8 C: (Default).  It is required that: UnoccHt<=OccHt<=OccCl-1.11 C. UnoccHt<=StdByHt<=StdByCl-1.11 C. If the above criteria is not met, then the nciSetpoints received over the LONWORKS network will not be accepted, and all the current controlling set points will be restored from the thermostat.
nciSndHrtBt	Controller Send Time	CONFIG	Send heartbeat time (seconds) for all Guaranteed periodic update heartbeat network variables in this node. 0: Disable periodic update (Default). 55: Typical value in Honeywell system.
nroPgmVer	Program Version	CONST	The Honeywell program identifier and subbase firmware version number.
nroT7350Ver	T7350 Version	CONST	Detailed T7350 cover assembly firmware version information.
nviApplicMode	Application Mode In	IN	Thermostat System mode switch: 0: HVAC_AUTO 1: HVAC_HEAT 3: HVAC_COOL 6: HVAC_OFF 8: HVAC_EMERG_HEAT Others: Considered to be HVAC_AUTO. Failure detect and mains power up value: HVAC_AUTO.

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description															
nviBypass	Bypass In	IN	<p>Remote time bypass input from usually from another device. Bypass is a method to command unoccupied override over the network from another controller. The other controller does the bypass timing. nviBypass can be used to place the T7350H into temporary occupied mode. This mode will bypass the time of day occupancy schedule in this device.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>State</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>NA</td> <td>Do not bypass the time of day occupancy schedule.</td> </tr> <tr> <td>NA</td> <td>0 or -1</td> <td>Do not bypass the time of day occupancy schedule.</td> </tr> <tr> <td>0.5 - 100</td> <td>1 or greater</td> <td>Bypass the time of day occupancy schedule.</td> </tr> <tr> <td>0</td> <td>0</td> <td>Mains power up and fail detect value.</td> </tr> </tbody> </table>	Value	State	Action	0	NA	Do not bypass the time of day occupancy schedule.	NA	0 or -1	Do not bypass the time of day occupancy schedule.	0.5 - 100	1 or greater	Bypass the time of day occupancy schedule.	0	0	Mains power up and fail detect value.
Value	State	Action																
0	NA	Do not bypass the time of day occupancy schedule.																
NA	0 or -1	Do not bypass the time of day occupancy schedule.																
0.5 - 100	1 or greater	Bypass the time of day occupancy schedule.																
0	0	Mains power up and fail detect value.																
nviDlcShed	DLC Shed In	IN	<p>Demand limit duty cycle load shed command from a network device.</p> <p>When a shed request is received, the thermostat “bumps” the control set point up for cooling and down for heating. The amount of the “bump is a user set point selection. The shed state remains until a DLC restore command is received or network communication is lost. When the unit transitions from shed to restore, the set point is ramped back to the original set point over a period of 60 minutes. The control only sheds when the thermostat is in the occupied mode.</p> <p>Value:  0: No load shed being called (mains power up or failure detect value).  1 or other values: Call for load shedding.</p>															
nviFanAuto	FanOnAuto In	IN	<p>Auto Fan switch (last in wins).</p> <p>value = 0, state = don't care:  Fan is On.</p> <p>value = Don't care, state = 0 or -1:  Fan is On.</p> <p>Value = 0.5 - 100: state = 1 or greater:  Fan is On when there is a call for heat / cool.</p> <p>Failure detect and mains power up value: No change from previous value.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>State</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>NA</td> <td>Fan is ON.</td> </tr> <tr> <td>NA</td> <td>0 or -1</td> <td>Fan is ON.</td> </tr> <tr> <td>0.5 - 100</td> <td>1 or greater</td> <td>Fan is ON when there is a call for heat / cool.</td> </tr> <tr> <td>no change</td> <td>no change</td> <td>Mains power up and fail detect value.</td> </tr> </tbody> </table>	Value	State	Action	0	NA	Fan is ON.	NA	0 or -1	Fan is ON.	0.5 - 100	1 or greater	Fan is ON when there is a call for heat / cool.	no change	no change	Mains power up and fail detect value.
Value	State	Action																
0	NA	Fan is ON.																
NA	0 or -1	Fan is ON.																
0.5 - 100	1 or greater	Fan is ON when there is a call for heat / cool.																
no change	no change	Mains power up and fail detect value.																
nviFilePos	File Position In	IN	Supports LONMARK® FTP file transfer. Random Access file Pointer to first byte to be transferred and Number of bytes to transfer.															
nviFileReq	File Request In	IN	Supports LONMARK® FTP file transfer. Message request management is communicated through this input variable.															
nviInUse	InUse	IN	In use number is used by a management node to indicate to all other management nodes that it is “logged on.”															

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nviManValue	Manual Value In	IN	Manual override values for outputs: Relays: Y1, Y2, Y3, Aux, G, W1, W2, W3 Analog Outputs: Mc, Mh
nviOccManCmd	Occupancy Cmd In	IN	<p>Manual occupancy is a method to command the occupancy state from a network workstation. Effective occupancy override works on a “last in wins” basis. That is, the last occupancy override command received from any source determines the override state. The workstation can command occupied, unoccupied, standby, bypass, or not active (null).</p> <p>nviOccManCmd is used to place the T7350H into manual occupancy (note there is no timer associated with nviOccManCmd).</p> <p>Manual occupancy input from a network device:</p> <ul style="list-style-type: none"> <li>0: OC_OCCUPIED</li> <li>1: OC_UNOCCUPIED</li> <li>2: OC_BYPASS</li> <li>3: OC_STANDBY</li> <li>-1: OC_NUL not connected (mains power up).</li> <li>Others: same as OC_NUL.</li> </ul> <p>NOTE: If nviOccManCmd is OC_BYPASS and the bypass timer (nvoData1.bypassTime) times out, then nviOccManCmd is set to OC_NUL.</p>
nviOccSchedule	Occupancy Schedule In	IN	<p>There are 2 distinct modes of operation: local schedule and network schedule. The local schedule mode causes the T7350H to change set points by using the scheduler in the T7350H. The network schedule mode causes the T7350H to change set points from a network-based scheduler. The network schedule, when valid, overrides the local schedule.</p> <p>The network schedule input is nviOccSchedule. This input has current state, next state and tuncos (Time Until Next Change of State). It is bound from another scheduler such as the XL15A or T7300/Q7300H. The XL15B or a workstation can also write to it in an “unbound” relationship.</p> <p>If the network schedule is not periodically updated the T7350H resumes local scheduling. Periodically means at a rate greater than the fail detect time. This rate is typically 55 seconds, 300 seconds maximum. (The actual rate and maximum depend on the configured heartbeat and failure detect times.)</p> <p>Current scheduled occupancy state:</p> <ul style="list-style-type: none"> <li>0: OC_OCCUPIED</li> <li>1: OC_UNOCCUPIED</li> <li>3: OC_STANDBY</li> <li>Others: same as OC_NUL.</li> <li>-1: OC_NUL (mains power up and fail detect value).</li> </ul> <p>Next scheduled occupancy state:</p> <ul style="list-style-type: none"> <li>0: OC_OCCUPIED</li> <li>1: OC_UNOCCUPIED</li> <li>3: OC_STANDBY</li> <li>Others: same as OC_NUL.</li> <li>-1: OC_NUL (mains power up and fail detect value).</li> </ul> <p>Time in minutes until next scheduled change of occupancy state:</p> <ul style="list-style-type: none"> <li>0: (mains power up and fail detect value).</li> </ul>

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nviOccSensor	Occupancy Sensor In	IN	<p>There are 3 distinct modes of operation: local occupancy sensor, network occupancy sensor, or none. The network occupancy input is nviOccSensor. It is bound from another sensor or controller with occupancy status.</p> <p>Occupancy sensor input from a network device:            0: OC_OCCUPIED            1: OC_UNOCCUPIED            -1: OC_NUL not connected (mains power up and fail detect value).            Others: same as OC_NUL.</p> <p>NOTE: If nviOccSensor is not invalid (OC_NUL), nviOccSensor is used as the occupancy sensor even if another sensor or no sensor is configured.</p>
nviOutdoorTemp	Outdoor Temperature In	IN	<p>Outdoor temperature input from a network device. Ignored unless nciConfig.oDAirSensor specifies a network configuration.            327.67: means to ignore comODTemp.            327.67: mains power up and failure detect value.</p> <p>NOTE: If nviOutdoorTemp is not invalid (327.67), nviOutdoorTemp is used as the outdoor temperature even if another sensor or no sensor is configured.</p>
nviPgm	Program In	IN	Memory address and data being sent to cover assembly flash memory.
nviRequest	Request	IN	Input variable for managing network requests for status.
nviSetpoint	Setpoint In	IN	<p>Desired space temperature (Celsius) set by remote network device.            327.67: means to ignore nviSetPoint.            327.67: mains power up value.</p>
nviSpaceRH	Space Humidity In	IN	<p>Space humidity input (percent) from a network device. Ignored unless nciConfig.humiditySensor specifies a network configuration.            163.83: mains power up and failure detect value.</p> <p>NOTE: If nviSpaceRH is not invalid (163.83), nviSpaceRH is used as the space relative humidity even if another sensor or no sensor is configured.</p>
nviSpaceTemp	Space Temperature In	IN	<p>When configured for a network sensor and periodically updated, the network space temperature sensor will override both the local and remote sensors.            Space temperature input (Celsius) from a network device. Values less than -2.2 will be clipped to -2.2. Values greater than 60 will be clipped to 60.            327.67: means to ignore nviSpaceTemp.            327.67: mains power up and failure detect value.</p> <p>NOTE: If nviSpaceTemp is not invalid (327.67), nviSpaceTemp is used as the space temperature even if another sensor or no sensor is configured.</p>
nviTimeSet	Time In	IN	<p>Set current month, day, year, hour, minute, second            Time synchronization will be to a network device that has been designated as the "time master." Time synchronization will occur at the Guaranteed Periodic Update rate (typically every 55 seconds).</p>

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nvoAlarmH	Alarm Out	OUT	<p>Alarm subnet, node and type.</p> <p>Alarm subnet is the LonWorks subnet number in domain entry to which nvoAlarmH is bound. If nvoAlarmH is not bound reports domain index 0.  0: Invalid subnet (power up value).  1-255: Subnet number.</p> <p>Alarm node is the LonWorks node number (in domain entry to which nvoAlarmH is bound. If nvoAlarmH is not bound reports domain index 0).  0: Invalid entry (power up value).  1-127: Node number.</p> <p>Alarm type is the alarm type being issued:  0: AT_NO_ALARM (power up value).  1: AT_INVALID_SUBBASE_TYPE  2: AT_NETWORK_COMM_FAIL  3: AT_SENSOR_FAIL  4: AT_INVALID_IO_CONFIG  5: AT_COVER_COMM_FAIL  6: AT_COVER_SUBBASE_MISMATCH  -127: AT_rtnINVALID_SUBBASE_TYPE  -126: AT_rtnNETWORK_COMM_FAIL  -125: AT_rtnSENSOR_FAIL  -124: AT_rtnINVALID_IO_CONFIG  -123: AT_rtnCOVER_COMM_FAIL  -122: AT_rtnCOVER_SUBBASE_MISMATCH  -1: AT_ALARM_NOTIFY_DISABLED</p>
nvoAlarmLog	Alarm Log Out	OUT	Reports the last five alarms.
nvoAlarmStatus	Alarm Status Out	OUT	<p>Status of the following alarms states:  Communications between the cover and sub-base.  0: No alarm (power up value).  1: The communications between the thermostat cover assembly and the sub-base has failed in one or both directions. The data from the cover to the sub-base has not been received for at least 90 seconds, or data from the sub-base is not updating the cover assembly.</p> <p>Output configuration error:  0: No alarm (power up value).  1: The number of outputs configured exceeds the capability of the sub-base to support them. Considers sub-base type, heat pump / conventional application, maxCoolStgs, maxHeatStgs.</p> <p>Sub-base type error:  0: No alarm (power up value).  1: The sub-base is not a valid sub-base type for the firmware in the cover assembly.</p> <p>Network Communications Failure:  0: No alarm (power up value).  1: One of the bound network input variables is not being updated periodically. This alarm may be caused by a failed node or a damaged LonWorks network cable.</p> <p>Sensor failure:  0: No alarm (power up value).  1: One of the analog sensors on the cover assembly has failed or is out of range (high or low).</p>

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description									
nvoBypass	Bypass Out	OUT	<p>The T7350H uses nvoBypass to command bypass to other XL10 nodes. When the T7350 is in bypass, it commands nvoBypass. This is a one to many bound relationship. "Many" means one T7350H can command bypass on all XL10s connected on the subnet.</p> <p>Reports whether this device is in timed bypass of the scheduled occupancy state. Used by other devices to also bypass the time of day schedule.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>State</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>This device is not in bypass Power up value</td> </tr> <tr> <td>1</td> <td>100</td> <td>This device is in bypass</td> </tr> </tbody> </table>	Value	State	Action	0	0	This device is not in bypass Power up value	1	100	This device is in bypass
Value	State	Action										
0	0	This device is not in bypass Power up value										
1	100	This device is in bypass										
nvoData1	nvoData1	OUT	Reports Manufacturer Specific Device Data including: bypassTime, coolStgsOn, DaysLeftKeypadHoliday, dischTemp, effMode, effOccCurrentState, effSetPt, fan, heatStgsOn, oDTemp, percentCmdCool, percentCmdHeat, spaceHumidity, spaceTemp, subBaseType, sysMode, terminalLoad.									
nvoData2	nvoData2	OUT	Reports Manufacturer Specific Device Data including: auxRelay, DALimit, dehumidActive, ESR, holiday, noAuxHeat1, noAuxHeat2, occSensor, relayAux, relayCool1, relayCool2, relayCool3, relayFan, relayHeat1, relayHeat2, relayHeat3, remoteStPtOffset, schedNextState, scheduledState, scheduledTuncos, stagesActive, T7350CommWorks, temporarySetPt, totalError.									
nvoDischAirTemp	Discharge Temperature Out	OUT	The current discharge air temperature (Celsius). The sensor is configured by nciConfig.dischAirSensor. A value of 327.67 means the sensor is not functioning correctly or is out of range. 327.67: Power up value.									
nvoEffectOccup	Effective Occ Out	OUT	Current effective occupancy state: 0: OC_OCCUPIED (power up value). 1: OC_UNOCCUPIED 2: OC_BYPASS 3: OC_STANDBY -1: OC_NUL									
nvoEffectSetpt	Effective Stpt Out	OUT	Effective room temperature control set point (Celsius). 327.67: Power up value.									
nvoError	nvoError	OUT	Device error status. Refer to Appendix C - Network Error Reporting for details.									
nvoFileStat	File Status Out	OUT	File transfer status.									
nvoHeatCool	Application Mode out	OUT	Effective operating mode: 0: HVAC_AUTO 1: HVAC_HEAT (heat or re-heat). 3: HVAC_COOL 6: HVAC_OFF (power up value). 7: HVAC_TEST (manual mode or cover in factory test mode). 8: HVAC_EMERG_HEAT									



Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nvoOccSchedule	Time Of Day Out	OUT	<p>This output has current state, next state and tuncos (Time Until Change of State). This output is typically bound to other controller(s) that need a schedule command.</p> <p>This output is the combination of the local schedule and the network schedule command. It doesn't include any bypass, override, or manual occupancy commands that affect this T7350H. There is no TOD assignment table in the T7350H. The T7350H allows a one to many binding of nvoOccSchedule. This means one T7350H can command all of the XL10s on the subnet – up to 119 controllers.</p> <p>Current scheduled occupancy state:  0: OC_OCCUPIED  1: OC_UNOCCUPIED  3: OC_STANDBY  -1: OC_NUL (power up value).</p> <p>Next scheduled occupancy state:  0: OC_OCCUPIED (power up value).  1: OC_UNOCCUPIED  3: OC_STANDBY  -1: OC_NUL (power up value).</p> <p>Time in minutes until next scheduled change of occupancy state:  2880: Means there is not a next change of occupancy state or it is longer than 2 days from now (Power up value).</p>
nvoOccSensor	Occupancy Sensor Out	OUT	<p>Status of occupancy sensor:  0: OC_OCCUPIED  1: OC_UNOCCUPIED  -1: OC_NUL (not configured and power up value).</p>
nvoOutdoorTemp	Outdoor Temperature Out	OUT	<p>The current outdoor temperature (Celsius). The sensor source is specified by nciConfig.oDAirSensor. A value of 327.67 means the sensor is not functioning correctly or is out of range.  327.67: Power up value.</p>
nvoPgm	Program Out	OUT	Cover assembly flash memory programming data.
nvoSpaceRH	Space Humidity Out	OUT	<p>The current space humidity (percent). The sensor source is specified by nciConfig.humiditySensor. A value of 163.84 means the sensor is not functioning correctly or is out of range.  163.84: Power up value.</p>
nvoSpaceTemp	Space Temperature Out	OUT	<p>The current space temperature (Celsius). The sensor source is specified by nciConfig.spaceSensor. A value 327.67 means the sensor is not functioning correctly or is out of range.  327.67: power up value.</p>

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nvoStatus	Status	OUT	<p>Status:</p> <p>Alarm notify disabled:</p> <p>0: Alarm notification is turned on (power up value). 1: Alarm notification via nvoAlarmH, nvoAlarmLog, nvoUnitStatus, and nvoStatus has been turned off.</p> <p>Alarm</p> <p>0: no alarm (power up value). 1: there is an alarm.</p> <p>Override the delays associated with automatic control:</p> <p>0: Delays turned on (power up value). 1: Delays turned off (Useful for troubleshooting).</p> <p>Invalid ID:</p> <p>0: The request was for a valid ID (Power up value). 1: The request was not for a valid ID.</p> <p>Invalid Request:</p> <p>0: The request was for a valid operation (Power up value). 1: Invalid request for an operation.</p> <p>Manual control:</p> <p>0: The function block is in automatic operation (power up value). 1: The function is in manual operation and outputs respond to nviManValue.</p> <p>Status report. Function block number being in status report:</p> <p>0: Node function block. 1: Space comfort controller function block.</p> <p>Programming Mode:</p> <p>0: Normal operating mode (power up value). 1: The node is in the “programming the cover flash memory” mode, and is not automatically controlling temperature.</p> <p>Report mask:</p> <p>0: Normal operation (power up value). 1: RQ_REPORT_MASK received. The status bits that are set have been implemented.</p>
nvoTerminalLoad	Terminal Load Out	OUT	<p>Terminal load (percent): Reports the demand for supply energy. Positive numbers are cooling demand and negative numbers are heating demand. 100 percent is full capacity. Terminal loads greater than 100 percent or less than -100 percent indicate that the equipment is not able to supply the required heating or cooling energy. The valid range is between 163 and minus 163 percent. Terminal load is used by supervisory level control applications to reset Boiler or Chiller discharge water temperatures.</p> <p>163.84: Power up condition.</p>
nvoTime	Time Out	OUT	<p>Current year, month, day, hour, minute, second.</p> <p>The T7350H can be a time master to other T7350Hs, XL15As, and Q7300s.</p>

Table 21. T7350H Network Variable Summary. (Continued)

Nv Name	LONSPEC™ Ref Name	Class	Description
nvoUnitStatus	Unit Status	OUT	<p>Unit Status:  Percentage of cooling capability currently being supplied to the controlled space.  163.84: Power up value.</p> <p>Fan turned on or off:  0: Fan not running.  100: Fan running.  163.84: (power up value).</p> <p>Percentage of auxiliary heating capability currently being supplied to the controlled space (Applies to heat pump application only):  163.84: Power up value.</p> <p>Alarm report:  0: No alarms reported in the unit (power up value).  1: One or more alarms reported in the unit.  -1: The Alarms have been suppressed by alarm notified disabled command.</p> <p>Effective operating mode:  0: HVAC_AUTO (power up value).  1: HVAC_HEAT  3: HVAC_COOL  6: HVAC_OFF (power up value).  7: HVAC_TEST (manual mode or cover in factory test mode).  8: HVAC_EMERG_HEAT</p>

## Class Description

CONFIG: LonMark network configuration parameters

FTP CONFIG: Configuration parameters implemented with the LonMark file transfer protocol

IN: Network variable inputs.

OUT: Network variable outputs.

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