

The RapidZone™ Solution



APPLICATION GUIDE

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INTRODUCTION

Application Overview

The RapidZone Solution configures constant volume single zone HVAC equipment and a series of dampers to maintain the desired temperature for up to 18 separate zones per roof top unit (RTU). Each project can have up to 50 RTU subsystems. Each zone is capable of having an adjustable setpoint, a programmable time-of-day schedule for each day of the week, and an independent unoccupied override input. The system satisfies the space temperature setpoints by first reading the space temperature deviation from setpoint for each zone, then energizing heating or cooling in the HVAC unit and controlling the position of a supply damper ducted to each zone. Individual zone dampers modulate open and closed based on the zone temperature versus setpoint and the temperature of the RTU discharge air (heating or cooling).

The RapidZone Solution controls the static pressure in the supply duct by modulating a bypass damper that channels air from the supply duct directly into the return air duct or return air plenum. When static pressure increases above the adjustable setpoint (due to the closing of individual zone dampers), the bypass damper opens to reroute the supply air and decrease the static pressure.

The RapidZone Solution provides custom wiring diagrams for your project. These wiring diagrams specify component O.S. numbers and point-to-point wiring details. This simplifies installation and reduces wiring mistakes.

The RapidZone Solution can be used in a variety of buildings. The most common use of the system is for buildings where a constant volume HVAC unit is applied to maintain temperature in various areas, each with different load conditions. Since one thermostat usually controls a single zone unit, the varying load conditions often result in frequent setpoint changes or uncomfortable occupants. In these cases, typically one or more areas require cooling due to sun, equipment, or people loads while other areas require heating due to outside conditions or orientation to the sun.

An example of a building with varying load conditions that could use zoning for better comfort is a single story, 10,000 square foot office building. See Fig. 1. The loads vary due to the building design and usage. The sun load in the reception/atrium area during the morning conflicts with the conference room load on the east side of the building, which may not be occupied or may have heating loads on cool mornings or sunny winter days. Two ten-ton RTUs control temperature in the spaces where the thermostats are located; however, the perimeter offices suffer. In addition to the varying load conditions, building and zone occupancy can also change because certain offices are not occupied at all times or they

are occupied after hours or on weekends. These varying conditions make the RapidZone Solution an excellent program to configure the controls for this building.

The RapidZone Solution configures and monitors rooftop controllers. It is designed to work in smaller commercial applications or in a section of a larger commercial structure. The RapidZone Solution configures the XL15C RapidZone Controller to control a constant volume heating/cooling unit, duct static pressure and up to 18 zone temperatures. RapidZone also has the capability of configuring single-zone RTUs with the XL10 CVAHU or T7300. In addition to the zone temperature and static pressure control, the system can be configured to monitor and annunciate alarms for various equipment safety and diagnostic functions such as cooling, heating and economizer failures and airflow failure.

The RapidZone Solution monitors the zone space temperature deviation from setpoint for each zone and, depending on the total demand from the zones, energizes heating or cooling. Individual zone dampers modulate open or closed to allow more or less of the conditioned air into the space. For example, if a particular zone requires heating and the unit is in the cooling mode, the zone damper modulates closed (or to its minimum position) depending on the space conditions or how the system is configured. When the minimum time in mode expires, the unit changes over to heating and satisfies any and all zones needing heat. The RapidZone Solution sets minimum on, off and interstage time delays to ensure equipment protection.

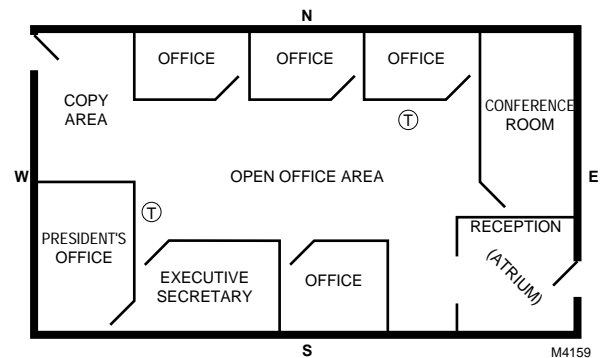


Fig. 1. Typical building with varying zone loads served by two constant volume, single zone units.

The RapidZone Solution works with any manufacturer's standard rooftop air handling unit (RTU) and volume regulated air terminals in each conditioned zone of the building. RapidZone controllers communicate through the LONWORKS® bus. See Fig. 2 for a typical RapidZone system.

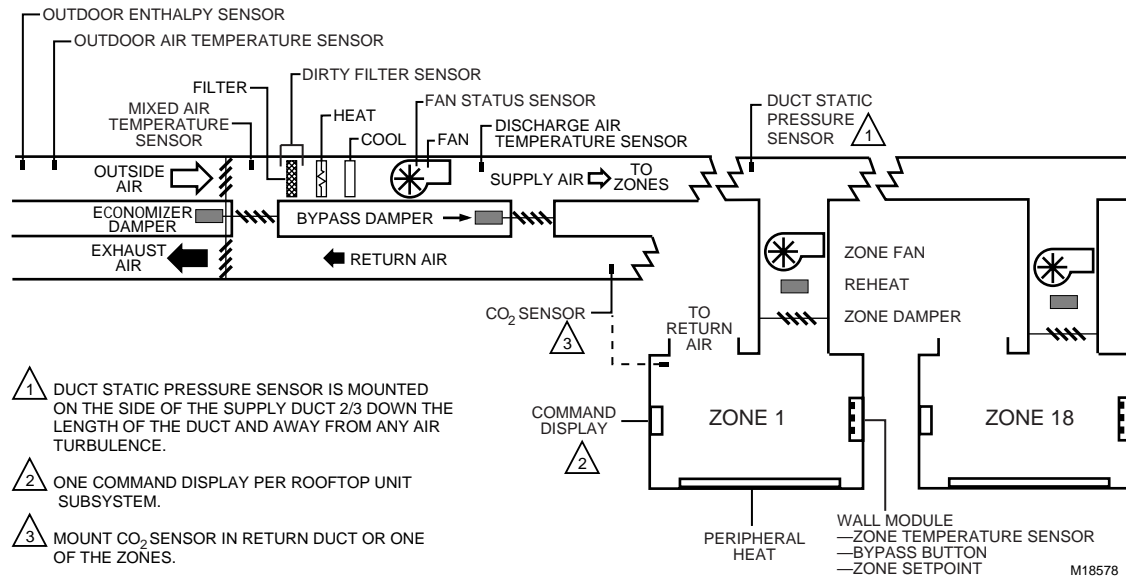


Fig. 2. Typical RapidZone Solution System. Some equipment is optional and is not present on every job.

The RapidZone Solution consists of the following components:

- RapidZone (ZL7751A) is an easy to use PC configuration tool. It leads the user through a series of screens where RTU, zone equipment and parameters are selected. RapidZone commissions and monitors the controllers.
- RapidZone Controller (XL15C). The RapidZone Controller controls the RTU subsystem fan, static pressure, heating, cooling and economizer. One is required per RTU subsystem. It can control up to four stages or 4-20 mA modulating outputs for heating and cooling.
- Zone Controllers (W7751J). The Zone Controllers control the temperature of each zone. One is required per zone.

NOTE: The W7751H with date code 0208 or higher may be used in place of the W7751J.

- T7770A, C Wall Module. The T7770A Wall Module senses zone temperature only. The T7770C optional model provides setpoint adjustment and bypass override in addition to sensing zone temperature. One is required per zone.
- Building Manager (XL15A optional). The Building Manager controls the scheduling, alarming, and trending for the RTU subsystem. This device is optional per RTU subsystem. If used, one is required for every four RTUs.

NOTE: The W7760A must be date code 0042 or higher.

- Command Display (S7760A optional). The Command Display shows system variables and alarms and allows schedules and certain setpoints to be changed. This device is optional per RTU subsystem. One command display can handle up to 4 RTU subsystems.
- SLTA-10 (Q7760A) and modem (optional). These devices provide access to the project either locally or via telephone

connection. For local connections, the SLTA-10 connects to the PC via a serial port on the back of the computer (most computers have two serial ports). The LONWORKS® bus wire then connects to the SLTA-10 and the devices in the project. For remote connections, the project has a SLTA-10 and modem on site connected to the LONWORKS® bus, and the PC uses a modem connected to one of its serial ports to call the project.

NOTE: The remote capability is for workstation access only.

- ST7009 Electronic Programmable Timer (optional). This device provides 24 hour or 7 day microprocessor based switching. This device is optional per RTU subsystem.
- LONSTATION™ (ZL7761A) is an easy to use PC workstation tool. It allows monitoring, setpoint and schedules changes either by local connection to the LONWORKS® network or by remote telephone connection.

CONFIGURATION INFORMATION

The following section shows each of the RapidZone screens with the default information. There are instructions at the bottom of the screen to walk the user through each step. Moving the cursor to a yellow area (light gray in this document) activates rollover text that further explains the information needed. Moving the cursor away from the cell closes the rollover text. A single click the cell activates a list or allows text to be typed. See Fig. 3.

Clicking on the close icon in the upper right corner (icon with an "x" in it.), closes RapidZone and cancels all changes unless saved on the Finish screen.

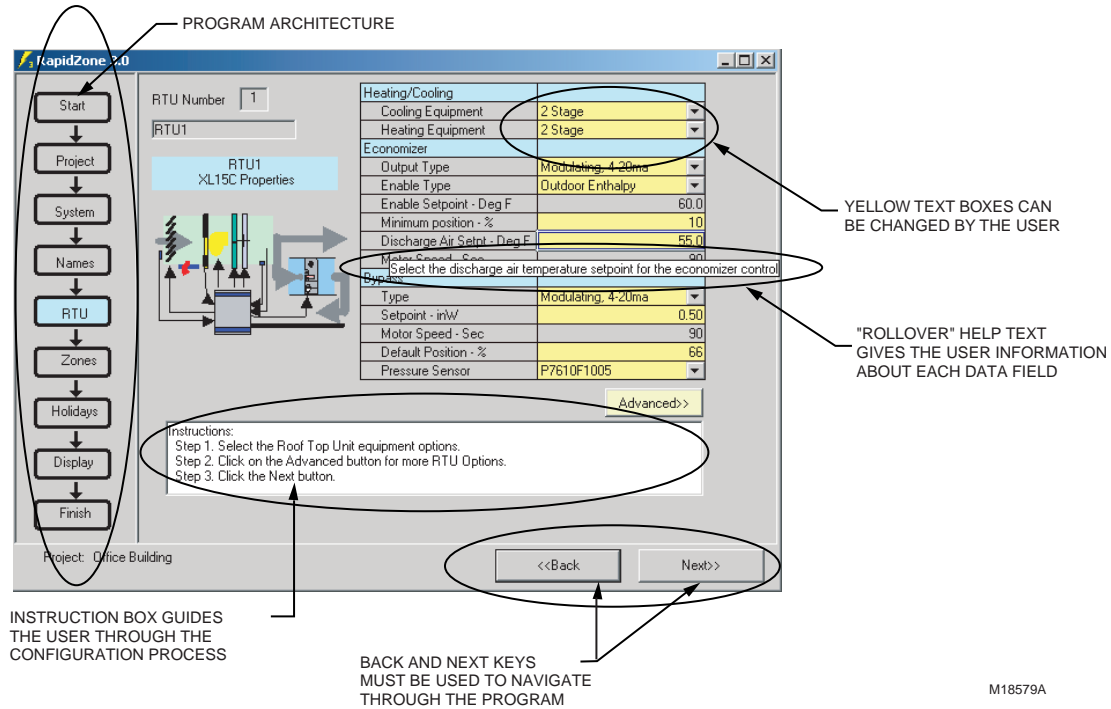


Fig. 3. User friendly configuring process.

Changes can be made at any time by clicking on the <<Back or Next>> button until the screen that needs to be changed appears. When the process is finished, the user can save the project, review a summary or print the project.

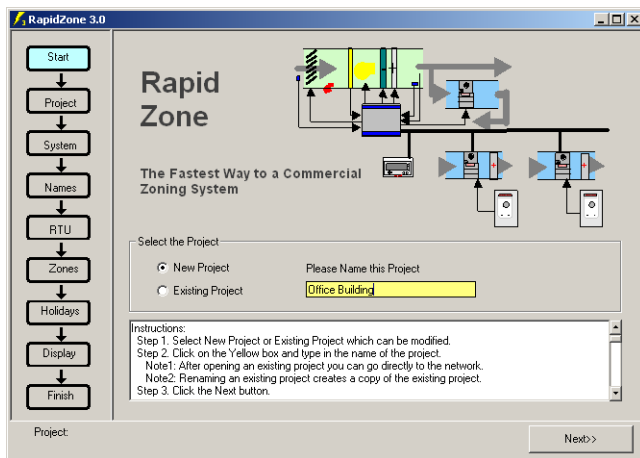


Fig. 4. Start screen.

Fig. 4 shows the Start screen. The options are:

- New Project: start a New Project from scratch.
- Existing Project: edit an existing project.

NOTES: To copy an existing project:

- Select the Existing Project button.
- Select the project name from the list.
- Click the Open Project button.
- Type a new name in the box.
- Advance through the screens and save the project in the finish screen.

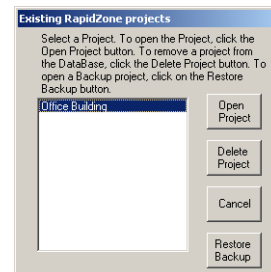


Fig. 5. Existing RapidZone Projects screen.

Fig. 5 shows the Existing RapidZone Projects screen. The options are:

- Open Project button: Opens the selected project in the list box.
- Delete Project button: Deletes the selected project in the list box.
- Cancel button: Closes this screen and returns to the Start screen.
- Restore Backup button: Displays the Open screen. Select the drive, directory and the project file to restore into the RapidZone Solution.

NOTES: The Open screen displays files of type *.rzb. This is the type of file saved in the Finish screen when Save Project is clicked and Save as a Backup Project is selected. When the project is finished, this file can be transferred to another PC. The file is restored into the second PC using the Restore Backup button.

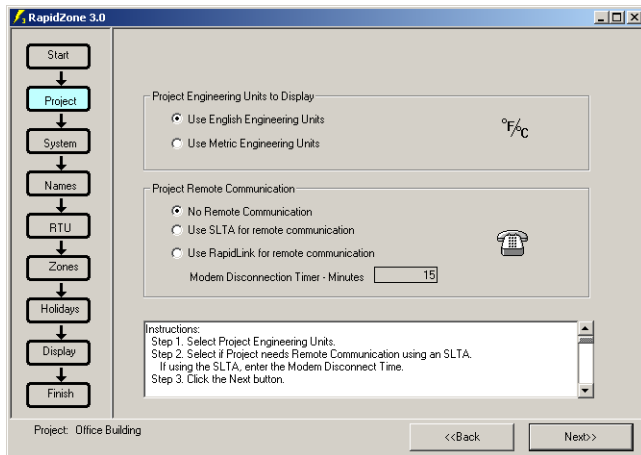


Fig. 6. Project setup screen.

Fig. 6 shows the Project setup screen. The options are:

- Use English Engineering Units: all default values and modified values are in English units. English units are °F and inches of water column.
- Use Metric Engineering Units: all default values and modified values are in Metric units. Metric units are °C and pascals.
- Install Serial LONTALK® Adapter (SLTA-10) for remote communication: allows a computer to connect to the system via modem connection. The system can then be monitored remotely. The default is No SLTA.
- Modem Disconnection Timer - Minutes: the number of minutes of inactivity between the remote computer and the SLTA-10 before the remote modem link is disconnected. Range: 0 - 600 minutes. Default 15 minutes.

ZONED RTU (XL15C) CONFIGURATION

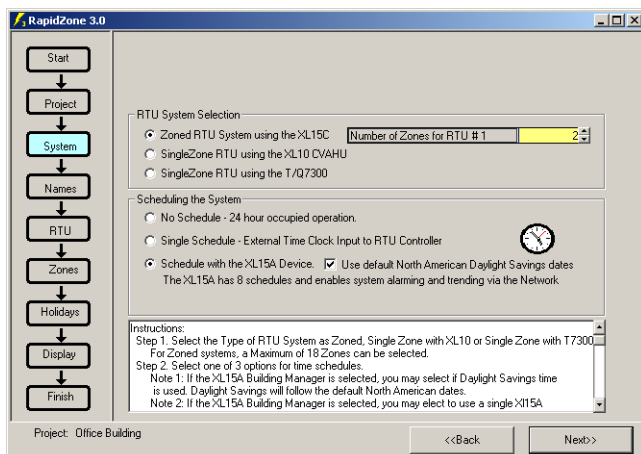


Fig. 7. System setup screen.

Fig. 7 shows the System setup screen. The options are:

- Zoned RTU system using the XL15C (user then chooses the number of zones, up to 18).
- Single zone RTU using the XL10 CVAHU.
- Single zone RTU using the T7300/Q7300.

- Scheduling the System allows one of three (3) choices:
- No Schedule - 24 hour occupied operation: the heating and cooling setpoints for each zone remain at the occupied setpoints all day.
- Single Schedule with Time Clock Input to the Roof Top Unit Control: allows for an external time clock with one schedule to handle all of the zone schedules. The external time clock is wired to a digital input of the RapidZone Controller. Contacts closed mean occupied, contacts open mean unoccupied.
- Scheduling with the XL15A: activates a scheduling screen later in the setup process. Each RTU can have up to eight separate schedules. Each zone can be assigned to one of these schedules. Multiple zones can be assigned to the same schedule. Scheduling multiple RTUs is done by simply clicking yes when RapidZone asks if you would like to configure more RTUs. The same scheduling process is run for each RTU until the user has configured all RTUs.

NOTE: When the XL15A is used, Select Use default U.S. Daylight Savings Time if the project is located where daylight savings time is observed.

NOTES: Later in the setup process, more than one RTU can be selected in the project. Each project can have up to 50 RTU subsystems. If the project contains more than one RTU, a Rooftop Subsystem selection box will be available at the top of this screen. Additional buttons are available to copy RTU 1 to the next RTU subsystem or to delete a RTU subsystem.

- Copy RTU Subsystem 1: copies the RTU, zones, XL15A, Command Display and all associated parameters settings from RTU 1 into the RTU selected in the RTU number box.
- Delete RTU Subsystem: removes the currently selected RTU subsystem (RTU, zones, XL15A, and Command Display) from the database. A confirmation box is displayed.

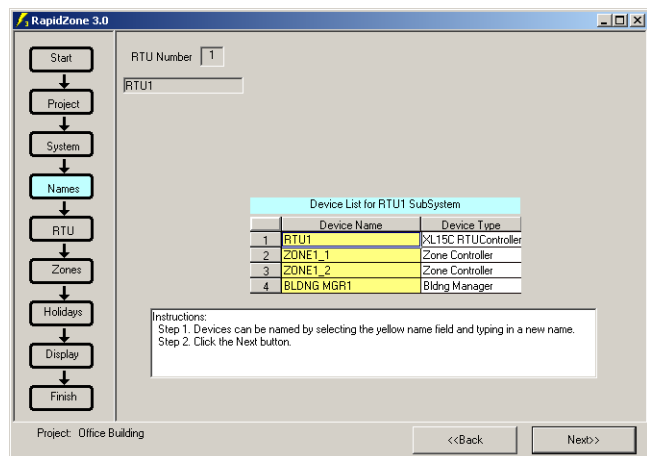


Fig. 8. Naming the devices screen.

Fig. 8 shows the Names screen. The options are:

- Device Name: allows the user to create descriptive names for the devices.

NOTES: Assigning names is not necessary since RapidZone can use the defaults, but using a descriptive name can give the end user a clear idea of which RTU/ zone they want. The names used here are the

names that appear on the Command Display.

An example of naming the devices would be in a restaurant where one zone handles the kitchen, another the dining room, and a third is used for the office and bathrooms. In this case, changing the default names to Kitchen, Dining room and Office/Bathroom would give the end user a clear description of which zone they want.

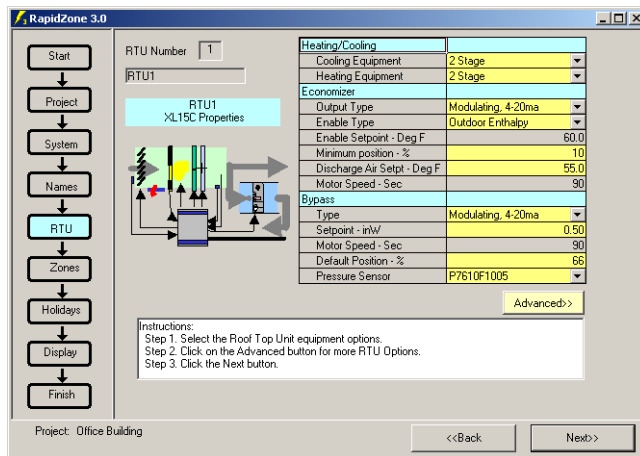


Fig. 9. RTU equipment options setup screen.

Fig. 9 shows the RTU screen. The options are:

Heating/Cooling

- Cooling Equipment: select the number of cooling stages or modulating. Range: None, 1-4 stages. Default: 2 stages.
- Heating Equipment: select the number of heating stages or modulating. Range: None, 1-4 stages. Default: 2 stages.

NOTE: If modulating heating or cooling is selected, a FreezeStat DI is automatically configured.

Economizer

- Output Type: select the type of economizer actuator. Range: None, Floating, Modulating, use Cool1 for Econ. Default: Modulating.
- Enable Type: select the means by which the economizer is enabled. Range: Digital Input, Outdoor Temperature, Outdoor Enthalpy, Differential Enthalpy. Default: Outdoor Enthalpy.

NOTES:

- Outdoor Enthalpy selected for RTU 1 is shared with all other RTUs.
- Output Type has to be set to Floating or Modulating to activate this cell.

- Enable Setpoint - Deg F: select the outdoor temperature that enables the economizer. Range: 0 to 90 °F (-18 to 32°C). Default: 60°F (16°C).

NOTE: Type has to be set to Outdoor Temperature to activate this cell.

- Minimum Position - %: select the minimum allowed position of the outdoor damper. Range 0 to 100%. Default: 20%.

- Discharge Air Setpoint - Deg F: select the discharge air temperature setpoint for the economizer control. Range: 45 to 85 °F (7 to 29°C). Default: 55°F (13°C).
- Motor Speed - Sec: select the floating economizer actuator speed. Range 30 to 1200 seconds. Default: 90 seconds.

NOTE: The Output Type has to be set to Floating Economizer to activate this cell.

Bypass

- Type: select the type of actuator used in the bypass damper. Range: None, Floating, Modulating 4-20 mA, Modulating 20-4 mA. Default: Modulating 4-20 mA.
- Setpoint - inW: select the duct static pressure setpoint for the bypass damper control. Range: 0 to 5 inW. (0 to 1245 Pa). Default 0.5 inW (125 Pa).
- Motor Speed - Sec: select the floating bypass actuator motor speed. Range: 30 to 1200 seconds. Default: 90 seconds.

NOTE: The Bypass Type has to be set to Floating to activate this cell.

- Default Position - %: select the bypass default position which is used on fan system start up or if the duct pressure sensor fails open. Range: 0 to 100%. Default: 66%.
- Pressure sensor: select the duct static pressure sensor module number. Range: P7610F (0-1 in. w.c.), P7610D (0-5 in. w.c.). Default: P7610F.

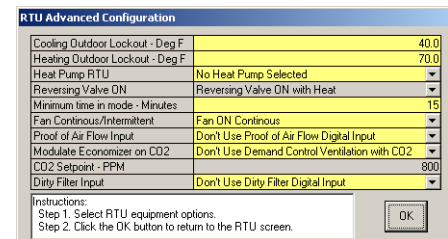


Fig. 10. Advanced screen for additional RTU configuration screen.

Fig. 10 shows the RTU Advanced Configuration screen. The options are:

- Cooling Outdoor Lockout - Deg F: select the minimum outdoor temperature that the RTU will be allowed to run Cooling. Range: 0 to 100°F (-18 to 38°C). Default: 40°F (4°C).
- Heating Outdoor Lockout - Deg F: select the maximum outdoor temperature that the RTU will be allowed to run Heating. Range: 0 to 100°F (-18 to 38°C). Default: 70°F (21°C).
- Heat Pump RTU: select if the RTU is a Heat Pump. This will assign an output for the reversing valve. Default: No Heat pump.
- Reversing Valve ON: select if the reversing valve is energized in heat or cool mode. Default: Energized On with heat.

NOTE: Heat Pump Selected has to be set in Heat Pump RTU to activate this cell.

- Minimum time in mode - Minutes: select the minimum time the RTU must stay in either heating or cooling mode before switching to the other mode. Range: 0 to 100 minutes. Default: 15 minutes.

- Fan Continuous/Intermittent: select the RTU Fan operation to be continuous ON or intermittent in occupied mode. Default: Continuous.
- Proof of Air Flow Input: select whether to use a proof of air flow (fan status) digital input. Default: Don't use proof of air flow
- Modulate Economizer on CO₂: select whether to use a CO₂ sensor for demand control ventilation of outside air. Default: Don't use demand control ventilation with CO₂ input.
- CO₂ Setpoint - PPM: select the CO₂ setpoint for demand controlled ventilation. Range: 200 to 2000 ppm. Default: 800 ppm.

NOTE: Modulate Economizer on CO₂ has to be set to Modulate Economizer with CO₂ Input to activate this cell.

- Dirty Filter Input: select whether to use a dirty filter input. Default: Don't use dirty filter input.

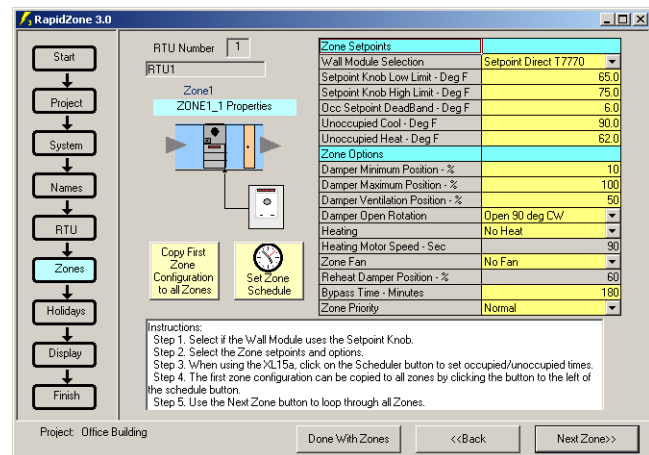


Fig. 11. Zone configuration screen.

NOTES:

- The Set Zone Schedule button is only active when the Scheduling with the XL15A option was selected on the System setup screen.
- When an external clock is part of the system, all scheduling is done at the clock, not in the software.

Fig. 11 shows the Zone screen. The options are:

Zone Setpoints

- Wall Module Selection: Select which wall module to use for this zone. Range: Sensor only T7770, Setpoint Direct T7770, Setpoint Offset T7770, Setpoint Direct T7560, Setpoint Offset T7560. Default: Setpoint Direct T7770.

NOTES:

- If Sensor only is chosen, the user only selects Occupied and Unoccupied heating and cooling setpoints.

- If Setpoint Direct is chosen, the user chooses setpoint high and low limits, an Occ setpoint deadband and Unoccupied heat/cool setpoints.
- If Setpoint Offset is chosen, the user selects \pm Setpoint Knob Offset and Occupied and Unoccupied heating and cooling setpoints.
- Setpoint Knob Low Limit - Deg F: select the minimum setpoint allowed from the setpoint knob. Range: 45 to 95°F (7 to 35°C). Default: 65°F (18°C).
- Setpoint Knob High Limit - Deg F: select the maximum setpoint allowed from the setpoint knob. Range: 45 to 95°F (7 to 35°C). Default: 80°F (27°C).
- Occ Setpoint Deadband - Deg F: select the occupied temperature deadband between the heating and cooling setpoint. Range: 0 to 20°F (0 to 11°C). Default: 6°F (3°C).
- Occupied Cool - Deg F: select occupied cooling setpoint. Range: 45 to 95°F (7 to 35°C). Default: 76°F (24°C).
- Occupied Heat - Deg F: select occupied heating setpoint. Range: 45 to 95°F (7 to 35°C). Default: 70°F (21°C).
- Unoccupied Cool - Deg F: select unoccupied temperature cooling setpoint. Range: 45 to 95°F (7 to 35°C). Default: 90°F (32°C).
- Unoccupied Heat - Deg F: select unoccupied temperature heating setpoint. Range: 45 to 95°F (7 to 35°C). Default: 62°F (17°C).
- Setpoint Knob Offset (\pm) - select the offset range for the setpoint knob. Range: 0 to 20. Default: 6.

Zone Options

- Damper Minimum Position - %: select the zone damper minimum position during occupied time. Range: 0 to 100%. Default: 10%.
- Damper Maximum Position - %: select the zone damper maximum position during occupied time. Range: 0 to 100%. Default: 100%.
- Damper Ventilation Position. Default: 50%.
- Damper Open Rotation: Select the zone damper rotation direction and travel. If less than 90 degrees of travel, mechanical stops should be inserted into the actuator.
- Heating: select the zone heating option. Range: None, Peripheral, 1 stage reheat, 2 stage reheat, floating reheat, floating peripheral heat. Default: None.
- Heating Motor Speed - Sec: select the heating actuator speed. Range: 30 to 1200 seconds. Default: 90 seconds.

NOTES:

- Heating has to be set to Floating Reheat or peripheral heat to activate this cell.
- The Zone Controller doesn't have enough outputs to support a zone fan with 2-stages reheat.

- Zone Fan: select the zone fan option. Range: None, Parallel. Default: None.
- Reheat Damper Position - %: select the zone damper position when in reheat. Range: 0-100%. Default: 80%.
- Bypass Time - Minutes: select the zone bypass override time which occurs for an unoccupied override. Range: 0-1440 minutes. Default: 180 minutes.
- Zone Priority: select the zone priority with a maximum of 5 high priority zones. Range: Normal, High, or None. Default: Normal.

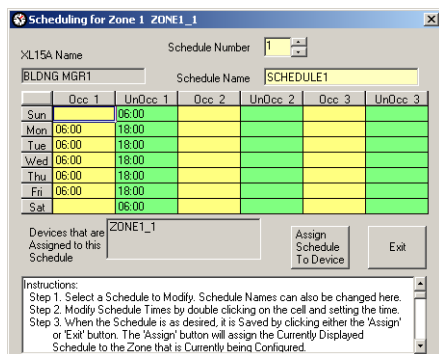


Fig. 12. Set Zone Schedule screen.

Fig. 12 shows the Scheduling for Zone screen when the Set Zone Schedule button is active. The options are:

- Schedule Name: using a descriptive name for each schedule can save time for the end user. Some names would be Factory Schedule, Cafeteria Schedule or Kitchen Schedule.
- Occ 1, 2, 3: set the starting times for the occupied setpoints. Default for Occ1 is 08:00 Monday through Friday.
- UnOcc 1, 2, 3: set the starting times for the unoccupied setpoints. Default for UnOcc1 is 18:00 Monday through Friday. 08:00 on Sunday and Saturday.

NOTES: To change times:

- click the cell and type in the new number or
- double click cell and scrolling in one hour increments is activated or
- type the number one in a blank cell and scrolling is activated or
- cut or copy and paste. Click the day of the week to select the row or a cell or group of cells to select individual times. Click ctl-x to cut, ctl-c to copy, ctl-v to paste.
- Times are entered in 24 hour format.
- Click Assign Schedule to Zone when the schedule is done.
- Click Cancel to discard all changes and return to Zones screen.

NOTE: Multiple zones can be assigned to the same schedule.

- When finished with the first zone, either click Copy First Zone Configuration to all Zones to copy all the zone 1 configurations to all the other zones or click next zone.

NOTE: Copying the first zone to the other zones is recommended in most cases. Making changes to each zone individually is usually easier than going through each step for each zone.

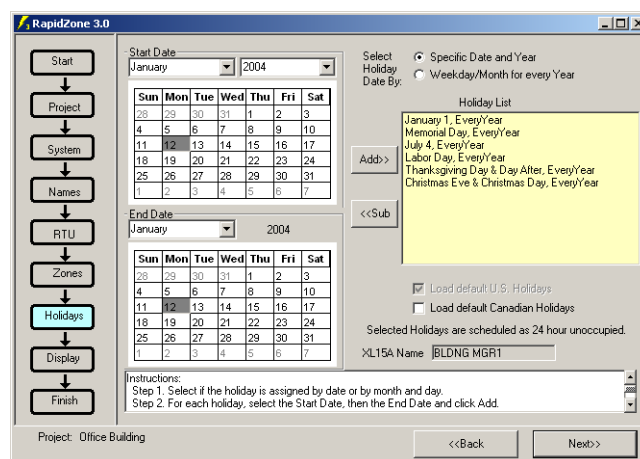


Fig. 13. Holiday Selection screen.

Fig. 13 shows the Holiday Selection screen. Holidays can be created using a start/end format in the above screen. The user selects a start date and a stop date on the calendar. The options are:

- Specific Date and Year: select the month and day for the holiday schedule. Year can be a specific year like 2001 or Every Year.
- Weekday/Month for every Year: select the month and any day (Monday through Sunday, first through last) for the holiday schedule.
- Load default U.S. Holidays: select this button to get the U.S. default holidays. U.S. default holidays are:
 - January 1, Every Year
 - Memorial Day, Every Year
 - July 4, Every Year
 - Labor day, Every Year
 - Thanksgiving Day, Every Year
 - Day after Thanksgiving, Every Year
 - December 24, Every Year
 - December 25, Every Year
- Load default Canadian Holidays

NOTE: The list can be customized by selecting holidays and clicking the Add>> button or the <<Sub button. Once the U.S. holidays are loaded, it is greyed out and is no longer an option.

- Click Next >> when finished with holidays. Fig. 14 appears.

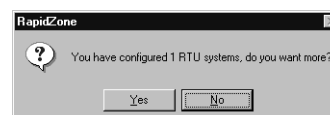


Fig. 14. Configure more RTUs screen.

When there are more RTU systems to program, click Yes and RapidZone goes back to the System screen and automatically increases the RTU number by 1.

SINGLE ZONE (XL10 CVAHU AND T7300/Q7300) CONFIGURATION

RapidZone version 3.0 and higher has the additional capability to configure and commission single zoned RTUs using the XL10 CVAHU (W7750A,B,C) and/or T7300 with a communication subbase. Use of a T7300/Q7300 allows that particular zone's schedule and setpoints to be set and changed either in the RapidZone software, or from the thermostat itself. Using an XL10 CVAHU, scheduling is done in the same manner as an XL15C. To configure a single zone RTU using an XL10 CVAHU or a T7300/Q7300, make the appropriate selection from the System setup screen.

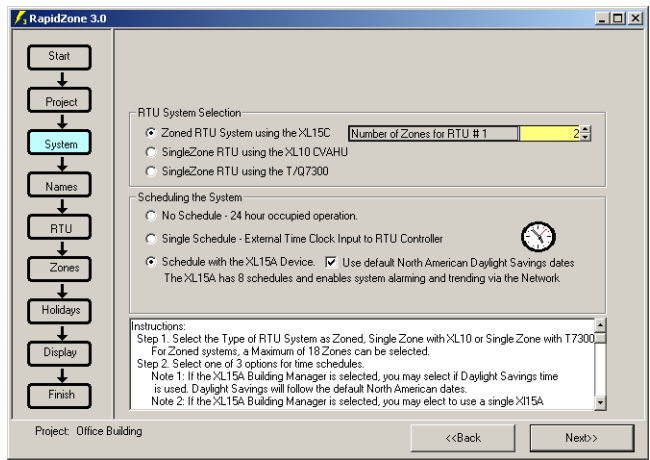


Fig. 15. System Setup screen.

Then follow the same steps for naming the RTU as mentioned in Fig. 8.

XL10 CVAHU CONFIGURATION

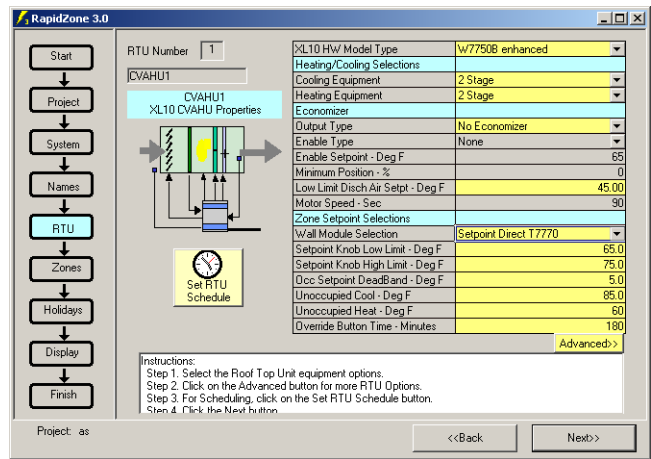


Fig. 16. XL10 CVAHU equipment options setup screen.

Fig. 16 shows the XL10 CVAHU setup screen. The options are:

- XL10 HW Model Type: Choose which model of XL10 CVAHU will be configured. Range: W7750A, W7750B enhanced, and W7750C. Default: W7750B enhanced.

Heating/Cooling

- Cooling Equipment: Same as XL15C
- Heating Equipment: Same as XL15C

Economizer

Table 1 summarizes the economizer options for the different CVAHU models.

Table 1. CVAHU Economizer Options.

XL10 CVAHU Type	Economizer Option	Enable Type	Enable Setpoint	Minimum Position (percent)	Low Limit Discharge Air Setpoint	Motor Speed (sec)
W7750A	None	None	None	None	45-85	None
W7750B enhanced	None	None	None	None	45-85	None
	Packaged	None	None	None	45-85	None
	Floating	Digital Input	None	0-100	45-85	20-240
		Outdoor Temperature	0-90	0-100	45-85	20-240
		Outdoor Enthalpy A	None	0-100	45-85	20-240
		Outdoor Enthalpy B	None	0-100	45-85	20-240
		Outdoor Enthalpy C	None	0-100	45-85	20-240
		Outdoor Enthalpy D	None	0-100	45-85	20-240
		Diff Temperature	None*	0-100	45-85	20-240
		Single Enthalpy	None	0-100	45-85	20-240
		Diff Enthalpy	None	0-100	45-85	20-240
		None	None	0-100	45-85	20-240
W7750C	None	None	None	None	45-85	None
	Packaged	None	None	None	45-85	None
	Modulating 4-20mA	Digital Input	None	0-100	45-85	20-240
		Outdoor Temperature	0-90	0-100	45-85	20-240
		Outdoor Enthalpy A	None	0-100	45-85	20-240
		Outdoor Enthalpy B	None	0-100	45-85	20-240
		Outdoor Enthalpy C	None	0-100	45-85	20-240
		Outdoor Enthalpy D	None	0-100	45-85	20-240
		Diff Temperature	None*	0-100	45-85	20-240
		Single Enthalpy	None	0-100	45-85	20-240
		Diff Enthalpy	None	0-100	45-85	20-240
		None	None	0-100	45-85	20-240
	Modulating 20-4mA	Same as 4-20 options, but reversed in case of reversed wiring				

* Differential Temperature is not allowed for the first CVAHU, it uses ODTemp and DATemp for AIs.

NOTE: Economizer options are not available with the W7750A model.

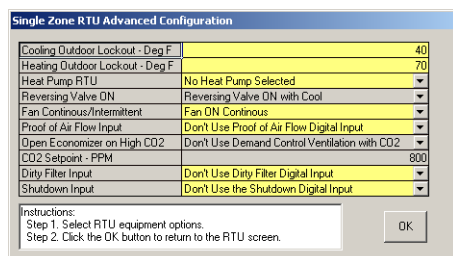


Fig. 17. Advanced screen for additional CVAHU configuration screen

Fig. 17 shows the advanced configuration screen for all models of available CVAHUs. The options are:

- Cooling Outdoor Lockout - Deg F: select the minimum outdoor temperature that the RTU will be allowed to run Cooling. Range: 0 to 100°F (-18 to 38°C). Default: 40°F (4°C).

- Heating Outdoor Lockout - Deg F: select the maximum outdoor temperature that the RTU will be allowed to run Heating. Range: 0 to 100°F (-18 to 38°C). Default: 70°F (21°C).
- Heat Pump RTU: select if the RTU is a Heat Pump. This will assign an output for the reversing valve. Default: No Heat pump.
- Reversing Valve ON: select if the reversing valve is energized in heat or cool mode. Default: Energized On with cool.

NOTE: Heat Pump Selected has to be set in Heat Pump RTU to activate this cell.

- Fan Continuous/Intermittent: select the RTU Fan operation to be continuous ON or intermittent in occupied mode. Default: Continuous.
- Proof of Air Flow Input: select whether to use a proof of air flow (fan status) digital input. Default: No fan status
- Modulate Economizer on CO₂: select whether to use a CO₂ sensor for demand control ventilation of the outside air. Default: No CO₂ input.

- CO₂ Setpoint - PPM: select the CO₂ setpoint for demand controlled ventilation. Range: 200 to 2000 ppm. Default: 800 ppm.
- Dirty Filter Input - Select whether to use a Dirty Filter digital input. Range: Use Dirty Filter Digital Input or Don't Use Dirty Filter Digital Input. Default: Don't use Dirty Filter Digital Input.
- Shutdown Input - Select whether to use the Shutdown Digital Input. Range: Use Shutdown Digital Input or Don't use Shutdown Digital Input. Default: Don't use Shutdown Digital Input.

Zone Setpoint Selections

The zone setpoint and scheduling are done from the same screen as equipment configuration when using an XL10 CVAHU. The options and defaults are the same as when using an XL15C.

Scheduling

Scheduling is also done from this screen when using an XL10 CVAHU. The format is identical to scheduling zones with an XL15C.

T7300/Q7300 CONFIGURATION

When done configuring a previous RTU and choosing to configure more RTUs or when starting a new project, choose T7300/Q7300 from the system setup screen (see Fig. 15). The user must also choose to schedule the T7300 using an XL15A or using the keypad.

IMPORTANT

With the XL15A chosen to schedule the T7300, lock out the T7300 keypad. With this scheduling scheme, the T7300 cannot be rescheduled through the keypad. Rescheduling in this manner appears to work. However, the XL15A schedule does not change and the T7300 follows the XL15A schedule.

The naming screen is identical to that of the XL15C and CVAHU.

Fig. 18 shows the XL10 CVAHU setup screen. The options are:

- Q7300H Model Selection: Choose which model of Q7300H subbase will be configured. Range: Q7300H2029 or Q73002003. Default: Q7300H2029.

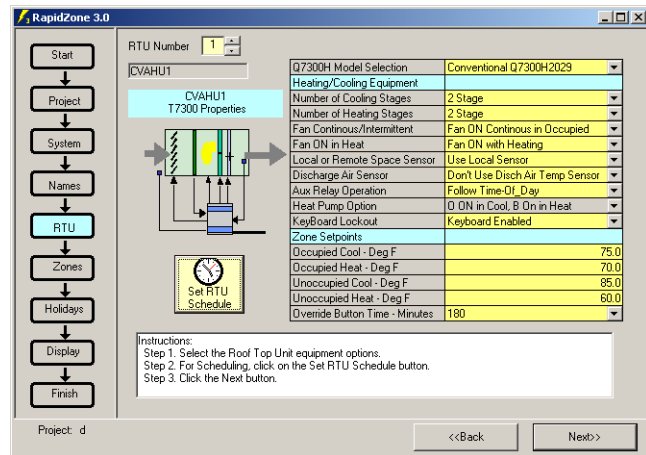


Fig. 18. T7300/Q7300 equipment options setup screen.

Heating/Cooling for Q7300H2029

- Number of Cooling Stages: Choose number of cooling stages. Range: None, 1 Stage, 2 Stage, or 3 Stage. Default: 2 Stage
- Number of Heating Stages: Choose number of heating stages. Range: None, 1 Stage, 2 Stage, 3 Stage. Default: 1 Stage
- Fan Continuous/Intermittent: Choose fan setting during occupied mode. Range: Fan ON Intermittent in Occupied, Fan ON Continuous in Occupied, or Fan ON Continuous in Occupied/Rcvy. Default: Fan ON Continuous in Occupied.
- Fan ON in Heat: Choose fan mode in heating. Range: Fan ON with Heating or Fan NOT ON with Heating. Default: Fan ON with Heating.
- Local or Remote Space Sensor: Choose local or remote sensor. Range: Use Local Sensor or Use Remote Sensor. Default: Use Local Sensor.
- Discharge Air Sensor: Choose whether to use a discharge air sensor. Range: Use Discharge Air Temp Sensor, or Don't Use Discharge Air Temp Sensor. Default: Don't Use Discharge Air Temp Sensor.
- Aux Relay Operation: Set operation of the Aux Relay. Range: Follow Time-Of-Day or Economizer Enable. Default: Follow Time-Of-Day.
- Heat Pump Option: Not available with H2029 model.
- KeyBoard Lockout: Choose level of keyboard lockout. Range: Keyboard Enabled, Partial Lockout, Lock Program Keys. Default: Keyboard Enabled.

Heating/Cooling for Q7300H2003

- Number of Compressor Stages - Choose number of compressor stages. Range: None, 1 Stage, or 2 Stage. Default: 2 Stage
- Number of Aux Heating Stages - Choose number of aux heating stages. Range: None or 1 Stage. Default: 1 Stage
- Fan Continuous/Intermittent - Same as Q7300H2029
- Fan ON in Heat - Same as Q7300H2029
- Local or Remote Space Sensor - Same as Q7300H2029
- Discharge Air Sensor - Same as Q7300H2029
- Aux Relay Operation - Same as Q7300H2029
- Heat Pump Option - Chose which O or B terminal to be on in heating/cooling mode. Range: O ON in Cool, B On in Heat or B ON in Cool, O On in Heat. Default: O ON in Cool, B On in Heat
- KeyBoard Lockout - Same as Q7300H2029

Zone Setpoints

Zone setpoints are configured in the same manner as setpoints in the XL10 CVAHUs. The options and defaults are the same.

Scheduling

Scheduling can be done in the same manner as scheduling in the XL10 CVAHUs if the XL15A scheduling option was chosen on the System Selection screen. Otherwise, the T7300 may be programmed using the keypad.

When all RTU systems are programmed, click No and RapidZone moves to Fig. 20 screen, the Network Display Option screen. There is a table where the a maximum of four RTUs can be selected per command display.

NOTE: The command displays that are not checked are eliminated from the project.

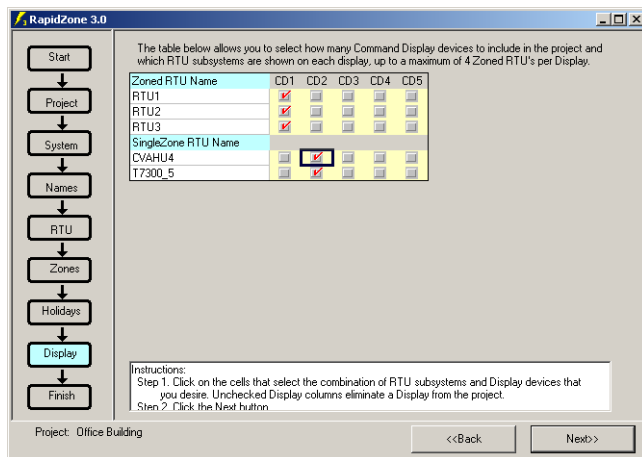


Fig. 19. Network Display Options screen.

When the table is filled in, click Next>> to move to Fig. 20.

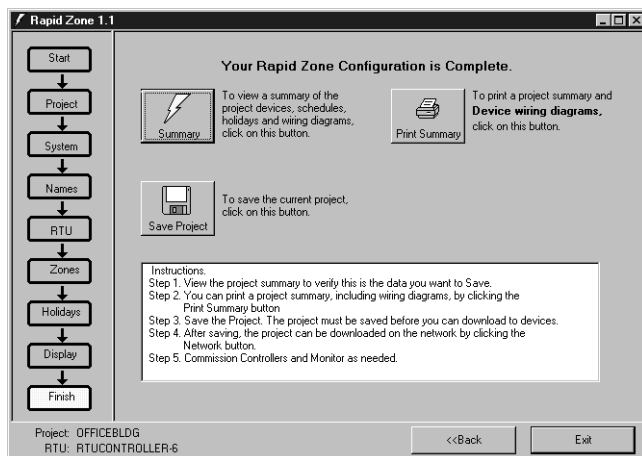


Fig. 20. Finish screen.

The Finish screen gives the user the option of viewing the project on the computer screen, printing a summary of the project which includes wiring diagrams for each unique device and saving the project. See Fig. 21 to 25.

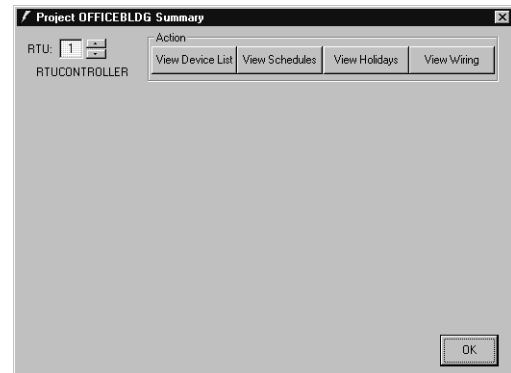


Fig. 21. Project Summary screen.

Save Project Button: To save the current project, click this button. See Fig. 26 to 28. The project will be saved in a subdirectory named after the project name under the RapidZone subdirectory. Next RapidZone asks if a backup of the project is needed. A backup is useful for transferring a project to another PC running RapidZone. If a backup is desired, click Yes and choose the directory location and file name. The project backup is saved to this file with an extension “.rzb”. See the Start screen for information on how to restore this backup.

The Network button appears after the project is saved. When clicked, the devices can be commissioned.

NOTE: If no changes are made to an existing project that has already been commissioned, then the Network button will appear on the Finish screen without having to save the project.

When reviewing information and changes are necessary, do either of the following:

1. When configuring the project, use the <<Back button to scroll back to the screen that needs changing. Make the changes and scroll to the finish screen to review again. Save the project again to keep the changes.
2. When commissioning or monitoring the project, exit the program and start over with the Start screen, select Existing Project and select the project name. Scroll through the screens until the information that needs to be changed appears. Make the changes and scroll to the finish screen to review again. Save the project to keep the changes.

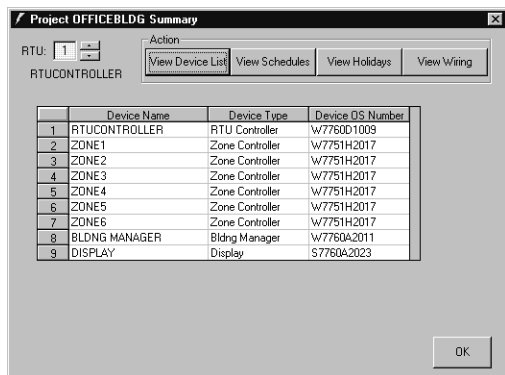


Fig. 22. Project Summary View Device List screen.

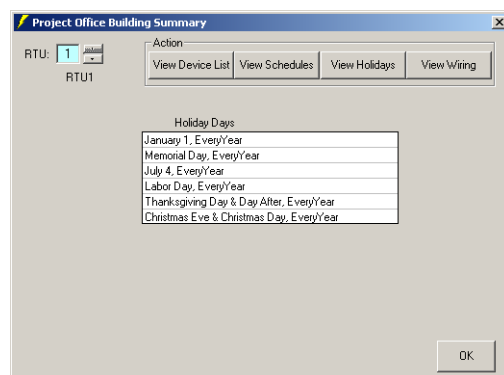


Fig. 24. Project Summary View Holidays screen.

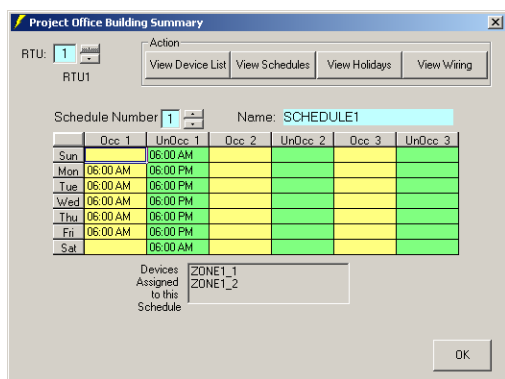


Fig. 23. Project Summary View Schedules screen.

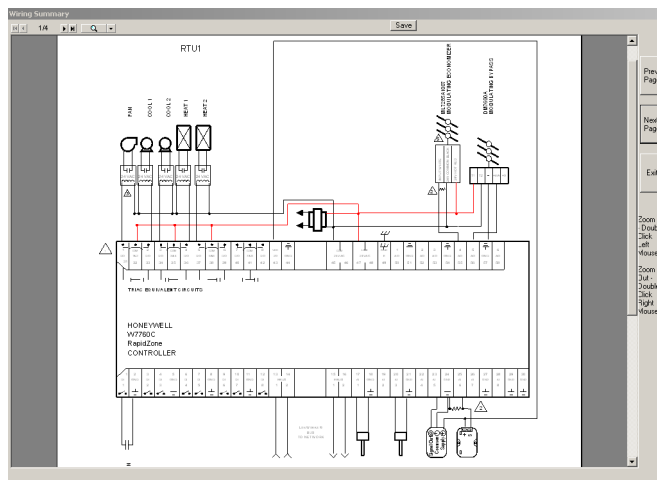


Fig. 25. Project Summary View Wiring screen.

NOTES:

- Left double click the wiring diagram screen zooms in and right double click zooms out.
- Wiring diagrams can be saved as WMF files and opened in other CAD programs capable of handling such files.



Fig. 26. Saving the project screen.

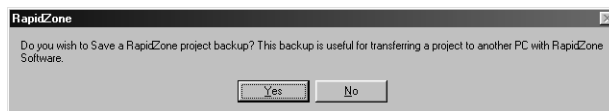


Fig. 27. Saving a backup of the project.

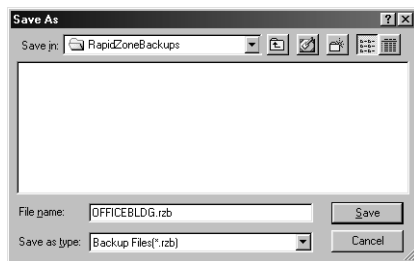


Fig. 28. Selecting the project backup name.

When saving the project, Fig. 26 to 28 screens appear.

SYSTEM COMPONENTS

The RapidZone Solution provides a complete network of direct digital control using a LONWORKS® bus. RapidZone is an easy to use PC tool that configures, commissions and monitors a project. The controllers (XL15C, XL10 CVAHU and T7300/Q7300) control the RTU subsystem fan, static pressure (if present), heating, cooling and economizer (if available). The Zone Controllers (W7751J) control the temperature of each zone. The Wall Module (T7560A, T7770A, C) senses the zone temperature. Optional T7770C models provide setpoint adjustment and bypass override. The optional Building Manager (XL15A) controls the scheduling, alarming and trending for the RTU subsystem. The optional Command Display (S7760A) shows system variables and alarms. The SLTA-10 (Q7760A) and optional modems provide local or remote access to the system via telephone connection. Both direct and remote connections can also be established with RapidLink (Q7770A1001). If RapidLink is used, speed is dramatically increased, especially via remote phone line connections. Also, RapidLink has an on-board modem, which eliminates the need for an additional external modem. The optional ST7009 Electronic Programmable Timer provides 24 hour or 7 day microprocessor based time clock switching. The

LONWORKS® bus allows sharing of outdoor air temperature and other data between controllers, which reduces the wiring and accessory costs of the installation.

Local monitoring and programming is provided by the Command Display. The Wall Module is designed to allow setpoint control from the zone rather than from the Command Display or from the PC.

Either the XL15A or an external time clock, if desired, provides scheduling. When using a T7300/Q7300, the XL15A can be used for scheduling, or the keypad may be used to manually input a schedule for that particular T7300/Q7300 and its RTU.

RapidZone (ZL7751A) Description

RapidZone (ZL7751A) is an easy to use Microsoft® Windows®-based PC tool that configures, commissions and monitors a constant volume HVAC system project with up to 18 zones per RTU subsystem. RapidZone leads the user through a series of screens where RTU, zone equipment and parameters are selected. RapidZone commissions and monitors the controllers. See Fig. 29.

RapidZone requires the following computer platform:

- Microsoft® Windows® 2000, or Microsoft Windows XP.
- 266 Mhz microprocessor or better.
- 128 MB of RAM.
- 100 MB minimum of available hard disk space.
- Super VGA monitor with 800 x 600 resolution or better.
- Standard RS-232 9 pin male to 9 pin female cable.

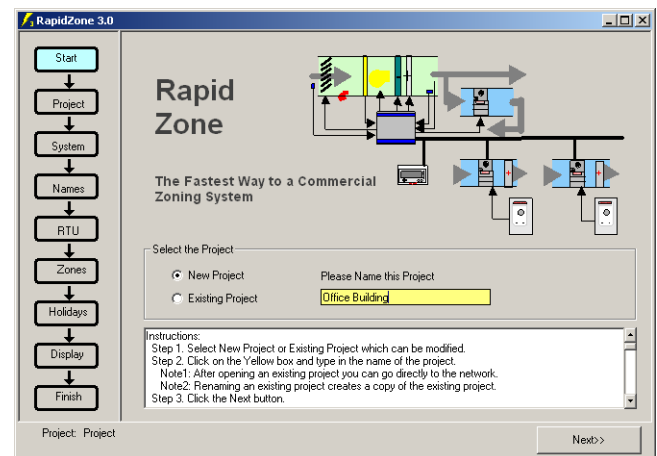


Fig. 29. RapidZone software.

RapidZone Controller (XL15C) Description

The XL15C RapidZone Controller (W7760C) is a LONWORKS® network device that is used to control and monitor the central RTU HVAC equipment for the RapidZone Solution. The RapidZone Controller controls the fan, cooling, heating, economizer and bypass damper. Each RapidZone Controller can support up to eighteen Zone Controllers. Each project can support up to 50 RTU subsystems. A further limitation is the LONWORKS® bus supports a maximum of 120 controllers. The RapidZone Controller offers easy access to all input and output points for checkout while operational. See Fig. 30.



Fig. 30. W7760C

XL10 CVAHU Description

RapidZone 3.0 and higher supports the use of the XL10 CVAHU (W7750A, B enhanced, and C) controller. Configuring and commissioning of the CVAHUs can be done without bringing the project into LonSpec. The CVAHU will only control one zone with its respective RTU. The same sensors are available for use on the CVAHU as for the XL15C. For a detailed description of the different capabilities of the CVAHU models, see literature 63-7046, 74-2956 and 74-2958.

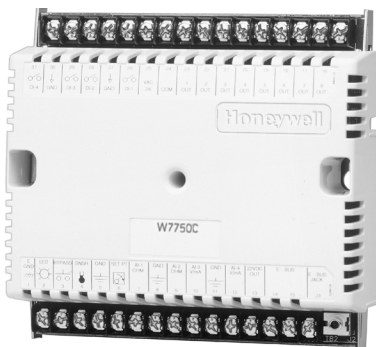


Fig. 31. W7750 CVAHU

T7300/Q7300 Description

Another way of controlling a single zone RTU in RapidZone 3.0 or higher is with a T7300 and a Q7300H2029 (conventional) or Q73002003 (heat pump) Thermostat. Configuring and commissioning of the T7300/Q7300 can be done without bringing the project into LonSpec. The thermostat will only control one zone with its respective RTU. The remote sensor for the T7300 is the T7147. For a detailed description of the different capabilities of the T7300/Q7300 models, see literature 63-4365, 63-1281 and 63-4366.

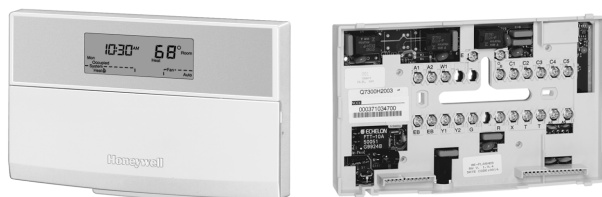


Fig. 32. T7300/Q7300

Zone Controllers (W7751J) Description

The W7751J is a factory-integrated Zone Controller and a 90 second ML6161B Direct Coupled Actuator in the Excel 10 family product line. This zone controller provides pressure dependent damper control. The W7751J controller provides two additional outputs that can control a fan, zone reheat coils, or peripheral heat. The heaters can be staged electric or modulating hot water. See Fig. 33.

NOTE: The W7751H may be used in place of the W7751J.



Fig. 33. W7751 Zone Controller.

T7560A, T7770A,C Wall Module Description

The T7770A, C Wall Modules are a family of direct-wired modules for use with the Zone Controllers (W7751J). Both models have a zone temperature sensor and the T7770C has setpoint adjustment, occupancy override with LED. See Fig. 34.

The T7560A Digital Wall Module may be used in place of the T7770A, C. See form 95-7620 for information on features.



Fig. 34. Wall Modules.

Building Manager (XL15A) Description

The XL15A Building Manager (W7760A) is an optional LONWORKS® network device that is used to schedule, trend, monitor and handle alarms for the RapidZone Solution. The XL15A can be configured to support up to four RTUs. The XL15A can have up to 8 different schedules and 20 holidays.

NOTE: To obtain maximum trending, alarming scheduling and holidays, one XL15A is required for each RTU.

The RapidZone Solution automatically configures each XL15A to trend key system variables and alarm on RTU failures. See Fig. 35.



Fig. 35. W7760A Building Manager.

Command Display (S7760A) Description

The Command Display (S7760A) provides local display of system variables and alarms in a LONWORKS® network. The RapidZone Command Display also allows the user to modify setpoints, schedules, and acknowledge alarms. Easy navigation between building and room views allow users to easily perform the most common tasks. See Fig. 36.

Several layers of display screens provide different views:

- buildings
- rooms
- schedules
- setpoints

Local display allows setpoint and schedule changes and alarm acknowledgment. See the Command Display Users guide (form number 74-3450) for more information. One command display can handle up to 4 RTU subsystems.

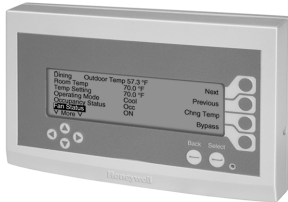


Fig. 36. S7760A Command Display.

ST7009 Electronic Programmable Timer

The optional ST7009 may be used as an alternative to the XL15A Building Manager for scheduling. The ST7009 family of one and two-switch programmable timers are compact timer controls providing 24-hour or 7-day microprocessor based switching. Heavy duty 16A spdt relay contacts can switch low- or line-voltage loads. Up to 21 on and 21 off functions are available per day. See Fig. 37.

All models feature large keys and a large liquid crystal display (LCD) for easy circular programming of schedules. The ST7009 allows for selection of any combination of days and additional programming events per day.

Built-in program backup provides retention of memory and time-of-day during a power outage. The ST7009 features an automatic internal recharging battery backup program for up to a two-week period. The ST7009 also offers a holiday programming schedule of one or more days that can be programmed up to a week in advance.

NOTES: The ST7009 timer must be programmed manually, RapidZone does not program it. One ST7009 is required per RTU subsystem, if configured. Since the ST7009 provides its output through a dry contact, one ST7009 can be used for multiple RTU subsystems with the appropriate isolation relays.



Fig. 37. ST7009 electronic programmable timer.

Q7770A RapidLink

The RapidLink™ Dial-Up Network Adapter provides local access to LonWorks Bus (E-bus) from a PC through an industry standard EIA-232 interface (previously called RS-232) or dial-up remote access through an on-board 56 Kbps modem. All of the RapidLink connections are located on the rear panel of the device. RapidLink utilizes superior communication methods to dramatically boost speed in both remote and direct communication.



Fig. 38. Q7770A RapidLink.

Q7760A SLTA-10

Commissioning and monitoring the RapidZone Solution is done on site via direct connection to the LONWORKS® network. The Q7760A SLTA-10 connects the PC running RapidZone to the project. See Fig. 39 and 40.

To locally commission and monitor the network with RapidZone via direct connection to the project, connect the SLTA-10 to a serial port on the PC. Connect the LONWORKS® bus wire from the SLTA-10 to the devices in the project.

The RapidZone Solution provides a means to remotely monitor the project over the telephone lines. Another SLTA-10 with a modem connected is required. Refer to the following LONSTATION™ section.



Fig. 39. Q7760A SLTA-10.

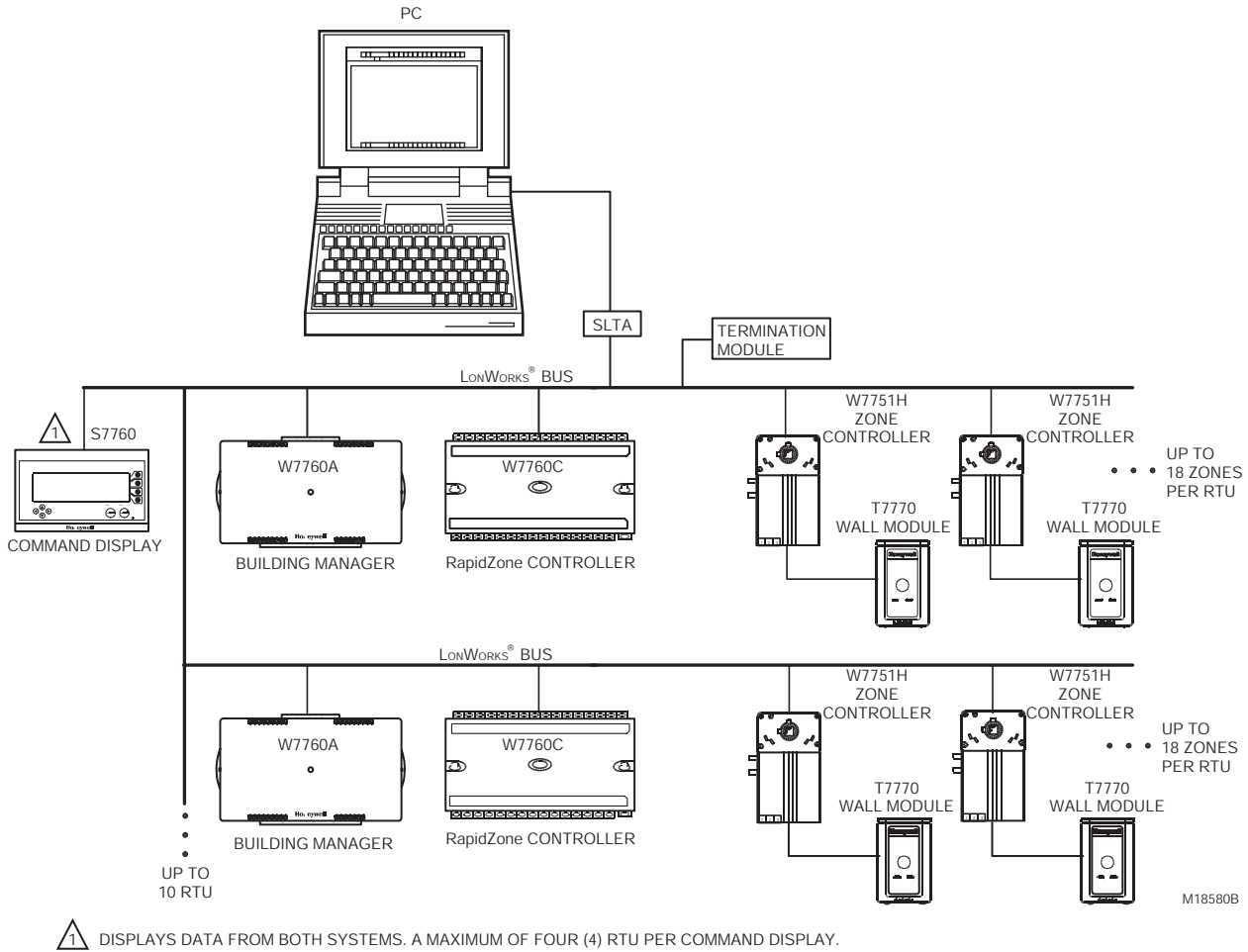


Fig. 40. PC connected directly to the SLTA.

ZL7762A LONSTATION™

LONSTATION™ (ZL7762A) is an easy to use PC workstation tool. It allows monitoring, setpoint and schedules changes either by local connection to the LONWORKS® network or by remote telephone connection. See Fig. 41.



Fig. 41. LONSTATION™ Workstation.

For local connections, a Q7760A SLTA-10 or Q7770A RapidLink connects to the PC via a serial port on the back of the computer (most computers have two serial ports). The LONWORKS® bus wire then connects the SLTA-10 or RapidLink and the devices in the system. See Fig. 40. For remote connections, the project must have a SLTA-10 and modem on site, or RapidLink unit and the PC has a modem connected to one of its serial ports. See Fig. 42.

NOTE: RapidLink does not require an onsite modem.

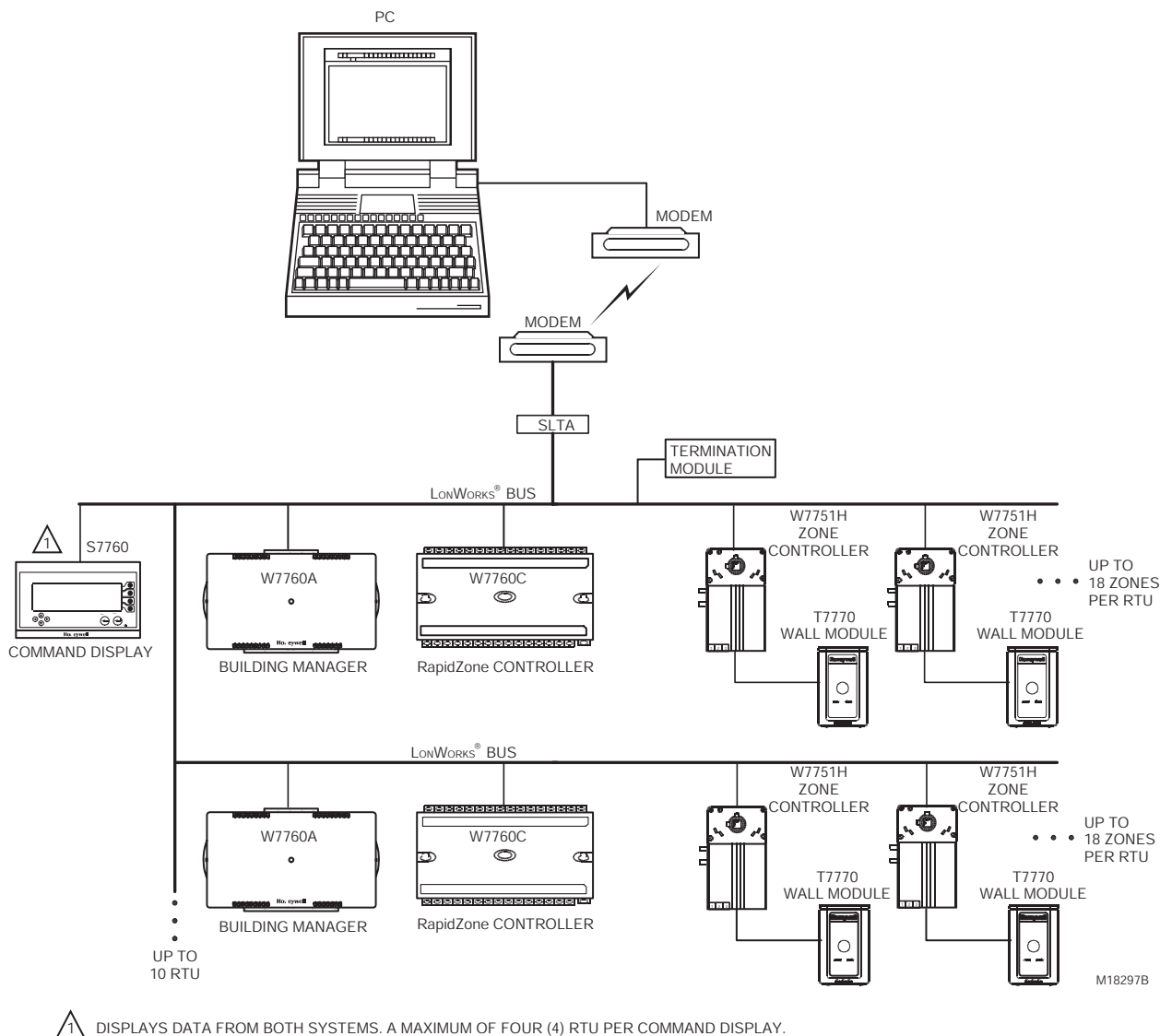


Fig. 42. Typical wiring diagram of a complete RapidZone Solution system with remote access.

LONWORKS® Bus Wiring and Remote Communications

The RapidZone 3.0 and higher supports the following devices on the LONWORKS® Bus: XL15C RapidZone Controller (W7760C), XL10 (W7750A,B enhanced, C), T7300/Q7300, XL15A Building Manager (W7760A), Zone Controller (W7751J), Command Display (S7760A), SLTA-10 (Q7760A), and Q7770A RapidLink. The RapidZone Solution limits the number of RTU subsystems per project to 50 and the number of zones per RTU subsystem to 18. A further limitation is the LONWORKS® bus supports a maximum of 120 controllers. If more devices are needed, another project needs to be

created in RapidZone. Each project needs to be on its own LONWORKS® bus. Multiple projects can not be wired together into a bigger project.

The RapidZone Solution uses Free Topology to support polarity-insensitive wiring scheme for star, loop and/or T-tap wiring. This network configuration supports a bus length of 1640 feet and requires one FTT Termination module (part number 209541B). Connect the brown and yellow wires of the FTT Termination module to the LONWORKS® network. If there are more than 60 controllers, then a Q7740 repeater must be used. The maximum number of controllers with a repeater is 120. See LONWORKS® Bus Wiring Guidelines (form 74-2865).

For information on these components of the RapidZone Solution, see web page [//customer.honeywell.com/rapidzone](http://customer.honeywell.com/rapidzone).

INPUTS

RapidZone Controller Inputs

Outdoor Air Temperature Sensor

A single outdoor air temperature sensor must be present in the RapidZone Solution system. It is used for cooling and heating lockout and optionally to enable the economizer. If the XL15A Building Manager is present, the system will log the outdoor air temperature each hour for the last 24 hours. This sensor must be mounted outdoors and protected from direct sunlight. RapidZone configures this input as type 20K NTC.

NOTE: When there are two or more RTU subsystems, only one OAT sensor is needed. It is wired to the RapidZone Controller on the first RTU subsystem and shared with the other RTU subsystems over the LONWORKS® network.

Discharge Air Temperature Sensor

A single discharge air temperature sensor must be present in each RTU subsystem. This sensor must be mounted in the discharge air stream before the bypass duct to properly sense the correct discharge air for the HVAC unit. Fig. 43 shows the proper location of the discharge air sensor. RapidZone configures this input as type 20K NTC.

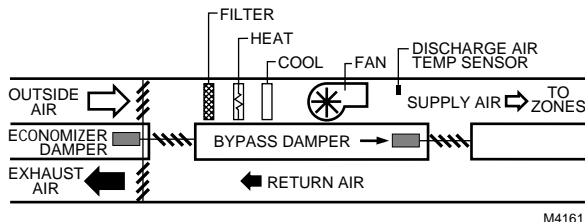


Fig. 43. Proper discharge air sensor location.

Duct Static Pressure Sensor

This optional sensor measures the duct static pressure. It is mounted on the side of the supply duct two thirds down the length of the longest duct and away from any air turbulence. See Fig. 46. The RapidZone Solution uses this sensor to modulate the bypass damper to maintain constant pressure in the supply duct. RapidZone configures this input as 0 to 10 volts equals 0 to 1 inW (for P7610F), or 4-20 mA equals 0 to 5 inW (for P7610D).

IMPORTANT

To protect against sensor shorts or failures, a high limit sensor should be wired to the fan to shut it down on high duct pressure.

Outdoor Enthalpy Sensor

This is one of four options to enable the economizer. This optional sensor measures outdoor enthalpy. If outdoor enthalpy is selected as the economizer enable, then this sensor must be present. With differential enthalpy selected, two of these sensors must be present, one for outdoor and one for return air. The RapidZone Solution uses the C7400A solid state enthalpy sensor configured for the B curve. RapidZone configures this input as 2 to 10 volts equals 0.004 to 0.02 Amperes.

Demand Control Ventilation (CO₂) Sensor

This optional sensor measures the CO₂ in the return air duct or a selected zone. See Fig. 2. The RapidZone Solution continuously compares the CO₂ level against the CO₂ Setpoint. If the measured value exceeds the setpoint, the RapidZone Controller will increase the outdoor damper position to let more outdoor fresh air in. The RapidZone Solution uses either the C7232A wall mounted or C7232B duct mounted sensor. RapidZone configures this input as 2 to 10 volts equals 500 to 1500 ppm.

Economizer Enable Digital Input Switch

This is one of four options to enable the economizer. This input can be used with any temperature or enthalpy control capable of providing a dry contact digital input to the RapidZone Controller. Examples of these controls are the T675 and T6031 for dry bulb changeover, the H705 for single enthalpy changeover or the H705 with C7400 enthalpy sensor for differential enthalpy changeover. When the input is open, then outdoor air is NOT suitable for use as cooling. When the input is closed, then outdoor air is suitable for use as cooling.

Dirty Filter Digital Input Switch

This optional digital input indicates a dirty RTU filter. It is typically a differential pressure measurement across the filter, converted to a dry contact digital switch signal. This input is not a selection in RapidZone but always appears on the wiring diagrams. If it is not required, do not wire to the terminals. When the input is open, then the filter is clean. When the input is closed, then the filter is dirty. This input is for diagnostics only.

Fan Status Digital Input Switch

This optional digital input provides proof of air flow. When the input is open, then there is no air flow (fan not running). When the input is closed, then there is air flow (fan running). Refer to Equipment Operation for details.

Shutdown Digital Input Switch

This optional digital input provides a means to shutdown the RapidZone Controller. This can be wired to a hand on/off switch or to an automated device that monitors the equipment for shutdown conditions. This input is not a selection in RapidZone but always appears on the wiring diagrams. When the input is open, then the system operates normally. If it is not required, do not wire to the terminals. When the input is closed, all RapidZone Controller digital outputs are deenergized and all analog outputs are commanded to 0%. The Zone Controllers continue to operate.

FreezeStat Digital Input

When Modulating Cooling or Heating is configured, a Freeze Stat Digital Input is automatically added to the wiring diagram. Upon receiving a contact closure, the control algorithm will turn the fan off, close the outdoor air damper, and open the hot water and chilled water valves to full open. The controller auto-clears this alarm once the contact opens. If manual-reset is desired, the Freeze Stat device must provide the physical pushbutton, which the operator presses, to reset the system after a freeze condition has occurred.

Heat Pump Emergency Heat Digital Input Switch

This optional digital input on heat pump systems commands auxiliary heat to be used instead of the heat pump compressors. When the input is open, then the normal heat pump sequence of operation will be used. When the input is closed, the RapidZone Controller will go to heat mode and turn off any heat pump compressor stages. If there is a demand for heat, then the auxiliary heat stages will be used.

Zone Controller Inputs

Zone Temperature Sensor

A zone temperature sensor is required for each zone. The T7770A,C Wall Modules each provide a sensor for zone temperature. See Fig. 34, 50 and 51. The T7770A is a sensor only model. The T7560A can be used as a zone sensor with setpoint knob and bypass button.

Zone Setpoint Knob

This optional input allows the user to adjust the setpoint from the zone. The T7770C Wall Module with setpoint knob and bypass button must be used. If a setpoint knob is used, high and low limits can be configured to limit adjustment from the zone.

Zone Bypass Button and LED

This optional input allows the user to initiate a bypass from the zone. The T7770 C wall module with setpoint knob and bypass button must be used.

OUTPUTS

RapidZone Controller Outputs

NOTE: Typically on/off outputs are assigned to RapidZone Controller digital outputs. RapidZone may assign analog outputs as digital depending on other output options selected. See the RapidZone wiring project diagrams for details.

Fan Digital Output

This digital output controls the supply duct fan. When the output is on, the fan is commanded on.

Cooling or Heat Pump Compressor Stage Digital Outputs

These optional digital outputs control each stage of cooling or heat pump compressor stages. The RTU subsystem can have up to 4 cooling stages or 2 heat pump compressor stages.

Cooling Modulating Output

This 4-20mA output controls a chilled water coil. If needed, the output may be converted to 2-10 VDC by adding a 500 ohm resistor across the output. For freeze protection a spring return actuator/value combination (ML7425B3012/ V501*N1**) is showing on the wiring diagram (opens on power failure). For applications not requiring freeze protection a non-spring return actuator (ML7421A1032) may be applied at a lower cost.

Heating or Heat Pump Auxiliary Stage Digital Outputs

These optional digital outputs control each stage of heating or heat pump auxiliary heating stages. The RTU subsystem can have up to 4 heating stages or 2 heat pump auxiliary stages.

Heat Pump Reversing Valve Digital Output

This digital output is required for heat pump systems. It controls the refrigerant reversing valve (also called the changeover relay or B/O valve). The Advanced RTU screen allows this to be configured either as Reversing Valve ON with Cool or Reversing Valve ON with Heat.

Heating Modulating Output

This 4-20mA output controls a hot water or steam coil. If needed, the output may be converted to 2-10 VDC by adding a 500-ohm resistor across the output. For freeze protection a spring return actuator/value combination (ML7425B3012/ V501*N1**) is showing on the wiring diagram (opens on power failure). For applications not requiring freeze protection a non-spring return actuator (ML7421A1032) may be applied at a lower cost.

Economizer Damper

These optional output(s) control the economizer damper. The economizer damper can be modulating or floating. If modulating, a single Analog Output is configured as 4-20 mA equals 0-100%. If floating, two digital outputs are configured, one to open the floating motor and one to close it. Floating outputs also require the motor speed to be entered. This is the time in seconds it takes to move the motor from full closed to full open.

Bypass Damper

These optional output(s) control the bypass damper. The bypass damper can be modulating or floating. If modulating, a single Analog Output is configured as 4-20 mA equals 0-100%. If floating, two digital outputs are configured, one to open the floating motor and one to close it. Floating outputs also require the motor speed to be entered. This is the time in seconds it takes to move the motor from full closed to full open.

Zone Controller Outputs

Zone Peripheral Heat or Reheat

These optional output(s) control the either the peripheral heat or the reheat in a zone. This can be staged or floating. This is wired to the W7751J Zone controller. If staged, up to 2 stages of reheat or 1 stage of peripheral heat can be configured. If floating, two digital outputs are configured, one to open the floating motor and one to close it. Floating outputs also require the motor speed to be entered. This is the time in seconds it takes to move the motor from full closed to full open. If a zone fan is used, only one stage of reheat or peripheral heat can be configured.

Zone Fan Output

This optional output controls the fan in the zone box. The options are no fan and parallel fan. The fan is wired to the W7751H,J Zone controller.

NOTE: The W7751J Zone Controller only has two outputs. If two stages of reheat, floating reheat, or floating peripheral heat is specified, then a zone fan can not be used.

COMPONENT WIRING

RapidZone provides custom wiring diagrams for each configured RTU subsystem and zone. The wiring diagrams show the O.S. number of each component and the terminals used in wiring. See Fig. 44. Use the installation instruction sheets with each controller for guidance on wiring power, inputs, outputs, and the LONWORKS® Bus.

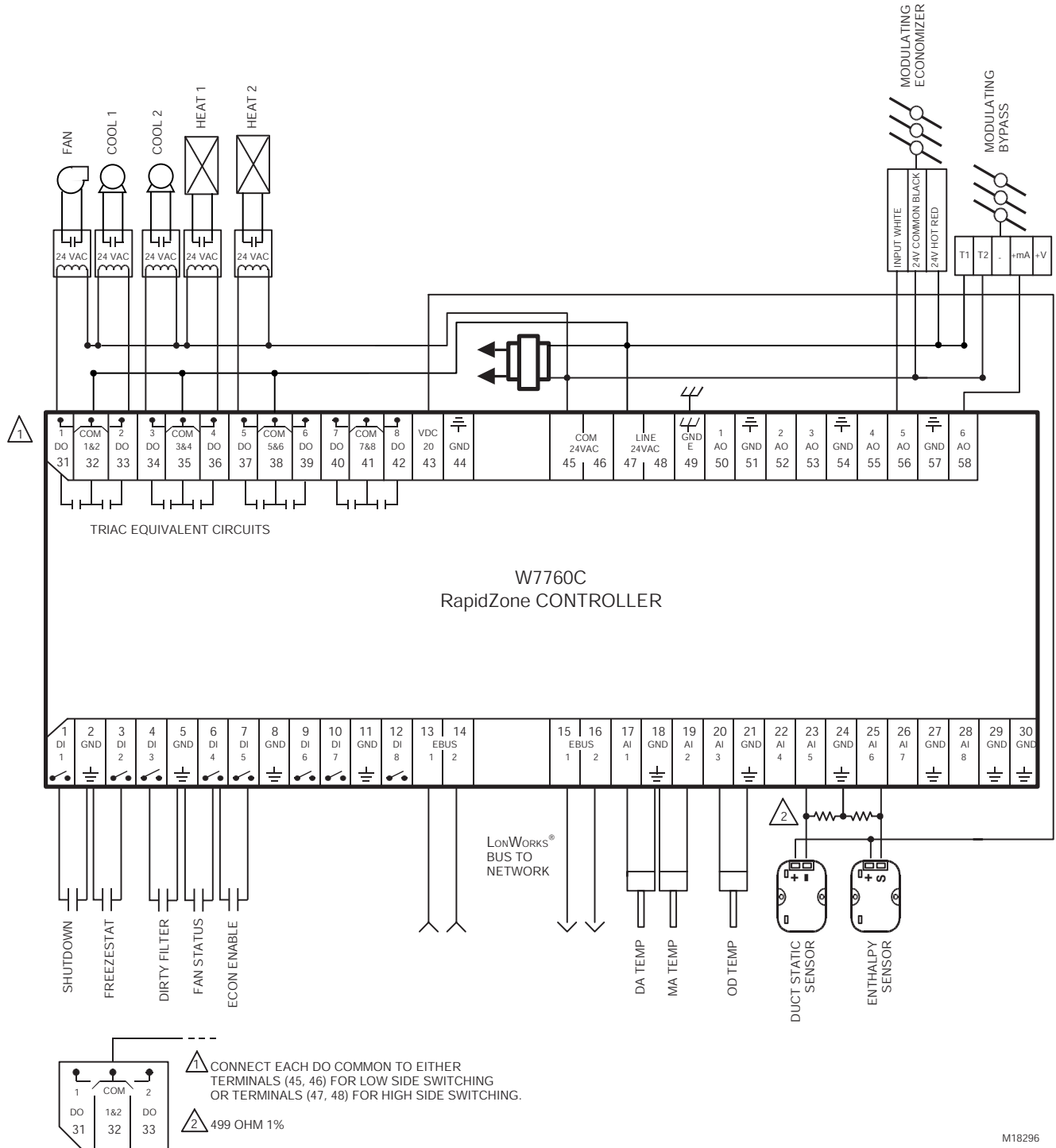


Fig. 44. Typical wiring diagram of RapidZone Controller.

EQUIPMENT OPERATION

The RapidZone Controller contains the control sequence for operating the HVAC RTU air handling unit. The Zone Controllers contain the control sequence for operating each zone (1 to 18). The RapidZone Controller controls the heating and cooling based on the terminal load requirements for each zone. The RapidZone Controller commands the HVAC unit through analog and digital outputs. These outputs include fan, modulating bypass signal, cooling modulation or stages, heating modulation or stages, modulating economizer signal and heat pump compressor, auxiliary heat stages and a reversing valve output (B/O). The Zone Controllers control the zone temperature by using the integral motor to command the zone damper. The Zone Controller has optional outputs for peripheral heat, reheat or a zone fan.

The RapidZone Controller and the Zone Controllers communicate with each other over the LONWORKS® network. The discharge air temperature (DAT) is continuously sent to all Zone Controllers. Each Zone Controller decides if the DAT is suitable to heat/cool the zone based on the current zone temperature and setpoint. Each Zone Controller sends its terminal load to the RapidZone Controller. The RapidZone Controller uses this to determine building heating and cooling needs. Terminal load represents zone temperature deviation from setpoint. Cooling is needed if terminal load is between 0 and +163%. Heating is needed if terminal load is between -163% and 0%. Zero percent means the zone is satisfied. The further from zero, the more heating or cooling is needed in the zone.

Fig. 45 shows a typical system HVAC unit. The RapidZone Controller continuously examines the terminal loads from all zones and determines whether it should change from cooling to heating or from heating to cooling. If all zones need heating, RapidZone Controller will command the RTU to heat mode and supply heating. If all zones need cooling, RapidZone Controller will command the RTU to cool mode and supply cooling. However, many times some zones will need heating and some zones will need cooling. If both positive and negative terminal loads exist and they are outside the deadband ($\pm 20\%$), the RapidZone Controller will cycle the RTU between heating and cooling every Minimum Time in Mode - Minutes. For example, if both heating and cooling are needed by zones and the Minimum Time in Mode is configured to 15 minutes, then every 15 minutes the RTU will switch modes. If a mode change is needed, the Minimum Time in Mode must expire. When it is time to switch from heating to cooling, the RapidZone controller will immediately turn off all heat stages, regardless of how long they have been on and enable cooling. Similarly when switching from cool to heat, the RapidZone controller will immediately turn off all cool stages and switch to heating. The RapidZone Controller will never call for simultaneous heating and cooling.

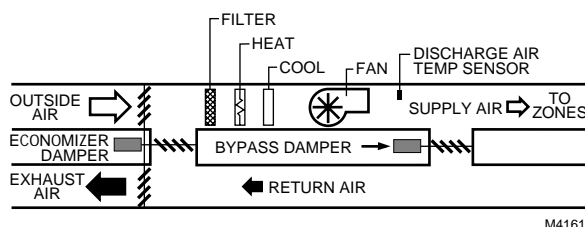


Fig. 45. Typical HVAC unit.

The zones monitor the discharge air temperature (DAT). When the DAT is suitable to meet the zone needs, the Zone Controllers will modulate their zone dampers to satisfy the zone setpoint while zones in the opposing mode will close their dampers to minimum position (occupied periods) or closed (unoccupied periods) See Zone Controller Operation for more information.

Up to 5 zones can be configured as High Priority. The remaining zones are Normal Priority. The RapidZone Controller uses the Zone Priority of each zone to modify the terminal load signal received from the zone. For Normal priority zones, the terminal load is used as received. For High priority zones, the terminal load is multiplied by 1.5. Zone terminal loads must be greater than 20% or less than -20% in order for the RapidZone Controller to turn heating or cooling on in the RTU. If all terminal loads are in the deadband (between -20% and 20%), then neither heating or cooling will be called for. High priority allows a zone to get noticed faster by the RTU than if it were Normal priority.

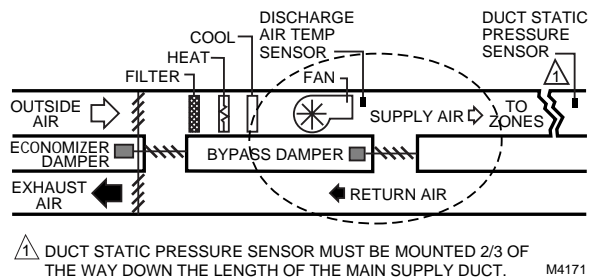
For example, a project has a RTU with 4 zones, 3 need heat and have terminal loads of -18% each. The fourth zone needs cooling and has a terminal load of 25%. Let the Minimum Time in Mode equal 15 minutes. In this example the RTU will be commanded to cool mode because only cooling has a terminal load outside of the deadband (greater than 20%, less than -20%). The RTU will remain in cool mode. The economizer/mechanical cooling will provide cooling until that zone's terminal load falls below 20%. Then mechanical cooling will be turned off.

Now suppose a project has the same initial conditions as before except one of the zones that needs heating is configured to be High Priority. Then its terminal load is really -18% multiplied by 1.5 = -27%. The RTU now has simultaneous calls for heating and cooling outside the $\pm 20\%$ terminal load deadband. The RTU will switch between cooling and heating every 15 minutes until all zones fall within the deadband. When all zones are within the deadband, the RapidZone Controller will remain in the last mode and all heating and cooling will be turned off.

As long as there is at least one zone outside the terminal load deadband needing heat and at least one zone outside the deadband needing cooling, the RTU will cycle between heating and cooling. For example, if 9 zones need cooling and only one zone needs heating, the RTU will cycle between heating and cooling. In this example, the zone needing heat should quickly be satisfied since all the RTU heat is directed at it. The RTU should then spend more time satisfying the cooling needs.

Fan Operation

The RapidZone Solution offers the option of operating the fan digital output continuously in the occupied mode or intermittently in the occupied mode. The fan digital output always operates intermittently in the unoccupied mode. A continuous fan is ON all of the time during the occupied period. An intermittent fan is OFF when heat and cool are OFF and the economizer is at minimum position or less; the fan is ON for other conditions.



Static Pressure Control

The RapidZone Solution allows constant volume HVAC units to be used for zone control applications. Because these units provide a constant volume of airflow, the control system must compensate for those occasions when the airflow to the zones is reduced due to the closing of individual zone dampers. The result of the zone damper closing is an increase in the supply duct static pressure. To compensate for this increase in static pressure sensed by the P7610 Differential Pressure Transmitter, the RapidZone Controller uses a proportional + integral control loop to modulate the bypass damper. When open, the bypass damper directs air from the supply duct to the return duct or the return air plenum. Fig. 46 illustrates the bypass damper and return duct arrangement.

The static pressure control loop is an independent loop. It continuously monitors the duct static pressure during heating or cooling and occupied or unoccupied periods and controls the bypass damper to maintain the Bypass Setpoint. If the fan is commanded off, then the bypass damper is commanded to the Default Position (default = 66%).

Fig. 46. Bypass damper and return duct arrangement.

IMPORTANT

To protect against sensor shorts or failures, a high limit sensor should be wired to the fan to shut it down on high duct pressure.

NOTE: The duct static pressure sensor is mounted on the side of the supply duct two thirds down the length of the longest duct and away from any air turbulence.

Bypass Damper Type

The RapidZone Solution offers three methods for controlling the bypass damper. These options are selected from the Bypass Type:

- None.
- Floating (requires two digital outputs)
- Modulating (requires one analog output)

NONE

When the RTU doesn't have a bypass damper, choose None. The RapidZone Controller doesn't control static pressure.

FLOATING

Floating control requires one digital output to open the bypass damper and one digital output to close the bypass damper. The Bypass Setpoint, Motor Speed and Default Position must be configured.

MODULATING

Modulating bypass damper control requires one analog output. The bypass setpoint and default position must be configured.

NOTE: The user can select direct (4-20 mA) or reverse (20-4 mA) action for the bypass damper.

Bypass Setpoint

The Bypass Setpoint is adjustable from zero to five inches water column (0 to 1245 Pa). The default is 1 inW (249 Pa). The setpoint represents the duct static pressure required to provide proper air flow to all zones. When the duct static pressure rises above the control setpoint, the bypass damper modulates open to maintain the Bypass Setpoint.

Bypass Default Position

The Bypass Default Position is used to establish an open position for the bypass damper when the fan is off. The Bypass Default Position is adjustable from 0 to 100%. The default is 66%. The bypass damper is commanded to the Bypass Default Position whenever the fan is commanded off.

Bypass Damper Sizing

Bypass damper sizing is critical for quiet system operation. Table 2 lists recommended bypass damper sizes and quantities for various sizes and types of HVAC equipment. Both round and rectangular damper sizes are listed.

Table 2. Bypass Damper Sizing.

AC Unit Tons	Total CFM ^a		Bypass CFM ^b		Total Dampers Required ^c		Damper Sizes ^c in in.		Rectangular Duct Equivalent ^d in in.	
	Gas/Electric ^e	Heat Pump ^f	Gas/Electric	Heat Pump	Gas/Electric ^g	Heat Pump ^g	Gas/Electric	Heat Pump	Gas/Electric	Heat Pump
3.5	1400	1575	1120	1260	1	1	14	14	11 x 14	11 x 14
5	2000	2250	1600	1800	1	1	16	16	14 x 14	14 x 14
7.5	3000	3375	2400	2700	2	2	14	1-12	20 x 14	20 x 15
10	4000	4500	3200	3600	2	2	1-12, 1-16	16	20 x 16	20 x 18
12.5	5000	5625	4000	4500	2	3	16	2-16, 1-12	20 x 20	20 x 22
15	6000	6750	4800	5400	3	3	2-16, 1-14	16	20 x 24	20 x 25
18	7200	8100	5760	6480	4	4	3-16, 1-12	16	20 x 26	20 x 28
20	8000	9000	6400	7200	4	4	16	16	20 x 28	25 x 25
25	10,000	11,250	8000	9000	5	5	4-16, 1-12	5-16	25 x 26	30 x 25
27	10,800	12,150	8640	9720	5	6	4-16, 1-14	5-16, 1-12	30 x 25	30 x 26
30	12,000	13,500	9600	10,800	6	7	5-16	6-16, 1-12	30 x 26	30 x 28

^a Consult manufacturer published airflow and fan data for actual cfm and static pressure data.

^b Bypass cfm equals total cfm times 80%.

^c Total dampers required and damper sizes are calculated using a 0.15 return air static pressure (friction per 100 feet of duct). All calculations result in a duct velocity below 1500 fpm (feet per minute).

^d When a rectangular duct is used, a fabricated damper can be applied. Use Honeywell actuator ML7161.

^e Total cfm calculated on gas and electric systems by multiplying total tons times 400 cfm per ton.

^f Total cfm calculated on heat pump systems by multiplying total tons times 450 cfm per ton.

^g Where more than one bypass damper is required.

Cooling

Stage

The RapidZone Solution controls up to four cooling stages. These stages are energized one at a time based on demand from the zones. Terminal load is the term used for the demand from the zone. The system remains in cooling until the cooling demand is satisfied or when a simultaneous heating demand exists, until the Minimum Time in Mode - Minutes has expired. When a cooling demand exists, stage 1 energizes first. When demand is not satisfied, stages 2, 3 and 4 energize as needed (when configured). The cooling control loop uses proportional control to cycle the cooling stages. The maximum terminal load from all zones is used to drive the control loop. This terminal load is scaled to maintain a target setpoint of 100. The scaling occurs in real time to cycle cooling stages on and off to meet the current cooling load.

Once a stage is energized, it must remain energized for at least the minimum on time while in cooling mode. Fig. 47 illustrates the minimum on and off times for single stage operation. RapidZone sets the cooling minimum off time to 4 minutes, minimum on time to 1 minute, interstage off time to 1 minute, and interstage on time to 4 minutes. When one stage energizes and additional cooling is still required, the next stage does not energize until the interstage on time has elapsed. Similarly, when a cooling stage deenergizes, another cooling stage can not deenergize until the cooling interstage off time has elapsed. Once a stage of cooling has deenergized it must remain deenergized until the minimum off time has elapsed. Fig. 48 illustrates the minimum on, off and interstage on, off times for multiple stage operation.

Modulating

The RapidZone Solution controls a modulating 4-20mA signal. The output modulates based on demand from the zones. The system remains in cooling until the cooling demand is satisfied or when a simultaneous heating demand exists, until the Minimum Time in Mode - Minutes has expired. The cooling control loop uses proportional control based on the terminal load from the zones to modulate the output. The output is 0mA at less than +20% terminal load and 40mA at 120% or higher terminal load. The maximum terminal load from all zones is used to drive the control loop.

The mechanical cooling lockout function is used to disable mechanical cooling. When the outdoor air temperature goes below the Cooling Outdoor Lockout setpoint, the mechanical cooling is turned off and the control keeps it off until the outdoor air temperature rises +2°F (+1°C) above the Cooling Outdoor Lockout setpoint. The Cooling Outdoor Lockout setpoint is configured in the RTU Advanced programming screen. The Cooling Outdoor Lockout is the minimum outside air temperature the RTU is allowed to run in the cooling mode. The range of the Cooling Outdoor Lockout setpoint is 0 to 100°F (-17 to +38°C). The default is 50°F (10°C).

If cooling should be enabled for the widest temperature range, then configure Cooling Outdoor Lockout to 0°F (-17°C). Then cooling will be enabled whenever outdoor air temperature is greater than 0°F (-17°C). Similarly, if cooling should be disabled for the widest temperature range, then configure Cooling Outdoor Lockout to 100°F (38°C).

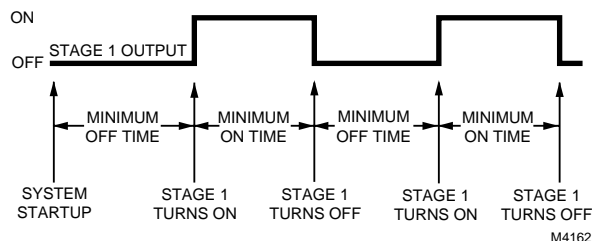


Fig. 47. Minimum on and off times for single stage operation.

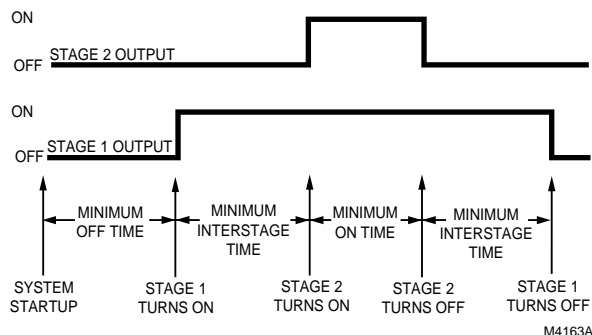


Fig. 48. Heating and cooling output staging.

Discharge Air Temperature Low Limit Control

When the discharge air temperature (DAT) approaches the low limit of 43°F (6°C), the cooling stages are gradually turned off and the economizer actuator (if configured and enabled) modulates toward the minimum position setting. The cooling stages and economizer are throttled back simultaneously. The DAT Low Limit control loop uses proportional only, with a setpoint of 43°F (6°C) and a throttling range of 5°F (3°C). This means as the DAT falls below 48°F (9°C), the DAT Low Limit control loop starts to throttle back cooling and the economizer. At 43°F (6°C), the cooling and economizer are completely shutdown.

Heating

Stage

The RapidZone Solution controls up to four heating stages. These stages energize in sequence based on demand from the zones. The system remains in heating until the heating demand is satisfied or when a simultaneous cooling demand exists, until the Minimum Time in Mode time has expired. When a heating demand exists, stage 1 energizes first. When demand is not satisfied, stages 2, 3 and 4 energize as needed (when configured). The heating control loop uses proportional control to cycle the heating stages. The minimum terminal load from all zones is used to drive the control loop. This terminal load is scaled to maintain a target setpoint of 100. The scaling occurs in real time to cycle heating stages on and off to meet the current heating load. Heating terminal loads are negative numbers. The minimum terminal load used to drive the control loop is really the most negative number.

The heating stages must adhere to minimum on, off and interstage on, off times like the cooling stages. Figs. 47 and 48 illustrate the minimum on, off and interstage on, off times for

heating operation. RapidZone sets the heating minimum off time to 4 minutes, minimum on time to 1 minute, interstage off time to 1 minute, and interstage on time to 4 minutes.

Modulating

The RapidZone Solution controls a modulating 4-20mA signal. The output modulates based on demand from the zones. The system remains in heating until the heating demand is satisfied or when a simultaneous cooling demand exists, until the Minimum Time in Mode - Minutes has expired. The heating control loop uses proportional control based on the terminal load from the zones to modulate the output. The output is 0mA at greater than -20% terminal load and 40mA at -120% or lower terminal load. The maximum negative terminal load from all zones is used to drive the control loop

The heating lockout function is used to disable heating. When the outdoor air temperature goes above the Heating Outdoor Lockout setpoint, the heating is turned off and the control keeps it off until the outdoor air temperature decreases +2°F (1°C) below the Heating Outdoor Lockout setpoint. The Heating Outdoor Lockout setpoint is configured in the RTU Advanced programming screen. The Heating Outdoor Lockout is the maximum outside air temperature the RTU is allowed to run in the heating mode. The range of the Heating Outdoor Lockout setpoint is 0° to 100°F (-17 to 38°C). The default is 60°F (16°C).

NOTE: Configure Heating Outdoor Lockout to 100°F (38°C) to enable the widest heating temperature range. Then heating is enabled whenever outdoor air temperature is less than 100°F (38°C). Similarly, to disable heating for the widest temperature range, configure Heating Outdoor Lockout to 0°F (-17°C).

Discharge Air Temperature High Limit Control

When the discharge air temperature (DAT) approaches the high limit of 130°F (54°C), the heating is gradually turned off. The DAT High Limit control loop uses proportional only, with a setpoint of 130°F (54°C) and a throttling range of 10°F (6°C). This means as the DAT rises above 120°F (49°C), the DAT High Limit control loop starts to throttle back heating. At 140°F (60°C), the heating is completely throttled back.

Economizer Control

RapidZone has three options for operating the economizer. The configuration selects the type of economizer operation. The options are:

- No Economizer
- Floating Economizer
- Modulating Economizer

The economizer allows outdoor air to be used as the first stage of cooling. When the economizer is enabled, the algorithm uses proportional + integral control to modulate the outdoor air damper to maintain the discharge air temperature at the Low Limit Disch Air Setpoint (default = 45°F (7°C)). The economizer opens when the discharge air temperature is above setpoint and closes when below setpoint. When the free cooling cannot satisfy the cooling demand, stages of mechanical cooling are energized when needed, as long as the outdoor air temperature is above the mechanical cooling lockout temperature. Mechanical cooling waits until the economizer is full open before energizing, if the economizer is

enabled. During occupied periods, the economizer maintains the outdoor damper position at least at the configured Economizer Minimum Position (default = 20%).

The RapidZone Controller enables or disables the economizer based on the Economizer Enable Type selection. The available options for enabling the economizer are described later in this section.

The economizer works with the demand ventilation control to control the outdoor air damper. This is described in the Demand Ventilation Control section.

No Economizer

When the HVAC unit does not have an economizer, choose no economizer.

Floating Economizer

Floating economizer allows direct control of the economizer actuator from the RapidZone Controller using two digital outputs to operate a ML6174A or equivalent floating actuator. The economizer actuator attempts to satisfy the cooling demand by opening the economizer damper and using outdoor air for free cooling. The outputs drive the economizer damper open and closed.

When floating economizer is selected, the Motor Speed needs to be configured. The Motor Speed is the time it takes the actuator to travel from full closed to full open. The default is 90 seconds.

Modulating Economizer

Modulating economizer allows direct control of the economizer actuator(s) using an analog output to operate a ML7285A or equivalent actuator. The economizer actuator attempts to satisfy the cooling demand by opening the economizer damper and using outdoor air for free cooling. The output drives the economizer damper open and closed.

Multiple damper actuators can be driven from this output. Refer to ML7174 Product Data Sheet 63-2209 for wiring details. See Fig. 49.

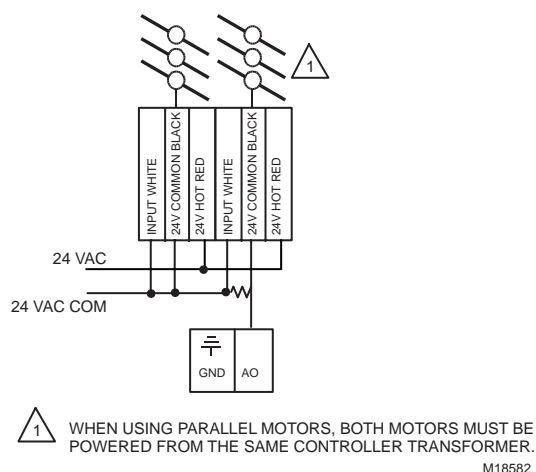


Fig. 49. Typical wiring for multiple damper actuators.

Economizer Enable Options

RapidZone enables or disables the economizer based on the Economizer Enable Type selection. RapidZone has four options for enabling the economizer. The configuration selects the economizer enable type. The options are:

- Digital Input
- Outdoor Temperature
- Outdoor Enthalpy
- Differential Enthalpy

Digital Input

A digital input is used to indicate that free cooling is available. This input can be used with any temperature or enthalpy control capable of providing a dry contact digital input to the RapidZone Controller. Examples of these controls are the T675 and T6031 for dry bulb changeover, the H705 for single enthalpy changeover or the H705 with C7400 enthalpy sensor for differential enthalpy changeover.

Outdoor Temperature

Outdoor temperature uses an analog temperature sensor and the economizer Enable Setpoint to determine when free cooling is available. This setpoint option uses the following equation to enable the economizer:

Enable the economizer if: Outdoor Air Temperature < Economizer Enable Setpoint

Example:

Enable the economizer if: Outdoor Air Temperature < 50°F (10°C)

In this example, the economizer is enabled when the outdoor air temperature is less than 50°F (10°C). The economizer is disabled and returns to minimum position when outdoor temperature is greater than the Economizer Enable Setpoint plus 2°F (1°C). The Economizer Enable Setpoint represents the maximum temperature of outdoor air that enables the economizer.

Outdoor Enthalpy

Outdoor enthalpy uses the outdoor temperature and humidity to determine when free cooling is available. This option uses the B-curve of the C7400A solid state enthalpy sensor. The economizer is enabled if outdoor enthalpy is less than ~24 BTU/lb (C7400A signal greater than 14 mA). The economizer is disabled and returns to minimum position when outdoor enthalpy is greater than ~25 BTU/lb (C7400A signal less than 13 mA).

NOTE: The C7400A is "reverse acting". That is, a low mA signal means high enthalpy.

Demand Ventilation Control

If Modulate Economizer on CO₂ Input is configured, then the measured CO₂ value is used to modify the outdoor damper position. An economizer must be configured for demand ventilation control. The larger of either the demand ventilation control signal or the economizer control signal is used to position the outdoor air damper. The demand ventilation control algorithm uses proportional + integral control to modulate the outdoor air damper to maintain the CO₂ level at the CO₂ Setpoint (default = 800ppm). When the CO₂ value is greater than the CO₂ Setpoint, the demand ventilation control signal increases. This may increase the position of the

outdoor air damper depending on where the economizer control commanded it. For example, if the economizer is commanding the outdoor air damper to 40% and demand ventilation control needs it at 50%, the outdoor air damper will be commanded to 50%. If the economizer is commanding the outdoor air damper to 90% and demand ventilation control needs it at 50%, the outdoor air damper will remain at 90%.

Heat Pump Operation

The RapidZone Solution can be configured to operate a heat pump. Heat pump operation can apply to either water source or air source heat pumps.

The RapidZone Solution controls up to 2 compressor stages (cooling/heating) and up to 2 auxiliary heating stages. This means there can be up to 2 cooling stages and 4 heating stages. Another digital output is required to energize the heat pump reversing valve. The reversing valve is energized according to the Reversing Valve ON selection. The Advanced RTU screen allows this to be configured either as Reversing Valve ON with Cool or Reversing Valve ON with Heat.

The Minimum Time in Mode applies to the compressor stages for both heating and cooling. When switching modes and all compressors are off, the RapidZone Controller waits 120 seconds before switching the reversing valve. This allows the compressors to pump down.

NOTE: The 120 second seconds count as part of the minimum time in the new mode.

The compressor and auxiliary heat stages must adhere to minimum on, off and interstage on, off times like the standard HVAC stages. Figs. 47 and 48 illustrate the minimum on, off and interstage on, off times for heating and cooling operation. RapidZone sets the heating and cooling minimum off times to 4 minutes, minimum on times to 1 minute, interstage off times to 1 minute, and interstage on times to 4 minutes.

Heat Pump Emergency Heat input

The RapidZone Controller has an optional digital input for heat pump emergency heat. When the input is closed, the RapidZone Controller will go to heat mode and turn off any heat pump compressor stages. If there is a demand for heat, then the auxiliary heat stages will be used.

Heat Pump Cooling, Heating and Auxiliary Heat lockout

The cooling outdoor lockout function is used to disable the compressor stages for cooling when the outdoor air temperature drops below the Cooling Outdoor Lockout setpoint. The compressor stages still can be used for heating when the outdoor air temperature is below the Cooling Outdoor Lockout setpoint. This functions works the same as described in the Cooling section above.

The heating outdoor lockout function is used to disable the compressor stages for heating when the outdoor air temperature goes above the Heating Outdoor Lockout setpoint. The compressor stages still can be used for cooling when the outdoor air temperature is above the Heating Outdoor Lockout setpoint. This functions works the same as described in the Heating section above.

Auxiliary heat will be locked out if the outdoor air temperature rises above 60°F (15°C). If the Heat Pump Emergency digital input switch is closed, auxiliary heat will be enabled regardless of the value of the outdoor air temperature.

System Shutdown Conditions

The RapidZone Controller monitors various sensors for proper operation of the equipment. If a failure is found, RapidZone Controller shuts down the appropriate control function. The rest of the control functions continue to work. The following are monitored:

- **Shutdown Digital Input.** When the input is closed, all RapidZone Controller digital outputs are deenergized and all analog outputs are commanded to 0%. The Zone Controllers continue to operate. When the input is open, the system operates normally.
- **Fan Failure.** If the fan fails (proof of flow fails to confirm the fan command), then the heating and cooling (heat pump compressors and auxiliary heat) outputs are commanded OFF. The economizer is commanded to 0%. The RapidZone Controller continues to command the fan on in order to start it. The failure must be present for 30 seconds cool mode, 90 seconds heat mode for this action to happen. When the input returns to normal, the system operates normally. The zone controllers continue to operate.
- **Discharge Air Temperature sensor OPENED or SHORTED.** If the DAT fails, then the heating and cooling (heat pump compressors and auxiliary heat) outputs are commanded OFF. The economizer is commanded to 0%. When the DAT fails, the Zone Controllers assume cold air is coming down the duct and modulate the zone damper accordingly. When the input returns to normal, the system operates normally.
- **Duct Static Pressure sensor OPENED.** If the duct static pressure sensor fails, then the bypass damper is commanded to the Bypass Default Position (default = 66%). When the input returns to normal, the system operates normally.
- **CO₂ sensor OPENED.** If the CO₂ sensor fails, then there will be no demand control ventilation override of the economizer position. When the input returns to normal, the system operates normally.
- **Outdoor Air Temperature sensor OPENED or SHORTED.** If the outdoor air temperature sensor fails, then cooling and heating lockout signals will be left as is. In other words, if heating or cooling is locked out, it will remain locked out, if enabled, then it will remain enabled. Also if the outdoor air temperature is being used to enable the economizer, then the enable signal will be left as is. In other words, if the economizer was enabled, it will remain enabled. If disabled, then it will remain disabled. When the input returns to normal, the system operates normally.
- **Enthalpy sensor OPENED.** If the enthalpy sensor fails, then the economizer enable signal will be left as is. In other words, if the economizer was enabled, it will remain enabled. If disabled, then it will remain disabled. When the input returns to normal, the system operates normally.

NOTE: If the RapidZone Controller is reset due to a power outage or recommission, the heating and cooling lockout signals will go to Enable. The economizer enable signal will go to disable.

Zone Controller Operation

The Zone Controllers contain the control sequence for operating each zone (1 to 18). The RapidZone Controller and the Zone Controllers communicate with each other over the LONWORKS® network. The discharge air temperature (DAT) is continuously sent to all Zone Controllers. Each Zone Controller decides if the DAT is suitable to heat/cool the zone based on the current zone temperature and setpoints. If the DAT is greater than 75°F (24°C) and the zone requires heating, the Zone Controller will use proportional + integral to modulate its damper open to heat the zone. If the DAT is less than the 70°F (21°C) and the zone requires cooling, the Zone Controller will use proportional + integral to modulate its damper open to cool the zone. If the DAT is opposite of what the zone needs, the Zone Controller will close its damper to minimum position if occupied, or completely close the damper if unoccupied.

The Zone Controller determines what setpoints to use based on the occupancy signal from the scheduler (if configured). The occupied setpoints are used if occupied, the unoccupied setpoints if unoccupied. A zone needs heating if the current space temperature is below the heating setpoint. A zone needs cooling if the current space temperature is above the cooling setpoint.

The Zone Controllers always use DAT, regardless of the state of the RapidZone Controller. This means if the RapidZone Controller is shutdown due to the Shutdown digital input being closed or partially shutdown due to an outdoor air temperature sensor failure, the Zone Controllers will continue to operate. They will determine the heating and cooling setpoints based on occupancy, determine if heating or cooling is required and finally determine if the discharge air temperature is suitable to meet the need.

Ventilation Band

The ventilation band feature has been added to provide ventilation to the building when there is no call for heating or cooling.

The criteria for activation are as follows:

- Must be occupied or bypass.
- Supply Temp not invalid.
- Supply Temp less than cool setpoint.
- Supply Temp greater than heat setpoint minus 2°F (1K).
- Zone is not calling for heating or cooling.

Once in ventilation mode, the criteria to remain in ventilation mode are less restrictive:

- Must be occupied or bypass.
- Supply Temp not invalid.
- Supply Temp less than cool setpoint plus 2°F (1K).
- Supply Temp greater than heat setpoint minus 4°F (2K).
- Zone is not calling for heating or cooling.

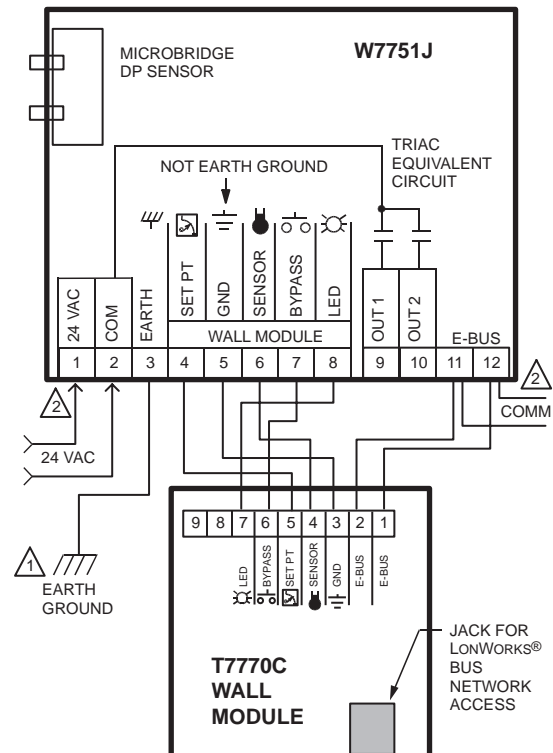
Zone Setpoints

The RapidZone Solution offers two methods of selecting the each zone's setpoints.

- Use Wall module setpoint knob (T7770C, T7560A).
- Disable Wall module setpoint knob. There is no wall module set point knob (T7770A). The setpoints are entered directly.

Wall Module Setpoint Knob

This option requires model T7770C or T7560 with a setpoint knob to be wired to the Zone Controller. See Fig. 50. This model has a setpoint knob that can be adjusted. The Setpoint Knob Low and High limits must be configured. These limits restrict the adjustability of the setpoint knob. These adjustments are similar to setpoint range stops on a mechanical thermostat. The default setpoint adjustment range is 68 to 80°F (20 to 27°C). This allows the building owner or manager to offer the building occupants some flexibility to meet various comfort needs without permitting excessive energy usage.



1 EARTH GROUND WIRE LENGTH SHOULD BE HELD TO A MINIMUM USE AND WITH THE HEAVIEST GAUGE WIRE AVAILABLE UP TO 14AWG WITH A MINIMUM OF 18AWG FOR EARTH GROUND.

2 TO ENSURE PROPER ELECTRICAL CONTACT, WIRES MUST BE TWISTED TOGETHER BEFORE INSERTING INTO THE TERMINAL BLOCK.

M18303

Fig. 50. Typical wiring diagram of the T7770C with a setpoint knob and W7751J.

The Occupied Setpoint Deadband must also be configured. When the wall module setpoint knob is used, the setpoint knob becomes the center of the Occupied Setpoint Deadband between the cooling and heating occupied setpoints. When the zone space temperature is within the deadband, the zone is satisfied and the zone damper will be at minimum position. For example, if the Occupied Setpoint Deadband is configured at 6°F (3°C), and the wall module setpoint knob is set to 73°F (23°C), then the effective occupied heating setpoint is 70°F (21°C) and the effective cooling setpoint is 76°F (24°C).

Disable Wall Module Setpoint Knob

This option assumes model T7770A without a setpoint knob is wired to the Zone Controller. See Fig. 51. The occupied cooling and heating setpoints are entered directly into RapidZone. The default occupied heating and cooling setpoints are 70°F (21°C), and 76°F (24°C) respectively. When the zone space temperature is between the occupied heat and cooling setpoints, the zone is satisfied and the zone damper will be at minimum position (occupied periods).

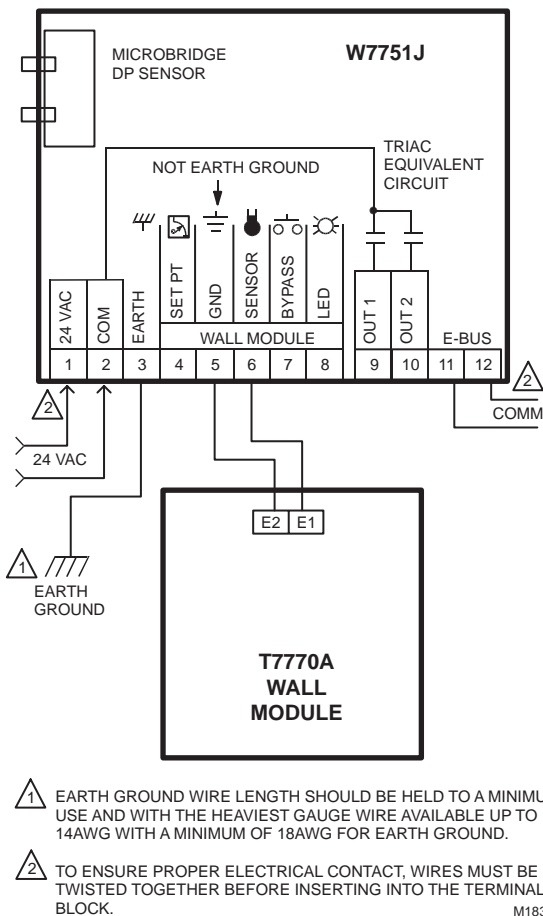


Fig. 51. Typical wiring diagram of the T7770A without a setpoint knob, bypass button and W7751J.

Unoccupied Setpoints

The RapidZone Solution requires Unoccupied Heating and Cooling setpoints for each zone. The default unoccupied heating and cooling setpoints are 62°F (17°C), and 90°F (32°C) respectively. During unoccupied periods, when the zone space temperature is between the unoccupied heating and cooling setpoints, the zone is satisfied. Since the zone is satisfied and it is unoccupied, the zone damper will be full closed.

Zone Options

The RapidZone Solution allows each zone to be customized to match the zone equipment.

Zone Damper Minimum Position

The Zone Damper Minimum Position setpoint (default = 10%) is used to establish the zone damper minimum position during occupied periods. During occupied periods, the zone damper will never be commanded below this position.

NOTE: During unoccupied periods the zone damper may be commanded to full close (0%).

Zone Maximum Damper Position

The Zone Maximum Damper Position setpoint (default = 100%) is used to establish the zone damper maximum position. The zone damper is never commanded beyond this position regardless of the occupancy mode.

Zone Heating

Each zone can be configured with additional heating. The RapidZone Solution offers the following choices: None, Peripheral, 1 stage Reheat, 2 stage Reheat, floating Reheat, floating Peripheral heat. Default: None. There are two types of heating: Reheat and Supplemental heat. Zone Reheat is defined as cool air coming down the duct (less than 70°F [21°C]) and the zone needs heat. Zone supplemental heat is a means to provide heat to a zone if hot air is coming down the duct (greater than 75°F [24°C]) and the zone load is not being met.

If the discharge air temperature is less than 70°F (21°C), indicating the HVAC unit is in cool mode, and the zone is too cold (space temperature below the heat setpoint), then the zone will go into Reheat mode. Zone reheat or peripheral heat will turn on or modulate on to reheat the cold air for use by the zone. The zone damper is commanded to the reheat position.

If the discharge air temperature is greater than 75°F (24°C), indicating the HVAC unit is in heat mode, and the zone is still too cold (space temperature below the heat setpoint), even after the zone damper is commanded to the Maximum Position, then the zone will go into supplemental heat mode. Zone reheat or peripheral heat will turn on or modulate on to supplement the heat coming down the duct.

Zone Fan

Each zone may be configured with a fan. The options are no fan and parallel fan. The fan is wired to the W7751J Zone controller.

Parallel fan powered zone boxes are located in the return plenum and do not run continuously during occupied hours. When the zone temperature is low and the need for primary air decreases, the controller modulates the primary air damper to a minimum and enables the fan, which re-circulates warm air from the return plenum into the zone acting as the first stage of reheat.

Zone Reheat Damper Position

When Zone heating is selected, the RapidZone Solution requires the Reheat Damper Position to be configured. This damper position is used during Reheat. If the Zone Controller is in Reheat mode, the zone damper is commanded to the Zone Reheat Damper Position (default = 60%).

Zone Unoccupied (Bypass) Time

The Zone Bypass Time is used to set the time in minutes for unoccupied override when the bypass button is pressed. The T7770C with bypass button must be used. To initiate the zone unoccupied override function, press the T7770C button for at least one second or until the LED indicator light turns on. The Zone Controller will then control the zone at its occupied setpoints for the amount of time configured in the zone Bypass Time (default = 180 minutes). If the bypass button is pressed again before the Bypass Time has expired, the zone will resume its normal Time-of-Day schedule.

Zone Priority

The RapidZone Solution allows certain zones to have more input into determining the HVAC mode of operation. This allows an executive office or a customer conference room to have higher priority than other zones. The Zone Priority of each zone can be set to either Normal, High, or No priority (default = Normal priority). Up to 5 zones can be set to High priority. The RapidZone Controller uses the Zone Priority of each zone to modify the terminal load signal received from the zone. For Normal priority zones, the terminal load is used as received. For High priority zones, the terminal load is multiplied by 1.5. The zone terminal loads are used by RapidZone Controller to initiate a switch between heating and cooling modes and determine how much heating or cooling is needed. See Equipment Operation for more details.

Zone Scheduling

The RapidZone Solution allows Time-of-Day scheduling of each zone. The RapidZone Solution offers 3 scheduling options:

- No schedule
- Single Schedule with Time Clock Input to the Roof Top Unit Control.
- Scheduling with the XL15A.

No Schedule

All Zone Controllers observe 24 hour occupied operation. The heating and cooling setpoints for each zone remain at the occupied setpoints all day.

Single Schedule with Time Clock Input

The Single Schedule with Time Clock input allows for an external time clock with one schedule to handle all of the zone schedules. The external time clock is wired to a digital input of the RapidZone Controller. Contacts closed mean occupied, contacts open mean unoccupied. Typically a ST7009 is wired to the RapidZone Controller digital input specified on the custom wiring diagrams.

Scheduling with the XL15A

This option requires the XL15A to be present in the system (one can support up to four RTUs). One XL15A allows up to eight schedules to be assigned to the RTUs with which it is affiliated (up to four).

NOTE: This means eight schedules are dispersed throughout the one to four RTUs. This does not provide eight schedules per RTU. To have more than eight schedules requires more than one XL15A.

When the XL15A is the scheduler, daylight savings time can be observed. If U.S. Daylight Saving Time is checked, the RapidZone Solution will switch to daylight savings time at 2 am on the first Sunday of April, and back to standard time at 2 am on the last Sunday of October.

The building blocks for zone scheduling are the eight schedules in the XL15A. Each XL15A schedule can be named and contains 7 day schedules for each day of the week. Each day schedule supports up to 3 occupied start times and 3 unoccupied start times. It is not necessary to set up all of the time schedules, just the ones needed. The defaults are 08:00 occupied / 18:00 unoccupied, Monday through Friday, 08:00 unoccupied on Sunday and Saturday.

Each Zone can be assigned to one of the eight schedules. Multiple zones can be assigned to the same schedule. A zone not assigned to a schedule will be 24 hour occupied.

Up to 20 Holidays can be configured. A Holiday can be a specific date and year, or a specific weekday/month for every year. Selected Holidays are scheduled as 24 hour unoccupied.

NOTES:

- An XL15A supports four RTU subsystems.
- Each of the eight schedules in the XL15A drives a corresponding Digital Output. For example, schedule 1 drives DO1, schedule 2 drives DO2, etc. This feature allows one XL15A to provide hard-wired schedule inputs to other RapidZone controllers and/or other devices. The XL15A with receiving this hard-wired input needs to be configured for an External time clock input.
- If the RTU subsystem needs to be in a continuous mode (occupied or unoccupied), select one of the 6 events for that particular day and insert a time. Repeat this step for each day that requires the continuous mode.

COMMISSIONING

Once the project is configured and saved with RapidZone, it is ready to be commissioned. Commissioning consists of the following steps:

1. Install and wire controllers.
2. Connect to the network.
3. Assign IDs to each controller
4. Commission each controller
5. Set the network time (If XL15A configured)

Install and Wire Controllers

Use the custom wiring diagrams provide by RapidZone to install and wire each controller, sensor, relay and actuator. Refer to individual controller Installation and Instruction sheets for details. See Equipment list section for a list of equipment, OS numbers and literature.

Connect to the Network

The next step after saving the project on the Finish screen is to click the Network button. This automatically establishes a local connection to the LONWORKS® network.

NOTES:

- RapidZone defaults to use COM1 and a SLTA-10 as the port/device to connect the PC to the network. If this is not correct, when RZ Connect attempts the connection, it will fail with the Error message “Unable to connect the network”. Select the File menu and choose Communication Settings. Choose the correct port and device. Click OK. Select the Network menu and choose Connect to connect to the network.
- Modem is not a valid selection under communication settings.

Controller Assign ID

Once connected, RapidZone displays the Controller Assign ID screen, Fig. 52. Each controller has an ID. There are two methods to enter the ID into RapidZone. The first method uses the service pin on the controller hardware. In the second method, the ID is entered by hand. When all controller IDs are assigned, click the Close button.

Use Service Pin (default): Highlight the controller. Click the Assign ID button and then activate the service pin on the controller hardware. RapidZone detects the service pin was pressed and assigns that controller's ID to the highlighted controller.

Manually Enter ID: Highlight the controller. Select Manually Enter ID. Type the Neuron® ID imprinted on the controller hardware in the New ID box. Click the Assign ID button.

NOTES: If the ID is entered incorrectly, click Close to exit the screen. Enter the Assign ID screen again and reenter it.

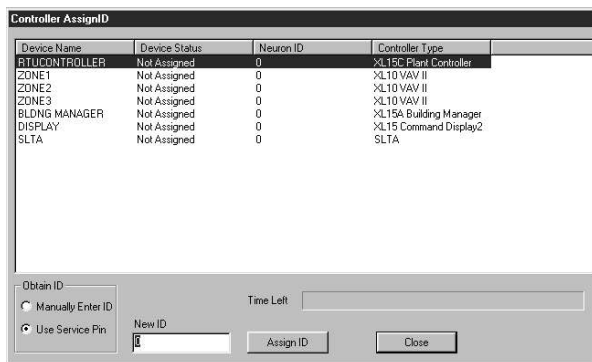


Fig. 52. Controller Assign ID screen.

Commission Controllers

After assigning IDs, the RZ Connect main screen is displayed. See Fig. 53. To commission a controller, select Controller menu and choose Commission to open the Commission Controllers dialog box. Alternately, right click the controller icon and choose Commission. See Fig. 54.

NOTE: If more than 60 controllers are on the network, a square solid red icon will be connected to the network on the main screen. This indicates a Q7740 repeater is needed. Install the repeater per 95-7555.

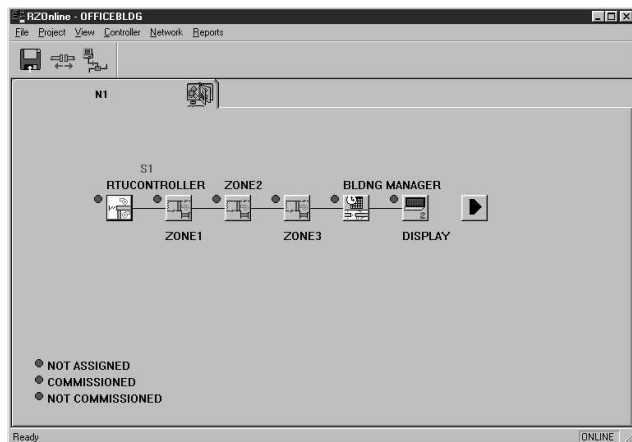


Fig. 53. RZ Connect screen.

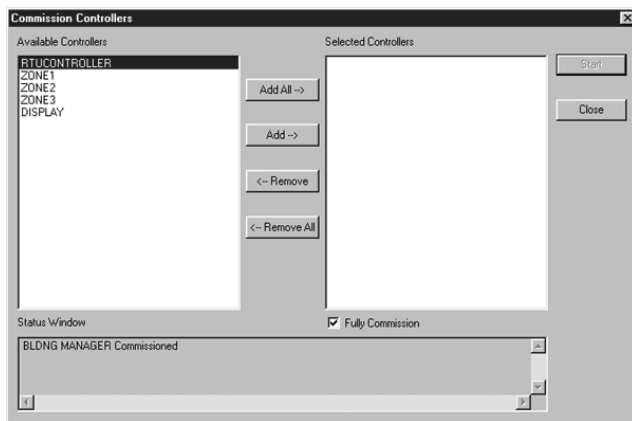


Fig. 54. RZ Connect Commission Controllers screen.

Select one or more controllers in the Available Controllers list. Click one to select it for commissioning. To select more than one, hold down the Shift key and click each name. Click the Add button to move the selected controller(s) to the Selected Controllers list. Or, click the Add All button to move all controllers to the Selected Controllers list. To remove a controller from the Selected Controllers list, select it and click Remove. Remove All button removes all controllers from the Selected Controllers list.

IMPORTANT:

The RapidZone Solution controllers must be commissioned in the following order: XL15C, zone controllers, XL15A, Command Display. Select All places controllers in this order. You must commission the S7760A Command Display last. If it is not the last entry in the selected controller's list, remove it and then add it back in so it is the last entry.

Next, click the Full Commission box. Full Commission sends down all configuration parameters to all controllers. If the Full Commission box is not checked, then RapidZone will download only the changed parameters. Full Commission should be used when commissioning the system the first time and whenever any major change is made.

To start commissioning, click the Start button. RapidZone will download the configuration to each controller. Commissioning status will be displayed in the Status Window. The status while a controller is being commissioned is displayed on the bottom status line. When a controller is done, its status (commissioned/not commissioned) is placed into the Status Window. When all controllers are finished, click the Close button. Upon a successful commission, RapidZone assigns a green, or commissioned status to the controller. The RapidZone Solution is now controlling the building.

NOTE: Commissioning the Command Display clears all alarms stored in the device. For an immediate update of alarm information, cycle power on XL15A (if present). This action is not required because the XL15A will update the Command Display alarms upon new alarm occurrence.

If a SLTA-10 is configured on the project, select Controller menu and choose Commission SLTA to open the Commission SLTA dialog box. Select the SLTA and click the Add button to add the SLTA to the Selected Controllers list. Click the Start button to commission it. Refer to System Communication Guide 74-3123 for details on how to setup the SLTA-10.

If an error occurs, check the following:

- The controller hardware installed matches the wiring diagrams.
- The controller is powered.
- The controller hardware and the Q7760A SLTA-10 are connected to the LONWORKS® network per the Installation Instruction procedures.
- correct dip switch settings on Q7760A SLTA-10.

Set Network Time

To set the network time, select Network menu and choose Network Time to open the Network Time Settings dialog box. Select the Building Manager from the Controller drop down list box. The buttons do the following:

- Get Time: sets the DATE TIME fields to the time in the Building Manager.
- Use PC Time: sets the DATE TIME fields to the current time in the PC.
- Set Time: changes the Building Manager time to what is displayed in the DATE TIME fields.
- OK: exits the screen.

MONITORING AND CALIBRATION

RapidZone offers a number of monitoring, calibration and diagnostic services. They are:

- Device Status.
- Zone Temperature sensor calibration.
- RapidZone Controller sensor calibration.
- Alarms on each controller.
- Runtime Log of the RapidZone RTU Equipment.
- Bypass Log
- Trend Logs
- Controller Monitoring

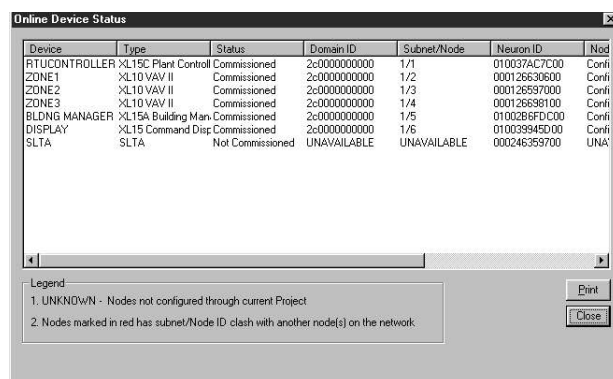
Monitoring and calibration are accessed from the Network button on the Finish screen. To access an existing project, do the following steps:

1. Launch RapidZone.
2. Select the project from the list on the Existing Project screen.
3. Click Next>> to sequence through all of the screens. When the Zones screen is shown, click Done With Zones to skip through them. Then click the Next>> button to go through the Holidays screen.
4. Answer No to configure more RTU systems.
5. Click Network Button. This connects RapidZone to the network and displays the RZ Connect screen. The monitoring, calibration and diagnostic services can now be accessed.

NOTE: If no changes are made to an existing project that has already been commissioned, then the Network button will appear on the Finish screen without having to save the project.

Device Status

To get the status of all devices on the LONWORKS® network, select Reports menu and choose Device Status to open the Online Device Status dialog box. See Fig. 55. Each device will be listed by name along with its type, status, Domain ID, Subnet/Node, Neuron® ID, Node State, Last Reset Cause and Last Error Logged. Controllers in RED, Status equal to Unassigned, or Unknown Nodes, indicate the Controller IDs should be reassigned and or recommissioned.



Device	Type	Status	Domain ID	Subnet/Node	Neuron ID	Node State
RTU/CONTROLLER XL15C Plant Control	Commissioned	2c0000000000	1/1	010037AC7C00	Conf	
ZONE1	XL10 VAV II	Commissioned	2c0000000000	1/2	000126630600	Conf
ZONE2	XL10 VAV II	Commissioned	2c0000000000	1/3	000126597000	Conf
ZONE3	XL10 VAV II	Commissioned	2c0000000000	1/4	000126636100	Conf
BLDNG MANAGER XL15A Building Mng	Commissioned	2c0000000000	1/5	0100286FDC00	Conf	
DISPLAY XL15 Command Disp	Commissioned	2c0000000000	1/6	010039945D00	Conf	
SLTA	SLTA	Not Commissioned	UNAVAILABLE	UNAVAILABLE	000246359700	UNA

Legend:
 1. UNKNOWN - Nodes not configured through current Project
 2. Nodes marked in red has subnet/Node ID clash with another node(s) on the network

Print Close

Fig. 55. Reports and Device Status screen.

Zone and RapidZone Controller Sensor Calibration

Sensor calibration makes the measured value of a sensor on a controller match the actual value measured by a known good instrument. To calibrate sensors on the controllers, select Controller menu and choose Calibrate to open the Sensor Calibration Screen and select the device. Alternately, right click the controller icon and choose Calibrate.

For the RapidZone Controller, see Fig. 56. Use the List of Sensors drop down list box to select the sensor. The Measured Value box shows what the controller is measuring. Enter the Expected Value measured by a known good instrument. Click the Calibrate button. RapidZone will calculate the appropriate offset so that the measured value matches the expected value. Click the Refresh button to update the measured value. Repeat for other sensors as necessary.

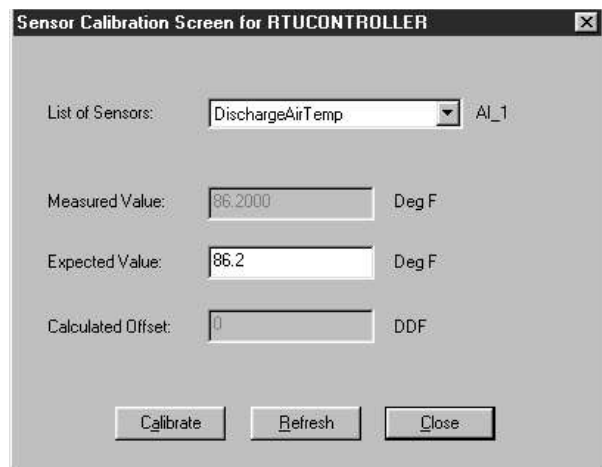


Fig. 56. Sensor Calibration screen for RapidZone Controller.

For the Zone Controller, see Fig. 57. Use the List of Sensors drop down list box to select the sensor. The Actual Value box shows what the Zone Controller is measuring. Enter the Edit Value measured by a known good instrument. Click the Calibrate button. RapidZone will calculate the appropriate offset so that the actual value matches the edit value. Click the Refresh button to update the actual value.

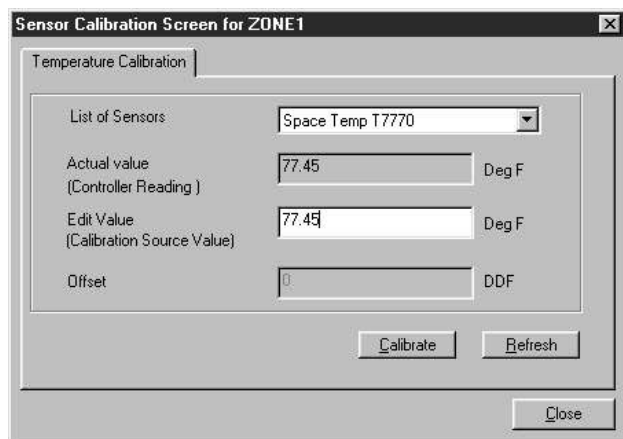


Fig. 57. Sensor Calibration screen for zone controller.

Alarms

The RapidZone Solution automatically sets up alarming when a XL15A is present in the system. The XL15A is the central receiver of all alarms from the RapidZone and Zone Controllers. The XL15A notifies the S7760A Command Display of new alarms. If a XL15A is not in the system, each controller must be examined individually for alarm (error) conditions. See the Troubleshooting section for more information on alarms.

To view alarms on the XL15A Building Manager, select Controller menu and choose Read Alarms and Logs to open the Read Alarms and Logs Screen. Alternately, right click the Building Manager controller icon and choose Read Alarms and Logs. See Fig. 58. The Commissioned Controllers drop down list box will display the Building Manager and the Supported Log Types drop down list box will display ALARM_LOG. Click the Display Alarms button. The Alarm Message box will be displayed. This box shows the date, time, controller name and the alarm condition of the most recent alarm. Click View Next button to look at the next alarm. Click All Alarms button to view all alarms. Click the screen close icon (X) in the upper right corner when finished. See Troubleshooting section for more details on alarms and causes.

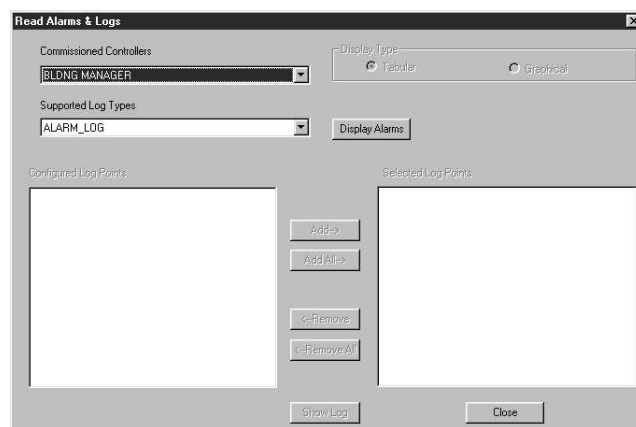


Fig. 58. Read Alarms and Logs for XL15A screen.

To view alarms on any controller, select Reports menu and choose Alarms to open the Alarms dialog box. Select the controller from the Controllers drop down box. The current alarms and the last 5 alarms will be displayed. See Troubleshooting section for more details on alarms and causes.

Runtime Log of RTU Equipment

The RapidZone Solution automatically sets up runtime logs in the XL15C RapidZone Controller. All runtime is truncated to the nearest hour. The maximum runtime is 65535 hours. When the maximum is reached, the log stops. The runtime should then be cleared to restart it. The following is a list of the runtime logs:

- Cooling Stages. Run-Time Log records all cooling stage runtimes.
- Heating Stages. Run-Time Log records all heating stage runtimes.

To view the runtime logs on the RapidZone Controller, select Controller menu and choose Reset Counters and Runtimes to open the Reset Counters and Runtime Screen and select the RapidZone Controller. Alternately, right click the controller icon and choose Reset Counters and Runtimes. See Fig. 59. Use the drop down list box to select the control loop (Only Cooling Stages and Heating Stages have runtimes.) Click the Refresh button to update the times with the current values. Click the Clear button to clear the runtimes and reset them to zero. To preset a runtime to a specific value, click the cell, enter the time desired and click the Set button.

A second method of viewing the runtimes is provided. Select Controller menu and choose Read Alarms and Logs to open the Read Alarms and Logs Screen and select the RapidZone Controller. Alternately, right click the controller icon and choose Read Alarms and Logs. Click Display Points. Select stages from the Configured Log Points list box and use Add, Add All, Remove and Remove All buttons to place the desired points in the Selected Log Points list box. When all stages are selected, click the Show Log button. The runtime value(s) are either shown in tabular or graphical format.

Click the Refresh button to update the data. Click the Table or Graph buttons to change format. Click the Save button to save the data as a text file. Click the Print button to print the data. Click Close to exit this screen.

Fig. 59. Reset Counters and Runtime for RapidZone Controller screen.

Trend Logs

One XL15A supports a maximum of 16 trend logs. Trend logs trend data as shown in Table 3.

Table 3. XL15A Trend Logs.

Trend Name	Description
Discharge Air Temperature (DAT)	Log DAT on a 60 second sampling frequency for a maximum of 60 samples.
Outdoor Air Temperature (OAT)	Log OAT as sensed by the first RTU associated with an XL15A. Set sampling frequency to 1 hour for every 24 samples.
Duct Pressure and Bypass Damper	If bypass is configured, log data every 10 seconds for a maximum of 60 samples.
CO ₂ Levels	If CO ₂ sensor is configured, log CO ₂ level every 1 hour for 24 samples.
Zone Air Temperatures	Log zone space temperatures. Set sampling frequency to 5 minutes with a maximum of 40 samples.

When more than one RTU is associated with an XL15A, the first RTU associated with the unit is trended as defined in Table 3. If more trending memory is available in the XL15A,

the DAT of all remaining RTUs is trended, then the Duct Pressures and Bypass Damper Positions (of all RTUs), followed by Zone Temperatures. The trend setup is limited by the 16 trend maximum and the total available trend memory of the XL15A.

To view trends on the XL15A Building Manager, select Controller menu and choose Read Alarms and Logs to open the Read Alarms and Logs Screen. Alternately, right click the Building Manager controller icon and choose Read Alarms and Logs. See Fig. 60. Select the XL15A Building Manager in the Commissioned Controllers drop down list box. Select TREND_LOG as the Supported Log Type. Click Display Points button to get a list of Configured Log Points. Select points from the Configured Log Points list box and use Add, Add All, Remove and Remove All buttons to place the desired points in the Selected Log Points list box. When all points are selected, click the Show Log button. The point value(s) and time stamp(s) are either shown in tabular or graphical format. If graphical format is chosen, only the first point is displayed.

Click the Refresh button to update the data. Click the Table or Graph buttons to change format. Click the Save button to save the data as a text file. Click the Print button to print the data. Click Close to exit this screen.

Fig. 60. Trend Log for XL15A screen.

Time of Day Bypass Logs

The RapidZone Solution automatically sets up Time of Day Bypass logs when a XL15A is present in the system. Each Bypass log records unoccupied override history for each zone. The logs are named TODBypass_1 (zone 1) through TODBypass_20 (zone 20). Each log contains:

- The date and time of the last bypass.
- The amount of time this zone was in bypass for the current month.
- The amount of time this zone was in bypass for last month.

To view the Time of Day Bypass log on the XL15A Building Manager, select Controller menu and choose Read Alarms and Logs to open the Read Alarms and Logs Screen. Alternately, right click the Building Manager controller icon and choose Read Alarms and Logs. See Fig. 61. Select the XL15A Building Manager in the Commissioned Controllers drop down list box. Select BYPASS_LOG as the Supported Log Type. Click Display Points button to get a list of Configured Log Points. Select points from the Configured Log Points list box and use Add, Add All, Remove and Remove All buttons to place the desired points in the Selected Log Points list box. When all points are selected, click the Show Log button. The Time of Day Bypass information is displayed.

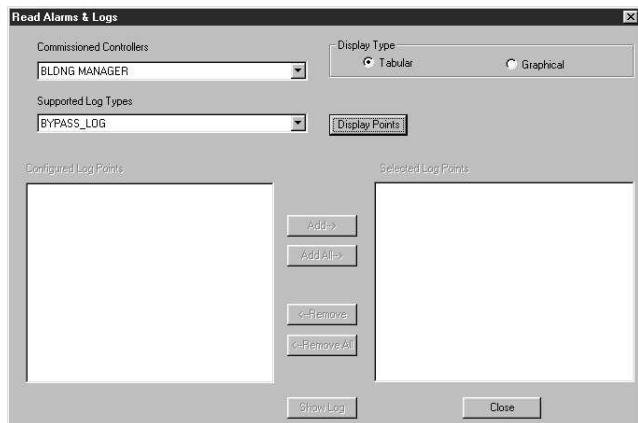


Fig. 61. Bypass Log for XL15A screen.

Controller Monitoring

To monitor any of the controllers: On the RZ Connect screen, select Controller menu, choose Monitor and select a controller from the list to open the Monitor Screen for the selected device. Alternately, right click the controller icon and choose Monitor.

Fig. 62 shows the Monitoring screen of the RapidZone Controller.

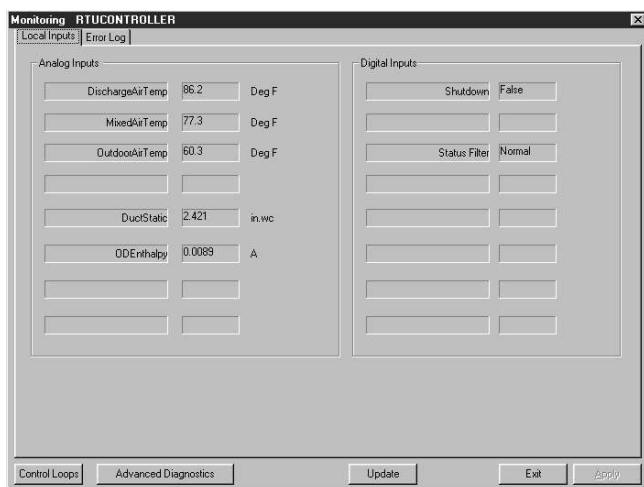


Fig. 62. Monitoring the RapidZone Controller.

- Local Inputs tab: displays values of all configured analog and digital inputs.
- Error Log tab: displays any current errors (alarms) on the RapidZone Controller. The Point name gives a description of the error and the State displays "Error". Only point names that have an error are displayed on this screen.
- Control Loop button: adds a tab for each control loop in the RapidZone Controller. Clicking on the tab displays the status of the control loop.
- Advanced Diagnostic button: adds a tab for each logic loop in the RapidZone Controller. Clicking on the tab displays the status of the logic loop.
- Update button: causes an immediate update of the values on the screen. Normally the screen is updated every 30 seconds.
- Exit button: Closes the monitoring screen.

On the Control loop tabs:

- Effective Setpoint: is the current setpoint the loop is trying to maintain.
- Control Sensor: is the current value of the controlled sensor.
- Loop Control: Auto means the loop is controlling normally. Manual means the loop outputs are being manually controlled from a workstation.
- System Mode: HVAC_AUTO means the loop is controlling normally. HVAC_OFF means the loop is off because the disable input is active. This can be normal operation. For example, the heating loop is disabled while cooling.
- Primary Command: is the output of the loop from 0 to 100%. This command drives the stages (if any).
- Aux Status: is the on/off state of the auxiliary output of the control loop.
- Stages- Primary 1,2,3,4: are the on/off state of each of the control loop stages.

On the Advanced Diagnostic tabs:

- Loop Control: Auto means the loop is controlling normally. Manual means the loop outputs are being manually controlled from a workstation.
- Digital Output: is the on/off state of the digital output of the logic loop.
- Analog Output: is the analog output of the loop from 0 to 100%.

NOTES: To get to the RZ Connect monitoring screen after a project has already been commissioned:

1. Launch RapidZone.
2. Choose the existing project
3. Click the Next>> key to cycle through all screens. Do not make any changes.
4. On the Finish screen, click the Network button (It is not necessary to Save the project since no changes were made.)
5. Select the Controller menu and choose Monitor.

Fig. 63 shows the Monitoring screen of the Zone Controller.

- Temperature Control tab: displays the current state of the Zone Controller.
- Controller Occupancy tab: displays the current occupancy status and if a bypass is active.
- Alarm/Diagnostics1 and 2 tabs: display the alarms on the Zone Controller. False indicates the point is functioning properly and not in alarm. See the Troubleshooting section for more details on these alarms.

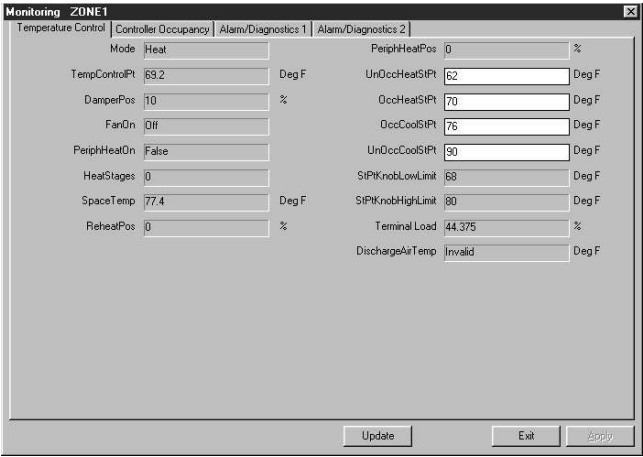


Fig. 63. Monitoring the Zone Controller.

Air Balancing

The Air Balancing feature has been added to easily place an RTU and the appropriate zones in manual mode. Fig. 64 shows the Air Balancing screen.

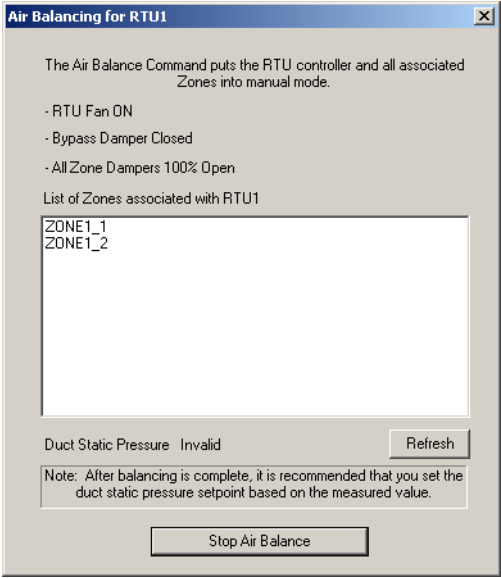


Fig. 64. Air Balancing screen.

TROUBLESHOOTING

RTU Subsystem Alarms and Diagnostics

The XL15A along with the XL15C monitors the RTU subsystem. Refer to Table 4. Alarms and diagnostics require the XL15A.

Table 4. XL15A Alarms and Diagnostics.

Alarm / Diagnostic	Command Display Message	XL15A Message	Cause
Fan Failure	FanFailure or LowStaticPAlm	RtuFanFailure or RtuLowStaticP	<p>RapidZone Solutions uses one of two methods to detect fan failure: proof of flow and low duct static pressure. The first method monitors the optional fan status input. If the fan status input is not configured, then the second method of monitoring the duct static pressure is used.</p> <p>Fan Status Method: If the fan is commanded ON and the fan status failed to confirm within 90 seconds OR the fan is commanded OFF and the fan status failed to confirm within 90 seconds, then alarm.</p> <p>Low Duct Static Pressure Method: If the fan is commanded ON and the duct static pressure is less than the StaticLoLimit for 8 minutes, then alarm. (StaticLoLimit is an internal setpoint equal to 0.75 inW (187 Pa) below the Bypass Setpoint.</p> <p>When the conditions that caused the failure are no longer present for 60 seconds, then the alarm returns to normal.</p> <p>Possible causes of fan failure alarm:</p> <ul style="list-style-type: none"> • Broken fan belt • Fan motor circuit breaker trip • Fan motor locally disabled. • External control commanding fan. • Fan status sensor is stuck. <p>Possible causes of low static pressure alarm:</p> <ul style="list-style-type: none"> • Fan not running when commanded • Supply duct failure • Fire Damper activated. • Under sized supply fan. • RTU plenum switch is keeping fan off.
Filter Maintenance		RtuFilterMaint	<p>The RapidZone Solution uses a differential switch to detect a dirty filter. If the dirty filter input is ON for 10 minutes, then alarm.</p> <p>When the condition(s) that caused the failure are no longer present for 10 minutes, then the alarm will return to normal.</p> <p>Possible causes of a filter maintenance alarm:</p> <ul style="list-style-type: none"> • Dirty air filter. • Local dirty air filter pressure switch requires adjustment.
FreezeStat	FreezeStat_ DI4(5)	FreezeStat	<p>When Modulating Cooling or Heating is configured, a Freeze Stat Digital Input is automatically added to the wiring diagram. Upon receiving a contact closure, the control algorithm will turn the fan off, close the outdoor air damper, and open the hot water and chilled water valves to full open. The controller auto-clears this alarm once the contact opens. If manual-reset is desired, the Freeze Stat device must provide the physical pushbutton, which the operator presses, to reset the system after a freeze condition has occurred.</p> <p>Possible causes of FreezeStat alarm:</p> <ul style="list-style-type: none"> • Outdoor air damper stuck open or leaking • Minimum outdoor air damper position is set too large during cold climate operation. • Cold Outdoor air stratification. Return Air is not mixing properly with Outside air.

Command Display Diagnostics

If a Command Display and XL15A are present, the RapidZone Solution automatically configures a Command Display Diagnostics group. The diagnostic group includes:

- fan command status (if a proof of air flow is used)
- fan failure including low static pressure

See Command Display form 74-3450 for more information.

Controller Alarms

In addition to the alarms configured by the RapidZone Solution, each controller in the system has intrinsic alarms. The following sections describe each controller's alarms. Also refer to individual controller Installation and Instruction sheets to check out and test each controller.

RapidZone Controller Alarms

Refer to Table 5 for the XL15C alarms.

Table 5. XL15C RapidZone Controller Alarms

Alarm	Cause
NORMAL	Indicates the condition returned to normal after being in an alarm condition.
Sensor Failure ALARM	<p>This indicates an open or short on an analog input or a problem with one of the internal XL15C calibration channels. Check the following sensors for open or short conditions: (The Monitoring screen / Local Input tab indicates which sensor is at fault)</p> <p>The following sensors are used in the RapidZone Controller:</p> <ul style="list-style-type: none"> AI1: Discharge Air Temperature sensor AI2: Mixed Air Temperature sensor AI3: Outdoor Air Temperature sensor AI4: not used AI5: Duct Static Pressure sensor AI6: Outdoor Enthalpy sensor AI7: not used AI8: CO₂ sensor <p>Sensor ALARM returns to normal when the sensor(s) return to their normal range. See System Shutdown Conditions above for more details on the action the RapidZone Controller takes on each sensor failure.</p>
Network Input Data not available ALARM	<p>One or more network variables (NV) inputs have failed in receiving an update within their specified fail detect time (300 seconds typical). Network variables are known as “bound” or “referred” points. The source controller sends the NV to all controllers that need it on a periodic basis or whenever the value changes. The receiving controllers expect to get an update of the NV at least every 300 seconds (the fail detect time). This alarm means the RapidZone Controller did not receive an update to one of its NVs within the fail detect time. Check the network connections of this controller and the source controller. Insure both controllers are powered. The Monitoring screen / Error tab indicates which NV is at fault.</p> <p>The following network variables have a bound relationship:</p> <ul style="list-style-type: none"> • When there are more than 6 zones in the RTU subsystem, zones 7-18 terminal load are bound from the Zone Controller to the RapidZone Controller. • If there is more than 1 RTU subsystem, Outdoor Air Temperature is shared from the first RTU subsystem to the other subsystems. <p>Network Input Data not available ALARM returns to normal when the network connection is reestablished to the network variable.</p>
Input Remote Poll ALARM	<p>The input remote poll alarm is set when the XL15C RapidZone Controller has not been able to get a new value for a poll point for 300 seconds. Poll points are data on another controller that the RapidZone Controller needs. The XL15C issues a request for that piece of data and the other controller responds with the data. The Monitoring screen / Error tab indicates which remote poll point is at fault.</p> <p>The following remote points are polled by the RapidZone Controller:</p> <ul style="list-style-type: none"> REM_POLL_1_FAULT: terminal load from Zone 1 not being received. REM_POLL_2_FAULT: terminal load from Zone 2 not being received. ...up to REM_POLL_18_FAULT: terminal load from Zone 18 not being received. REM_POLL_XX_FAULT: occupancy signal from the Building Manager is not being received. <p>NOTE: XX means the next remote poll position after the zones. If there are 4 zones, then the occupancy signal is placed onto remote poll 5.</p> <p>Input Remote Poll ALARM returns to normal when the network connection is reestablished to the polled variable.</p>

Table 5. XL15C RapidZone Controller Alarms

Alarm	Cause
Flash Checksum ALARM	<p>The Flash checksum alarm indicates at least one of the configuration sections (internal to the controller) or the NV configuration table has a bad checksum. The XL15C needs to be recommissioned.</p> <p>On a flash checksum alarm, the XL15C reinitializes all of the sections and the NV configuration table in FLASH to the default values. These make the XL15C <i>unconfigured</i>. This alarm goes away on the next powerup/reset. The XL15C never issues a <i>Return to Normal</i> on this alarm because a download of all of its files causes a reset and erases any Return to Normal that would have been issued on a recommissioned.</p>
File ALARM	During commissioning, the XL15C received a file window out of sequence, a window didn't complete, or received more bytes than suppose to. Recommission the XL15C.
Ram Checksum ALARM	This alarm and its Return to Normal tells the user the XL15C had a problem and fixed it. No further action is needed.
Notify Disable ALARM	Alarms have been disabled from a Workstation. Use the Workstation to enable alarm reporting.

Zone Controller Alarms

Refer to Table 6 for the Zone Controller alarms.

Table 6. Zone Controller Alarms.

Zone Controller Alarm Message	Cause
NORMAL	Indicates the condition returned to normal after being in an alarm condition.
Sensor Failure ALARM	<p>This indicates an open or short on a sensor input. Check the following sensors for open or short conditions.</p> <ul style="list-style-type: none"> • Zone Temperature Sensor • Setpoint (if configured) <p>NOTE: The Monitoring screen / Alarms/Diagnostics tabs indicate which sensor is at fault.</p> <p>Sensor Failed ALARM returns to normal when the sensor returns to normal range.</p>
Network Input Data not available ALARM	<p>One or more network variables (NV) inputs have failed in receiving an update within their specified fail detect time (300 seconds typical). Network variables are known as “bound” or “referred” points. The source controller sends the NV to all controllers that need it on a periodic basis or whenever the value changes. The receiving controllers expect to get an update of the NV at least every 300 seconds (the fail detect time). This alarm means the Zone Controller did not receive an update to one of its NVs within the fail detect time. Check the network connections of this controller and the source controller. Insure both controllers are powered.</p> <p>The following network variables have a bound relationship:</p> <ul style="list-style-type: none"> • Discharge Air Temperature is bound from the RapidZone Controller to each Zone Controller. • Occupancy signal is bound from the Building Manager to each Zone Controller. <p>NOTE: The Monitoring screen / Alarms/Diagnostics tabs indicate which NV is at fault.</p> <p>Network Input Data not available ALARM returns to normal when the network connection is reestablished to the network variable.</p>
NodeDisabled ALARM	The control algorithm has stopped because the controller was placed into the Disabled mode by a Workstation. No more alarms are reported when the controller is in the disabled mode. Use the Workstation to enable the controller.
Notify Disable ALARM	Alarms have been disabled. Use the Workstation to enable alarm reporting.

Building Manager Alarms

Refer to Table 7 for the XL15A Building Manager alarms.

Table 7. XL15A Building Manager Alarms.

XL15A Alarm	Cause
NORMAL	Indicates the condition returned to normal after being in an alarm condition.
Node Failure ALARM	<p>This indicates a XL10 class device (Zone or RapidZone Controller) is no longer sending status and alarm information to the Building Manager. Check the network connections of the Building Manager and the source controller. Insure both controllers are powered.</p> <p>Node Failure ALARM alarm returns to normal when the network connection is reestablished to the controller.</p>
Checksum ALARM	The checksum failure indicates at least one of the configuration sections (internal to the controller) or the NV configuration table has a bad checksum. The XL15A needs to be recommissioned.

EQUIPMENT LIST

Refer to Table 8 for a list of equipment and literature.

Table 8. Equipment and Literature List.

Device Type/Description	OS Number	Literature Number (Spec Sheet)
Rooftop Devices		
Excel 15 RapidZone Controller	W7760C2017	74-3080
Discharge Air Sensor	C7770A1006	74-2868
Outdoor Air Sensor	C7031F1018	60-2217
Wall Mounted CO ₂ Sensor	C7232A1008	63-2571
Duct Mounted CO ₂ Sensor	C7232B1006	63-2571
Fan Relay	RIBU1SM	
Cooling Stages Relay	RIBU1SM	
Heating Stages Relay	RIBU1SM	
Outdoor Enthalpy	C7400A1004	63-1143
Floating Economizer	ML6185A1000	63-1279
Modulating Economizer	ML7285A1007	63-2486, 63-1279
12 Volt DC Relay	R8466A1007	77-5323
Transformer for RTU (75 VA)	AT175F1031	69-1014
Bypass Devices		
Duct Pressure Sensor	P7610F1005	68-0214
6 inch Bypass Damper / Modulating motor	DM7600A1005	63-2237
8 inch Bypass Damper / Modulating motor	DM7600A1013	63-2237
10 inch Bypass Damper / Modulating motor	DM7600A1021	63-2237
12 inch Bypass Damper / Modulating motor	DM7600A1039	63-2237
14 inch Bypass Damper / Modulating motor	DM7600A1047	63-2237
16 inch Bypass Damper / Modulating motor	DM7600A1054	63-2237
6 inch Bypass Damper / Floating motor	DM7600B1004	63-2237
8 inch Bypass Damper / Floating motor	DM7600B1012	63-2237
10 inch Bypass Damper / Floating motor	DM7600B1020	63-2237
12 inch Bypass Damper / Floating motor	DM7600B1038	63-2237
14 inch Bypass Damper / Floating motor	DM7600B1046	63-2237
16 inch Bypass Damper / Floating motor	DM7600B1053	63-2237
Floating Motor ^a	ML6174A2002	63-1146
Modulating Motor ^a	ML7174A2001	63-1146
Zone Devices		
Zone Controller ^b	W7751J2004	74-2953
Wall Module, Sensor only	T7770A1006	74-2697
Wall Zone Sensor/Setpoint/Bypass/LED	T7770C1002	74-2697

Device Type/Description	OS Number	Literature Number (Spec Sheet)
Digital Wall Module Sensor/Setpoint/Bypass/LED	T7560A1018	95-7620
6 inch Zone Damper	D690A1002	63-2577
8 inch Zone Damper	D690A1010	63-2577
10 inch Zone Damper	D690A1028	63-2577
12 inch Zone Damper	D690A1036	63-2577
14 inch Zone Damper	D690A1044	63-2577
16 inch Zone Damper	D690A1051	63-2577
Actuator	VC6931ZZ11	95C-10789
1/2 inch Sweat Valve	VCZAA1100	95C-10646
3/4 inch Sweat Valve	VCZAM1100	95C-10646
1 inch Sweat Valve	VCZAS1100	95C-10646
Transformer 40 VA	AT72D1683	60-0428
Accessories		
Building Manager (Scheduler) ^c	W7760A2011	74-2967
Network Display	S7760A2007	74-2972
Electronic Programmable Timer	ST7009A1003	68-3003
FTT Termination Module	209541B	95-7554 (install)
LONWORKS® Bus Wire	AK3791BL	74-2865-2
SLTA-10	Q7760A2001	95-7511
Portable Operations Kit	32000180-009	95-7511
Modem installation cable	32002517-001	95-7511
Repeater	Q7740A, B	95-7555

^a Recommend motors if bypass damper provided by others.

^b W7751H2017/2009 with date code 0208 or higher may be substituted.

^c The W7760A must be date coded 0042 or higher.

NOTE: Refer to FAQs at web page:
[//customer.honeywell.com/rapidzone](http://customer.honeywell.com/rapidzone)
 for further information

APPENDIX A. SCHEDULE EXAMPLES

Fig. 65 shows a schedule for an area to be occupied from 8:00 a.m. to 6:00 p.m. on Monday through Friday and unoccupied on Saturday and Sunday.

NOTES: To prevent confusion, all times are entered in 24 hour format.

Scheduling for Zone 1

Schedule Number1

Schedule NameMain

	Occ 1	UnOcc 1	Occ 2	UnOcc 2	Occ 3	UnOcc 3
Sun		08:00				
Mon	08:00	18:00				
Tue	08:00	18:00				
Wed	08:00	18:00				
Thu	08:00	18:00				
Fri	08:00	18:00				
Sat		08:00				

Zones that are Assigned to this Schedule

ZONE1
ZONE2
ZONE3
ZONE4

Assign Schedule To Zone

Cancel

Instructions:
Step 1. Select Schedule for this Zone. Schedule Names can be changes here
Step 2. Modify schedule time by double clicking on the cell and setting the time.
Step 3. When Schedule is as desired, click Assign to apply this schedule to the zone.
Step 4. Verify that this zone was assigned by viewing the 'Zones assigned to this

Fig. 65. Typical schedule for an office.

Fig. 66 shows an office with a different schedule for everyday.

Scheduling for Zone 1

Schedule Number1

Schedule NameLUNCH

	Occ 1	UnOcc 1	Occ 2	UnOcc 2	Occ 3	UnOcc 3
Sun	08:00	13:00				
Mon	08:00	12:00	01:00	18:00	19:00	22:00
Tue	08:00	12:00	01:00	18:00		
Wed	08:00	18:00				
Thu	08:00	11:00	03:00	18:00		
Fri	08:00	12:00				
Sat	08:00	12:00				

Zones that are Assigned to this Schedule

ZONE1
ZONE2
ZONE3
ZONE4

Assign Schedule To Zone

Cancel

Instructions:
Step 1. Select Schedule for this Zone. Schedule Names can be changes here
Step 2. Modify schedule time by double clicking on the cell and setting the time.
Step 3. When Schedule is as desired, click Assign to apply this schedule to the zone.
Step 4. Verify that this zone was assigned by viewing the 'Zones assigned to this

Fig. 66. Typical schedule with something happening everyday.

Fig. 67 shows a schedule for an area that is occupied 24 hours a day from Monday to Friday. This could be a laboratory that runs 3 shifts.

If the RTU subsystem needs to be in a continuous mode (occupied or unoccupied), select one of the 6 events for that particular day and insert a time. Repeat this step for each day that requires the continuous mode.

Scheduling for Zone 1

Schedule Number2

Schedule Namelaboratories

	Occ 1	UnOcc 1	Occ 2	UnOcc 2	Occ 3	UnOcc 3
Sun	08:00					
Mon	08:00					
Tue	08:00					
Wed	08:00					
Thu	08:00					
Fri	08:00					
Sat	08:00					

Zones that are Assigned to this Schedule

ZONE1

Assign Schedule To Zone

Cancel

Instructions:
Step 1. Select Schedule for this Zone. Schedule Names can be changes here
Step 2. Modify schedule time by double clicking on the cell and setting the time.
Step 3. When Schedule is as desired, click Assign to apply this schedule to the zone.
Step 4. Verify that this zone was assigned by viewing the 'Zones assigned to this

Fig. 67. Typical schedule for a laboratory or factory that has 3 shifts.

Fig. 68 shows a schedule for an area that is occupied during normal office hours, but has a meeting on Wednesday night.

Scheduling for Zone 1

Schedule Number3

Schedule NameConferenceRoom

	Occ 1	UnOcc 1	Occ 2	UnOcc 2	Occ 3	UnOcc 3
Sun		08:00				
Mon	08:00	18:00				
Tue	08:00	18:00				
Wed	08:00	18:00	20:00	22:00		
Thu	08:00	18:00				
Fri	08:00	18:00				
Sat		08:00				

Zones that are Assigned to this Schedule

ZONE1

Assign Schedule To Zone

Cancel

Instructions:
Step 1. Select Schedule for this Zone. Schedule Names can be changes here
Step 2. Modify schedule time by double clicking on the cell and setting the time.
Step 3. When Schedule is as desired, click Assign to apply this schedule to the zone.
Step 4. Verify that this zone was assigned by viewing the 'Zones assigned to this

Fig. 68. Typical schedule for a conference room.

APPENDIX B. RESTORING RAPIDZONE DB INTO LONSPEC™ 2.02.0 OR HIGHER

Requirements

IMPORTANT

If using this procedure, the XL15C (W7760C2017) Controller must be used because LONSPEC™ 2.02 or higher cannot commission an XL15D RapidZone Controller.

1. Must use RZConnect project backup to create a RapidZone backup (.ntb format) that is compatible with LONSPEC™ 2.02.0 or higher.
2. RapidZone backups can not be merged into existing LONSPEC™ projects. This means the LONSPEC™ work needs to start after Restoring the RapidZone Backup.
3. Modifications made in LONSPEC™ are not recognized in RapidZone dB. It is a one-way street from RapidZone to LONSPEC™.
4. RapidZone software and LONSPEC™ software can not be active (running) on the same computer at the same time. The two software package may be installed on the same computer just not running at the same time.
5. Must use LONSPEC™ 2.02.0 or higher unless advised otherwise.

Potential Reasons to Use LONSPEC™

1. LONSPEC™ provides access to unique Commercial Zoning job features configurable not selectable in RapidZone. Using LONSPEC™ to Engineer additional features into the RapidZone Solution is not described in the Honeywell Literature. The user is required to have extensive knowledge of LONSPEC™ and the controllers to complete these modifications. It is recommended to limit LONSPEC™ modifications to the following areas:

Zone Controller

- Pressure Independent VAV in Zones (Requires W7751H)

Building Manager

- Remote Alarm Dial-out (requires W7760A)
- Modifying or creating Trends

Command Display

- Modifying splash screen
 - Changing network variables displayed
2. Desire to have non-RapidZone XL15, XL10 and T7300 controllers on the same LONWORKS® bus as RapidZone System. Restoring a RapidZone dB into new LONSPEC™ project allows other controllers to be added to the same channel.

Procedure

1. Create and Save project in RapidZone Software
2. Select Network button to launch RZ Connect.
3. Create RapidZone backup from RZ Connect. On main menu click Project, select Backup. The Backup Project screen displays per Fig. 69 (this backup has .ntb format compatible with LONSPEC™ 2.02.0).

NOTE: If RapidZone dB has more than four XL15A Controllers, the RZ Connect Backup is disabled. This means only RapidZone project with four or less XL15As may be restored into LONSPEC™.

4. Restore Backup in LONSPEC™ 2.02.0. On main menu click Project, choose Restore. Restore Project screen will be displayed. See Fig. 70.
5. Use LONSPEC™ 2.02.0 to modify controller configuration as needed and/or add other non-RapidZone controller to channel. Commission controllers with LONSPEC™.

NOTE: The modified LONSPEC™ project can not be imported into RapidZone.

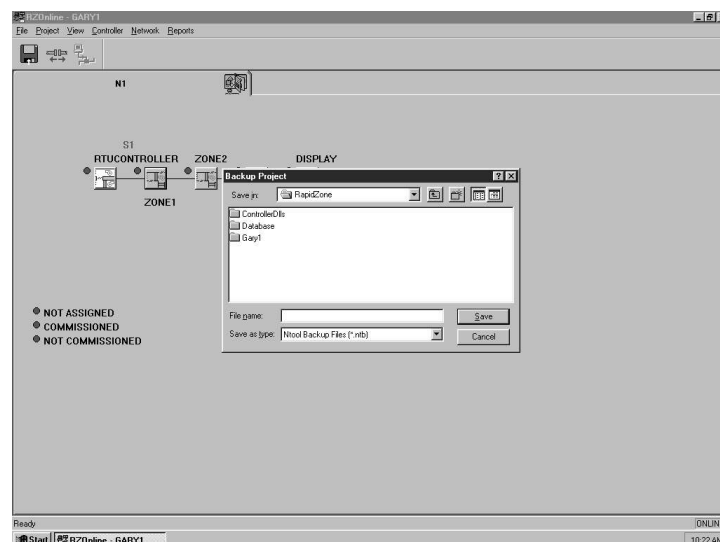


Fig. 69. Backup Project screen.

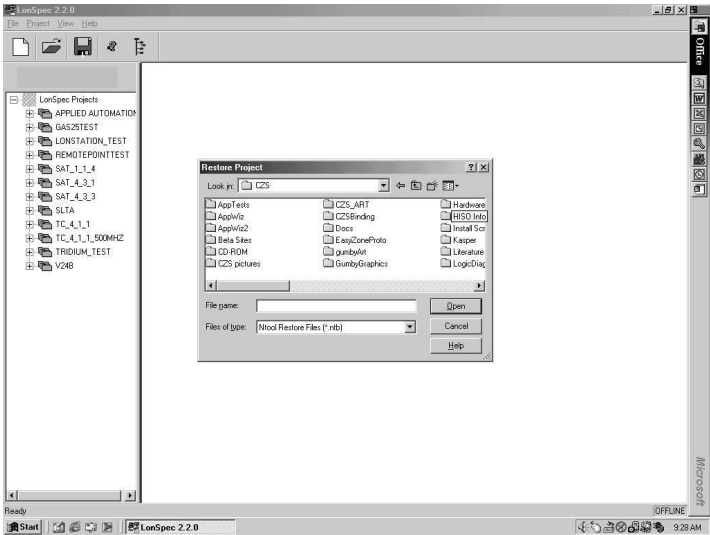


Fig. 70. Restore Project screen.

APPENDIX C. LONSTATION™

LONSTATION™ is offered with the RapidZone solution for users who wish to be able to monitor their system remotely. LONSTATION™ allows users to view alarms, make schedule changes, and make setpoint changes from remote locations. This appendix gives brief instructions of how to do the primary functions of LONSTATION™. If extra help is needed, LONSTATION™ contains extensive help menus to aid the user while they are using the program.

Start-Up

To work in LONSTATION™ the project must first be backed up in RapidZone Online and restored in LONSTATION™. To do this, follow the instructions below:

- Once the project has been saved and RapidZone online has been opened, select “Backup Project” from the project pull-down menu. This will save the project as an .ntb file that can be restored in LONSPEC™ or LONSTATION™.
- Open LONSTATION™ and select “Restore LONSPEC™ Project” from the File pull down menu. Find the .ntb file that you just created and click OK. This will create an .mdb file that can be opened in LONSTATION™. Save this file to the desired location.
- Now click the site icon on the left side of the screen. Select the create menu. Choose a site name and site ID and check the associate box. Click “Select LONSPEC™ site”, then select the .mdb file that you have just created. Click OK. You should now see the site you just created in the window on the left side of the screen. Make sure that the N1 is highlighted.

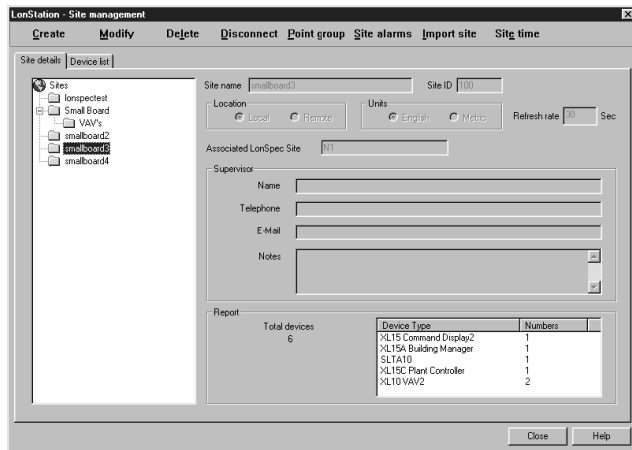


Fig. 71. Site Management screen.

You may connect to that site either by clicking “Connect” or by selecting the device list tab. This brings up the following window.

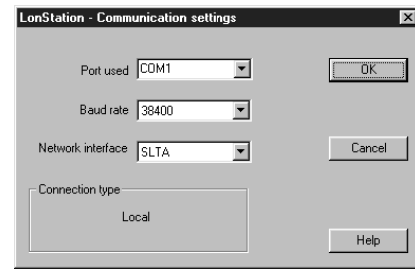


Fig. 72. Communications settings.

Leave the Baud Rate on its default value, and select the correct port value before connecting.

Clicking on the device tab will display all of the controllers on the network. The device names that were specified in RapidZone will also be shown here. Clicking on any of the devices will bring up a monitoring screen that shows setpoints, data values and error logs. Most of these values cannot be changed and some are not relevant in the RapidZone system.

NOTE: The device list finds all controllers connected to the bus which may be more than were configured in the RapidZone file that was created for this application.

Changing Temperature Setpoints

If you wish to change the setpoint for any of the zones, click the zone name on the device list. Select the Temperature Control Tab. The setpoints that can be changed are highlighted in white. From this screen you may change the Unoccupied heating and cooling setpoints as well as the Occupied heating and cooling setpoints.

NOTE: The Standby occupancy mode is not supported in RapidZone, changes to these setpoints will have no effect on the system.

NOTE: If the wall module in the selected zone has a setpoint knob, then changing occupied heating and cooling setpoints will not change the temperature but instead change the deadband for that zone. The deadband will be the difference between heating and cooling setpoints and will be centered around the setting on the wall module.

Changing schedules

To change schedules, close down the site window and click the Schedules icon on the left side of the screen. Select the building manager and the schedule that you wish to change. The following screen will be displayed.

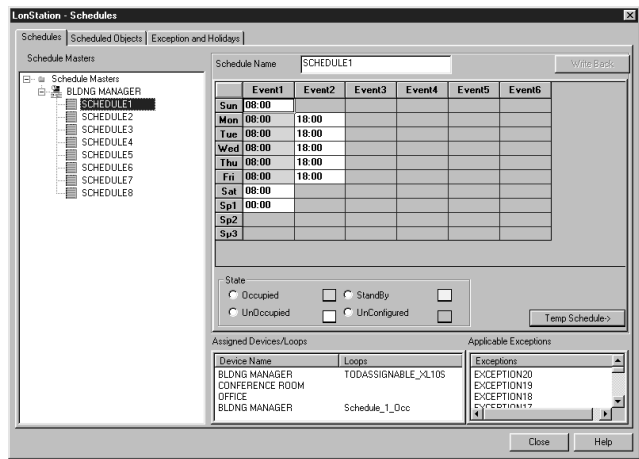


Fig. 73. Schedule screen.

The user may change any of the times that occupied and unoccupied times listed in this screen. The special schedules are at the bottom of the screen and are assigned to chosen holidays/exceptions. Notice the “Temp Schedule” bottom on the bottom right of the screen. Clicking on this tab allows the user to set a one time temporary schedule and assign to it any of the daily or special schedules.

By clicking on the Scheduled Objects tab, the user is given a list of all zones and schedules. This is a read only screen and none of the times can be changed. The only change that can be made on this screen is the schedule that is assigned to each zone.

NOTE: It is HIGHLY recommended that you make all changes of zone assignments in RapidZone and not in LONSTATION™. Changes made in LONSTATION™ will not be reflected on the command display. This may cause problems when changes are made to a command display that is displaying incorrect zone assignments.

By clicking on the “Exception and Holiday” tab, the user can choose days where the schedule will be different then the one normally assigned to that day. Exceptions in LONSTATION™ are the same as Holidays in RapidZone. The only difference is that in RapidZone all holidays are counted as a 24 hour unoccupied period, while LONSTATION™ allows you to assign a daily or special schedule to each holiday. Any holidays that were assigned in RapidZone will shown in LONSTATION™.

NOTE: Each schedule has 3 of its own special schedules along with the daily schedules. If you wish to assign a special schedules to an exception, that special schedule must be entered in each schedule individually where that exception will apply, or else it will have a default of 24 hours unoccupied.

Exemptions are defaulted to apply to all schedules. The user can adjust what schedules the exemption applies to by removing the check mark next to the schedules.

Viewing Alarms

There are two icons for viewing alarms located on the left side of the screen. The alarm history log contains the record of up to 1000 acknowledged alarms until the alarm record is manually deleted from the log. The alarm history includes the alarm information, the date and time the alarm occurred, the date and time it was acknowledged, and the ID of the user who acknowledged the alarm.

The alarm browse is used to read the unacknowledged alarms directly from the Excel 15A building manager’s alarm buffer. It contains the same basic information as the alarms displayed in the Alarm History. Because it reads the alarms directly from the building managers alarm buffer, it will only read the alarms that are currently active.

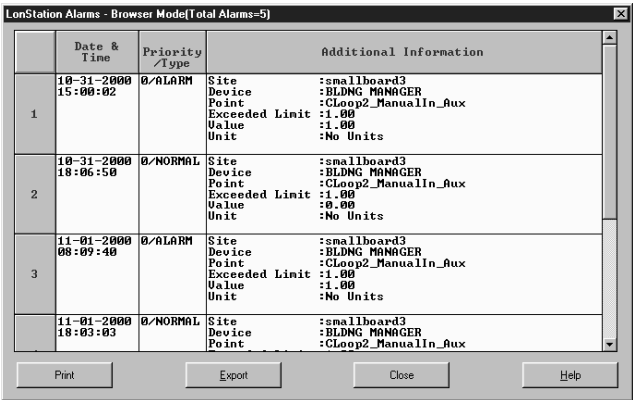


Fig. 74. LONSTATION™ Alarm Screen

NOTE: The same alarms shown in LONSTATION™ will look different than how they appear on the Command Display.

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Honeywell

Automation and Control Solutions

Honeywell International Inc.	Honeywell Limited-Honeywell Limitée
1985 Douglas Drive North	35 Dynamic Drive
Golden Valley, MN 55422	Scarborough, Ontario
	M1V 4Z9

