ZonexCommander

ZonexCommander (Plus)

Network All Your HVAC Equipment

Centralized DDC Communications
for Stand-Alone HVAC and Zoned Systems

Installation and Applications Manual

ZONEX
SYSTEMS
comfort you control

Table of Contents

COMMANDER SYSTEM OVERVIEW

This manual covers the design and installation for the *ZonexCommander* systems. *ZonexCommander* is a communicating Windows-based DDC system designed to remotely control 1 – 80 RTUs, split systems or zones. The systems can control stand-alone HVAC equipment, zoned units with fully modulating or two-position zone dampers and auxiliary equipment such as exhaust fans, lighting or other generic loads scheduled via the *ZonexCommander* software.

Zonex is designed to network one or multiple zoned units on one two-wire twisted pair for remote communications over the Internet in buildings too large for multiple programmable thermostats but too small for a full blown energy management system.

Two versions of the product are available:
1. *ZonexCommander* – Controls stand-alone HVAC equipment 1-80 units
2. *ZonexCommander (Plus)* – designed to centralize control of multiple constant volume and VAV systems.

Communications with these systems are accomplished with a computer connected directly to the system or over the Internet. A dedicated on-site computer is not required to operate any *ZonexCommander*.

Systems utilize Zonex Windows-based software and provide the following features to enhance control and management of the facility remotely or on-site as follows:
– On-site or remote control of all HVAC equipment
– Remotely collect and view temperature data, RA/SA from any unit
– Monitor or change every thermostat remotely, individually or globally
– Schedule each thermostat for two occupied and two unoccupied periods per day
– Remotely lock thermostats individually or globally
– Vacation scheduling for 20 events of up to 30 days in duration
– Provide scheduled occupied and unoccupied operation of generic devices (pumps, lights, fans, and more)
– Print reports for thermostat setpoints, zone or room temperatures
– Trend logging capability
– Alarming
– Remote system control with simple Windows operating software

SYSTEM SELECTION CRITERIA

To select the proper Zonex system for your application please answer the following questions:

Are you using zone dampers on this job?

> NO, control your stand-alone equipment with a *ZonexCommander*.
> YES, use a *ModCom* or a *ZonexCommander (Plus)*.

Stand-Alone Unit Applications

ZONEXCOMMANDER
1. How many units are on this project?
2. Are units Gas Electric or Heat Pump?
3. Are there any generic loads to control (pumps, lights, or fans)?
4. Is a Network/Internet communication required?
5. Proceed to the *ZonexCommander* Component Selection Guide, and insert the above answers to develop a bill of materials for your control system composed of stand-alone RTUs or split systems.

ZONEXCOMMANDER (PLUS) – for Multiple Zoned and Stand-Alone Units
1. How many zones are on each unit?
2. How many stand-alone units are in this application?
3. What size dampers are needed?
4. What size and how many bypass dampers are needed?
5. Are there any generic loads to control and schedule (pumps, fans or lights)?
6. Is Network/Internet communication required?
7. Proceed to the *ZonexCommander (Plus)* Component Selection Guide.

The *ZonexCommander* automates and networks 1-80 HVAC units, providing remote communication with all RTUs or splits in your system. The *ZonexCommander* eliminates the need to continually set and reset multiple programmable thermostats located throughout your building. *ZonexCommander* bridges the gap between ineffective stand-alone thermostats and expensive and complex automation systems. Please review integral components of the Zonex Systems below.

COMMAND CENTERS

The Command Center is a microprocessor based digital communicating controller. Each Command Center supports up to 20 devices (thermostats and RLYCOM relay modules).

A unique Command Center exists for each communicating Zonex System:

> ZonexCommander
> ZonexCommander (Plus)

The Command Centers communicate with the computer through the RS-232 link, and communications with thermostats or devices communicate through the RS-485 link using a daisy chained two-wire twisted pair (Belden 8740).

Each Command Center maintains Day, Date, Time and Year with battery backup. All Occupied, Unoccupied and Vacation schedules, device name tags and addresses are programmed into non-volatile memory, which is not affected by power interruptions.

The Command Centers are powered by dedicated 24vac 40va, field supplied transformers. **Each Command Center must have its own transformer power supply.**

ZONEXCOMMANDER COMMAND CENTER

Part #CETCIP

CETCIP – ZonexCommander Communications Package with TCIP network device, for 20 communicating devices.

COMCIP – Command center with TCIP – adds 20 additional communicating devices for larger systems.

ZONEXCOMMANDER (PLUS) COMMAND CENTER

ZPTCIP – *ZonexCommander (Plus)* Communications Package with TCIP network device for internet communications, for 1-4 **RMODs** with 20 communicating devices. Includes system operating software.

CZNXIP Command Center with TCIP – supports 4 additional **RMODs** and another 20 additional communicating devices.

ZonexCommander (Plus) is designed to provide centralized control for multiple zoned HVAC systems. Each Command Center supports up to 20 devices (**ModStat, MODS2, DIGICOM** thermostats and **RLYCOMs**). Each ZPTCIP Command Center controls up to four **RMOD** controllers, each controlling one HVAC unit. CZNXIP Command Centers via TCIP device provide expansion capability to support up to 16 HVAC units with 80 zones. The thermostats are allocated to the **RMOD** controller through *ZonexCommander (Plus)* software.

RMOD – UNIT RELAY MODULE
For use with *ZonexCommander (Plus)* systems only
Each Command Center can support 4 **RMODs**. Each Universal **RMOD** controls a zoned GE or HP unit with on-board capacity control. The **RMOD** communicates with the Command Center and thermostats assigned to that **RMOD.** Each thermostat can send a heat or cool call to the **RMOD**. The **RMOD** polls the number of heat or cool calls every minute and energizes the unit based on our control algorithm of first call first served, majority wins on changeover.
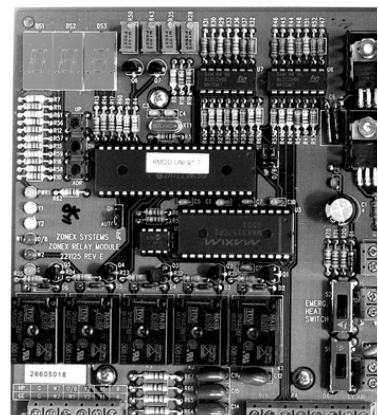
THERMOSTATS
The **DIGICOM** and **DIGIHP** thermostats are used to control stand-alone Gas Electric (2H/2C) or Heat Pump (3H/2C) HVAC systems.

The **ModStat** (modulating) and **MODS2** (2-position) are zone thermostats, which control zone dampers.

The Zonex thermostats are microprocessor based, auto changeover, digital communicating thermostats. The thermostats have a large, easy-to-read LCD display with a distinctive grey backlight. The display is designed to clearly indicate space temperature from 57° to 92°, heat and cool setpoints, system status, override and thermostat address.

The factory set Heat and Cool setpoints are 70° and 75°, and the factory set address is 25. Thermostats can be electronically "locked" by the *Commander* software and have a manual two-hour override. When the thermostats are "locked," the setpoints can be adjusted locally by no more than 2° above or below the locked setpoints.

The Heat / Cool setpoints and address assignments are stored in non-volatile memory to insure recovery in the event of a power interruption. Thermostats are powered with 24vac, and communication is through the RS-485 twisted pair (Belden 8740) communication wire.

COMMUNICATION WIRE SPECIFICATION RS-485

The *Commander* System sends and receives data from the Command Center to all communicating devices through a 2-conductor twisted pair RS-485 link (Belden 8740). The communication wire has a maximum run length of 4,000 L Ft. The communication link is a vital component of any DDC system, and it must be installed correctly using the correct wire for the specific application.

For standard applications the basic twisted pair (Belden 8740) wire is used, which is daisy chained to each communicating device. For installations with any potential for electrical interference such as caused by large transformers, VFDs, ballasts and other electrical devices, shielded twisted pair (Belden 8450) should be used to insure clean communications.

LAT – 5vdc TEMPERATURE SENSORS

LAT sensors are used on the **RMOD** and **SENDCOM** devices for Return and Supply Air temperature sensing. The Supply and Return sensors provide data to the **RMOD** and **ModCC / CMod** for proper system capacity control and HI/LO limiting. The **SENDCOM** has a supply sensor, which is factory installed in the enclosure for supply plenum installation; and the remote return sensor is included for field installation on the return plenum.

OLAT - 5vdc OUTSIDE AIR SENSOR

The LAT Thermistor sensor assembly is provided with the *Zonex-Commander* and *ZonexCommander (Plus)* Command Centers to provide the Outside Air Temperature which is displayed on the System screen of the *ZonexCommander/Commander (Plus)* program.

COMPUTER SPECIFICATIONS

A dedicated on-site "control" computer is **not required**. All of the *ZonexCommander* Family of control systems are accessed by Windows based Laptop or Desktop computers using Windows 7, 8,XP or Vista operating systems. Our systems can be easily accessed with a direct connected computer or the optional TCIP device for Internet or Ethernet access.

OPTIONAL DEVICES

SENDCOM Sensor
### Communicating Supply and Return Air Temperature Sensors

The **SENDCOM** is a microprocessor based communicating air duct temperature sensor. This optional device is used to display Supply and Return air on stand-alone HVAC systems. Each stand-alone HVAC system requires a **SENDCOM** to display Return and Supply air temperature for that particular system. This data is transmitted to and displayed on the *Commander* software.
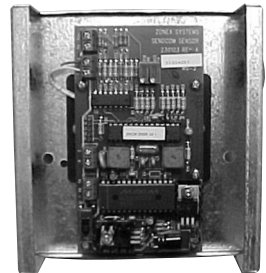
The **SENDCOM** is designed for installation on the supply duct, with a remote sensor for the return duct. The **SENDCOM** does not use a dedicated address on the communication link; it piggybacks a thermostat address and displays data when that thermostat number is selected by double clicking over that thermostat's current room temperature.

RLYCOM

The **RLYCOM** is a communicating device equipped with two SPDT relays, which are used for controlling fans, pumps, blowers, lighting, etc. The **RLYCOM** enables these auxiliary devices to be cycled ON and OFF by programmed schedules in the *Commander* software. Status is displayed on the REVIEW screen for verification. Each **RLYCOM** uses a dedicated address from 01 to 20. The load applied to the relay contacts must not exceed one amp at 24vac. The **RLYCOM** is designed to switch 24vac circuits only. The relays energize in the Occupied mode and de-energize in the Unoccupied mode.
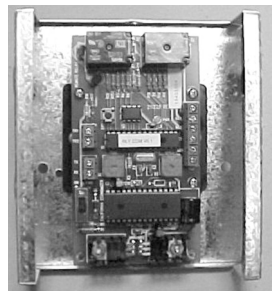
TCIP Network Device

The TCIP device provides communication with the *Commander* System through the Internet or Ethernet Network using an assigned IP address and Port Forwarding. The Network device includes the iServer with power supply, installation software and the *Commander* Network version operating software.

ZONEXCOMMANDER CONCEPT DRAWING

ZonexCommander is a DDC system for automating and networking new and existing stand-alone HVAC systems and mechanical devices. Gas Electric and Heat Pump HVAC units are controlled with communicating thermostats while mechanical devices are controlled with a relay device (**RLYCOM**). Each of these devices can be scheduled through the simple Windows-based *ZonexCommander* software and communicate to the Command Center via a daisy-chained 2-wire twisted pair communications link.
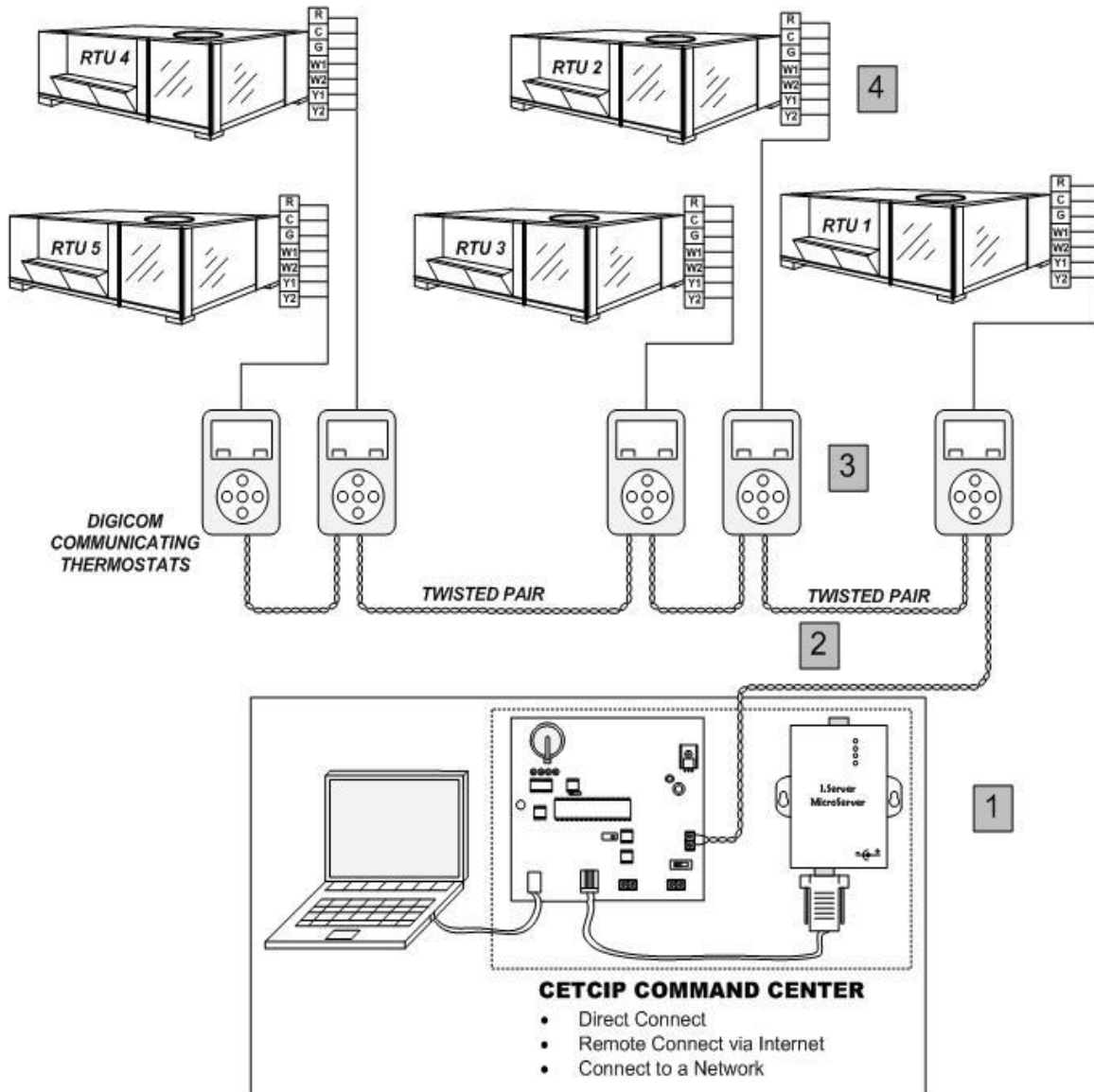
1   *ZonexCommander* Command Center (Part #CETCIP)

2   Twisted Pair Communications Wire (Belden #8740)

3   DIGICOM or DIGIHP Thermostat

4   Standard 18-ga. Thermostat Wiring to Unit

ZonexCommander

Remotely control 1-80 stand-alone rooftops or split systems

SYSTEM

**STAND-ALONE
EQUIPMENT**

COMMAND CENTER

CETCIP Communications package
Includes: Command Center, software, TCIP Device, cables and LAT Sensor

NUMBER OF THERMOSTATS

Up to 20

(Use 1 – CETCIP
from above)

21 to 80
1 – CETCIP Communications Package
1 – COMCIP Command Center per
additional 20 Thermostats

THERMOSTATS

Gas/Electric

DIGICOM
(2H/2C)

Heat Pump

DIGIHP
(3H/2C)

COMMUNICATING ACCESSORIES (Optional)

SENDCOM
Stand-Alone Equipment
Duct Temperature Sensor
(1 per HVAC unit)

RLYCOM
Communicating
Relay Device

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SYSTEM OVERVIEW

ZonexCommander is a DDC system for automating and networking new and existing stand-alone HVAC systems and mechanical devices.

The *ZonexCommander* networks 1-20 RTUs, AHUs, Heat Pumps, or split systems per Command Center with an expansion capability of up to 80 units.

Gas Electric and Heat Pump HVAC units are controlled with communicating thermostats (**DIGICOM / DIGIHP**), while mechanical devices are controlled with a relay device (**RLYCOM**). Each of these devices can be scheduled through the simple Windows-based *ZonexCommander* software and communicated to the Command Center via a daisy-chained 2-wire twisted pair communications link (Belden 8740).
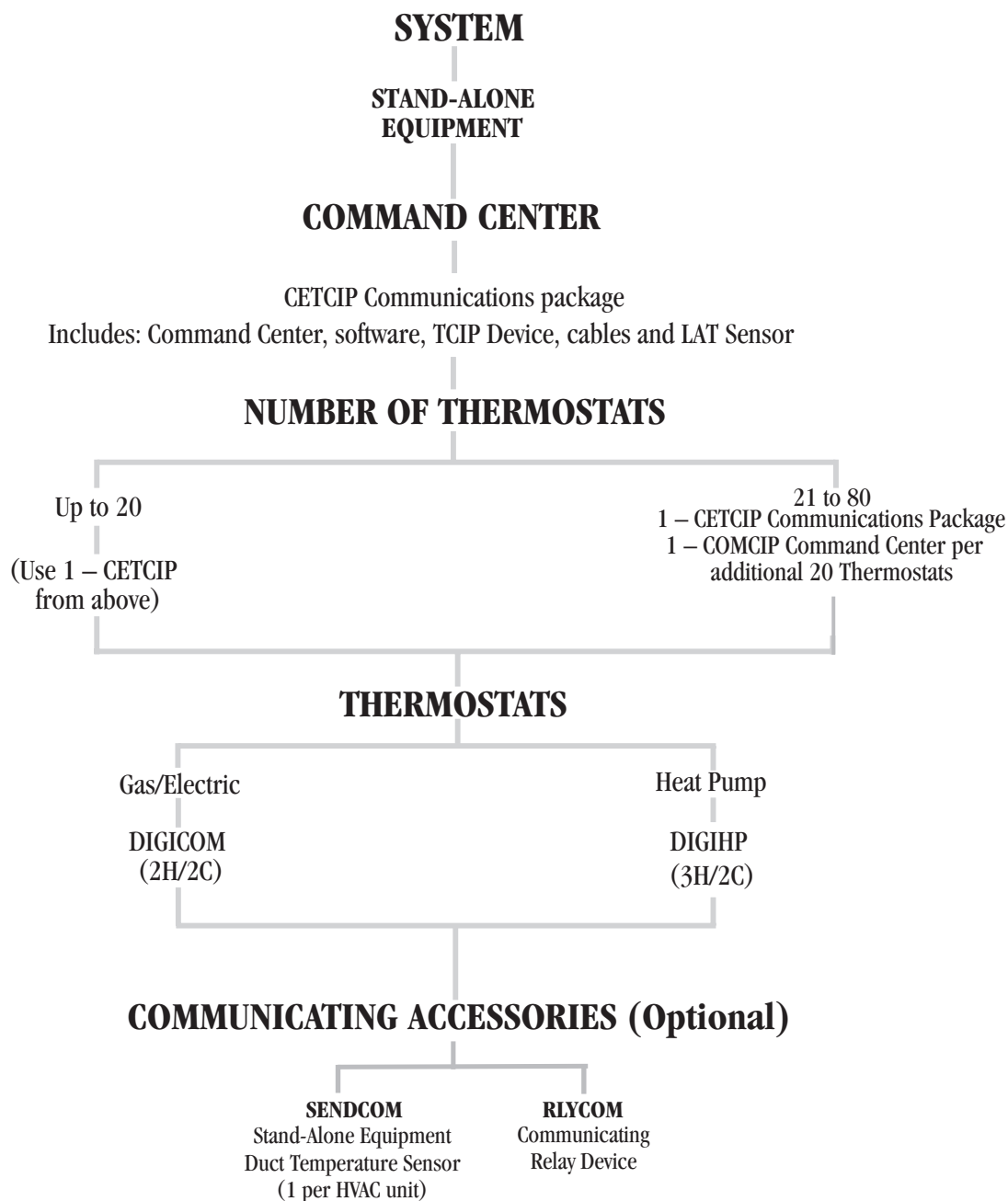
The Command Center has available inputs for outside air temperature display; and, with the addition of a **SENDCOM** sensor, each unit's Return Air and Supply Air temperature is remotely displayed on the *Commander* software. This information may also be trend logged via the *Zonex-Commander* Trending Program, included with your *Commander* software.

***ZonexCommander* allows you to instantly communicate and remotely control every unit in your system.**

OPERATION

The *ZonexCommander* Command Center polls all devices every minute to register information on operation in the Command Center. **DIGICOM** and **DIGIHP** thermostats place calls to HVAC units based on thermostat setpoint.

Cool Call

The **DIGICOM** and **DIGIHP** thermostats will initiate a Y1 cool call when the space temperature rises 1° above the Cool setpoint. The fan will also be energized on "G." On 2-stage systems, Y2 will be energized when the space temperature rises 2° above the Cool setpoint. Y1 and Y2 will remain energized until the active cool call is satisfied at setpoint.

When the **DIGIHP** thermostat is configured for "O" reversing valve on an active cool call, "O" will energize on call for cool and will remain energized until a heat call is made. When the **DIGIHP** is configured for "B" reversing valve, there is no signal from the O/B terminal on an active cool call.

Heat Call

The **DIGICOM** and **DIGIHP** thermostats will initiate a 1st stage heat call (W1 or Y1 & G) when the space temperature drops 1° below the Heat setpoint. 2nd stage heat is energized (W2 or Y2 & G) when the space temperature drops 2° below the Heat setpoint. The **DIGICOM** thermostat does not energize "G" for fan on a heat call unless the thermostat has been configured for FAN ON in the Occupied mode.

On the **DIGIHP** thermostat, when the temperature drops 3° below the heat setpoint, the auxiliary heat will be energized on W2 and G, along with Y1 and Y2. When Emergency Heat is selected, Y1 and Y2 are de-energized; and W2 and "G" are energized.

When the DIGIHP thermostat is configured for "O" reversing valve on an active heat call, the O/B output will be de-energized. When the **DIGIHP**

is configured for "B" reversing valve on a call for heat, "B" will energize the reversing valve and will remain energized until a call for cool is made.

Occupied/ Unoccupied

A schedule for Occupied and Unoccupied operation is made through the *ZonexCommander* Windows-based software. This schedule will communicate with thermostats to reset temperature setpoints of thermostats for occupied and unoccupied time. Each thermostat can have its own occupied and unoccupied schedule and thermostat setpoints. The *Zonex-Commander* Windows-based software allows for seven-day programmability with two occupied and two unoccupied time periods per day.

Thermostat Lock Feature

The **DIGICOM / DIGIHP** thermostats can be electronically locked either individually or globally through the *ZonexCommander* program. When a thermostat is in the Lock mode, the address number on the left column of the Review screen on the Zonex software will be in red. The thermostat will also display the Lock mode with a padlock symbol on the upper left of the LCD display. When in the Lock mode, the thermostat can be locally controlled providing heating or cooling changes ±2° from Heat or Cool setpoint. The 2-hour override is operational in the Lock mode.

Schedule Override

The **DIGICOM / DIGIHP** thermostats provide a 2-hour override in the Unoccupied mode. When the thermostat goes into the Unoccupied mode, the backlight automatically goes off, and Unoccupied is displayed. When the **Select** button on the thermostat is pressed in the Unoccupied mode, the backlight energizes and the 2-hour override to Occupied begins. To terminate the 2-hour override, press the **Select** button again, which returns the thermostat to the Unoccupied mode.

RLYCOM

The **RLYCOM** energizes and de-energizes two SPDT relays based on the schedule input on the *Commander* software. When the Command Center sends an Occupied call, the **RLYCOM** energizes. When the Command Center sends an Unoccupied call, the **RLYCOM** de-energizes. Manual changes are performed from the Toggle button on the **RLYCOM**. When the red LED is illuminated, the **RLYCOM** is energized. Multiple RLYCOMS may be utilized to control additional devices or loads.

SENDCOM

SENDCOMs work in conjunction with their assigned thermostats. To review **SENDCOM** information, double click on an assigned thermostat's current room temperature. Supply and Return air temperatures will appear on the REVIEW page for this **SENDCOM**, if a **SENDCOM** was installed in this application.

CETCIP Command Center

1. Install the **CETCIP** Command Center on a wall or mounting board in a dry interior space where the ambient temperatures will be between 32° and 125° non-condensing.

2. When installing multiple Command Centers, mount all boards together on the same surface.
   NOTE: 120vac outlets are required for the TCIP iServer device power supplies.

3. When the installation calls for an on-site, direct connected computer, the Command Center must be located within 10' of the computer if the USB cable is used. The TCIP device requires an Ethernet cable, which is field provided.

4. Install a 24vac 40va dedicated transformer for each individual Command Center, and wire to terminals "G" and "B." (*See Fig. 1*)
   NOTE: Power supply voltage on G and B should be 24 to 28vac.

5. For system TCIP configuration, you must provide a 120vac outlet for the power supply.

6. A single air sensor (**OLAT**) is supplied to display the Outside Air Temperature on the System screen of the *Commander* program. It should be installed where it will not be in direct sunlight. If the sensor leads must be extended, simply use standard 18/2 thermostat wire, and connect to the S S terminals on the Command Center.

7. The twisted pair communication wire (Belden 8740) is to be daisy chained to each communicating device, which is controlled by the specific Command Center. When multiple Command Centers are used, each Command Center is to have a dedicated communication loop. The communication loop is polarity sensitive on RX and TX. **Wire nuts are never to be used on the communication wire.** When splicing wire, use screw type terminal strips or solder.

NOTE: for systems with potential electrical interference, such as large transformers, VFDs, etc, shielded twisted pair (Belden 8450) may be used for the communications loop.
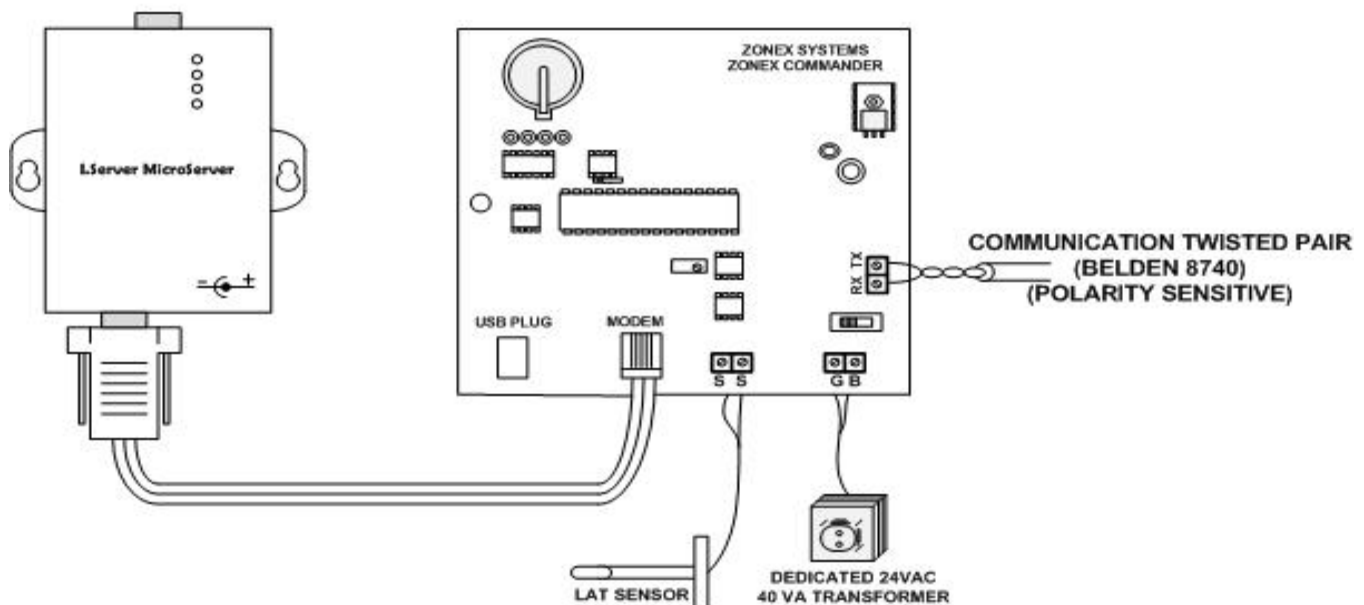
Internet LAN Connection

Fig.1

DIGICOM / DIGIHP THERMOSTATS

DESCRIPTION

The Zonex Systems **DIGICOM** and **DIGIHP** are microprocessor based, auto changeover, stand-alone thermostats used to control stand-alone units with no dampers in the system. The **DIGICOM** is the Gas Electric version and has two-stage heat / cool outputs with selectable fan operation. The **DIGIHP** Heat Pump thermostats have two-stage cool and three-stage heat outputs with selectable fan. The **DIGICOM** and **DIGIHP** thermostats have a large, easy-to-read LCD display with a distinctive gray backlight. The display backlight is continuously illuminated in the Occupied mode and goes off in the Un-occupied mode.
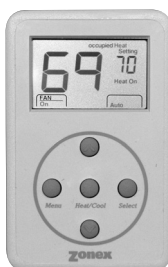
The **DIGICOM** and **DIGIHP** are very easy to configure through the system program or to make manual adjustments using the buttons located on the front cover.

These thermostats feature an onboard thermistor for precise temperature measurement. In the event of power loss, the Heat and Cool setpoints are stored in a non-volatile memory, without the need for battery backup.

The space ambient temperature is continually displayed with large, easy-to-read numbers. The DIGICOM temperature display range is 57°to 90°F., and the DIGIHP temperature display range is 57°to 90°F. Fan mode, Heat or Cool setpoints and operation modes are all indicated on the display.

Programmed setpoints can be manually adjusted at the thermostat or electronically locked through the system program to provide limited manual setpoint adjustment. Two-hour override is provided for after-hours temporary operation with a touch of a button.

INSTALLATION
Thermostat and terminal base
1. The thermostat is to be installed on an interior wall, away from drafts, supply air currents and direct sunlight or any heat generating source.
2. To remove the thermostat cover, grasp the cover at the top and pull straight off; do not pivot the cover from the base.
3. Install the thermostat terminal base to the wall using the provided anchors and screws. The thermostat can also be mounted on a 2x4 electrical box using two #6-32" screws.

Wiring
The Zonex Systems **DIGICOM** and **DIGIHP** thermostats have been specifically designed to make wall mounting and wire connections very easy. The thermostat terminal base has two separate terminal blocks: the left side terminal block is for the 24vac control circuits, and the right side terminal block is for the RX TX communication circuits. There are two sets of RX TX terminals on the base to make daisy chain wiring from device to device straightforward and simple.
1. Use minimum 18-gauge AWG thermostat wire for the 24vac control circuits. The load on these circuits must not exceed 1 amp. The voltage range on R and C must not exceed 28vac.

2. Connect the communication wires to the RX TX terminals. There are 2 sets of RX TX terminals for "daisy chain" installation of this circuit. The communication wire specification is twisted pair (Belden 8740) or shielded twisted pair wire (Belden 8450).

NOTE: When using shielded twisted pair wire (Belden 8450), just connect the shield conductors together, as there is no electrical connection on the thermostat base terminals. The shield will be landed on the Command Center on the G or TR2 terminal.
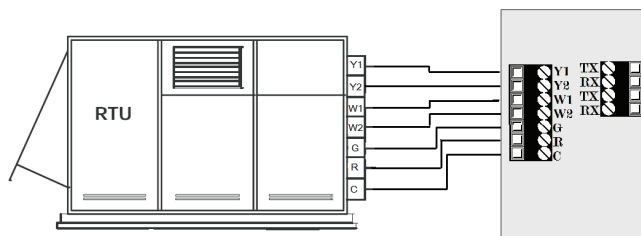
DIGICOM

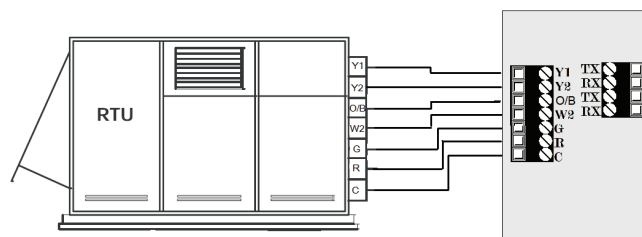*Fig. 1*

DIGIHP

Fig. 2

Blower Fan Relay
For electrical heat applications, which require a fan output on a call for heat. (See *Fig 3.*)
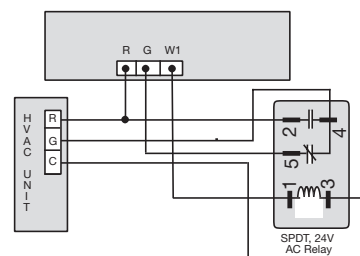

Fig. 3

DIGICOM / DIGIHP THERMOSTATS

Configuration

1. Set the unique address for each thermostat from 01 to 20.
2. Press and hold the **Menu** button until you see the system mode display on the lower right begin to scroll and change modes; then press and hold the **Heat/Cool** button with the **Menu** button.
3. When the display shows "address" and the setpoint temperature changes to the address number, release **Heat/Cool** and **Menu** buttons and press the **UP** or **DN** button to raise or lower the number.

MANUAL ADJUSTMENTS
Heat and Cool Setpoint Display

Press the **Heat/Cool** button to display the Heat or Cool setpoint temperatures.
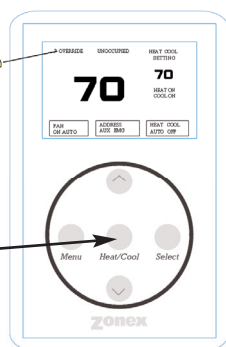
Temperature Setpoints
COOL Setpoint

1. Press the **Heat/Cool** button to display the Cool setpoint on the upper right.
2. Press the **UP** or **DN** buttons to change the Cool setpoint.

HEAT Setpoint

1. Press the **Heat/Cool** button to display the Heat setpoint on the upper right.
2. Press the **UP** or **DN** buttons to change the Heat setpoint temperature.

FAN Mode

To change the FAN operation to AUTO or ON, press the **UP** and **DN** buttons together, once to toggle fan operation.

HVAC system mode

To select Heat, Cool, Auto, Emergency Heat (HP only) or OFF, press and hold the **Menu** button; and when the desired mode is displayed, press and hold the **Select** button; then release both to confirm mode.

Override

When the system is in the Unoccupied mode, the thermostat provides a 2-hour override for after-hours system operation. To select the 2-hour override, press the **Select** button and note "Override" indicated on the display, along with the backlight coming on. When additional override is required, press the **Select** button again.

Calibration

When re-calibration is required, press and hold the **Heat/Cool** and **Select** buttons simultaneously (the screen will flash). Then press the **UP** button once to increase temperature 1°, or press the **DN** button once to decrease the temperature 1°. If additional calibration is required, repeat this step.

Reversing Valve Mode

DIGIHP (**O&B**) is factory set at "**O**" and can be field configured for "**B**" reversing valve operation. For "**B**" mode reversing valve (reversing valve energized in the heat mode), press and hold the **Heat/Cool** and **Select** buttons; then press and release the **Menu** button once. Release the **Heat/Cool** and **Select** buttons. The ° symbol next to the set point display should disappear. Repeat steps above to go back to "O."

THERMOSTAT OPERATION
Display

The grey display backlight is constantly illuminated in the Occupied mode. The display backlight goes off when in the Unoccupied mode. When in the Unoccupied mode, if any button is pressed, the backlight will illuminate for 5 seconds. If the thermostat is placed into the override mode, the backlight will illuminate until the 2 hours times out. To terminate override, press the **Select** button again.

COOL – DIGICOM / DIGIHP: The thermostat will make a Y1 cool call when the space temperature rises 1° above the cool setpoint. Y2 will energize when the space temperature rises 2° above the cool setpoint. When the room temperature is less than 2° from setpoint, Y2 de-energizes. Y1 de-energizes at setpoint. O or B is energized for the reversing valve circuit, depending on configuration. The G circuit is energized for fan.

HEAT – DIGICOM: The thermostat will make a W1 heat call when the space temperature is 1° below the heat setpoint. W2 will energize when the space temperature is 2° below the heat setpoint. When the room temperature rises to within 2° of the heat setpoint, W2 de-energizes. W1 de-energizes at setpoint.

NOTE: The "G" fan circuit on the **DIGICOM** thermostat is not energized in the Heat mode unless the fan is set for ON operation.

HEAT – DIGIHP: The thermostat will make a Y1 heat call when the space temperature is 1° below the heat setpoint. Y2 will energize when the space temperature is 2° below the heat setpoint. E (aux heat) will energize when the space temperature is 3° below setpoint. When the room temperature rises to within 2° of the heat setpoint, E (aux heat) de-energizes. When the room temperature rises to within 1°, Y2 de-energizes. Y1 de-energizes at setpoint.

Emergency Heat – DIGIHP: When Emergency heat is selected on the **DIGIHP** thermostat, on a call for heat, there is an output signal on "E" for backup heat and "G" for the fan. The compressor circuits "Y1" and "Y2" are locked out during heat calls until Auto, Heat or Cool mode is selected. The thermostat display will indicate when Emergency Heat has been selected.

DIGICOM – FAN operation for electric heat applications: A pilot relay may be required to energize the fan for heat operation on electric heat applications. This relay is a 24vac coil – SPST and is field supplied. The coil is energized from W1 and C from the **DIGICOM** thermostat terminal base.
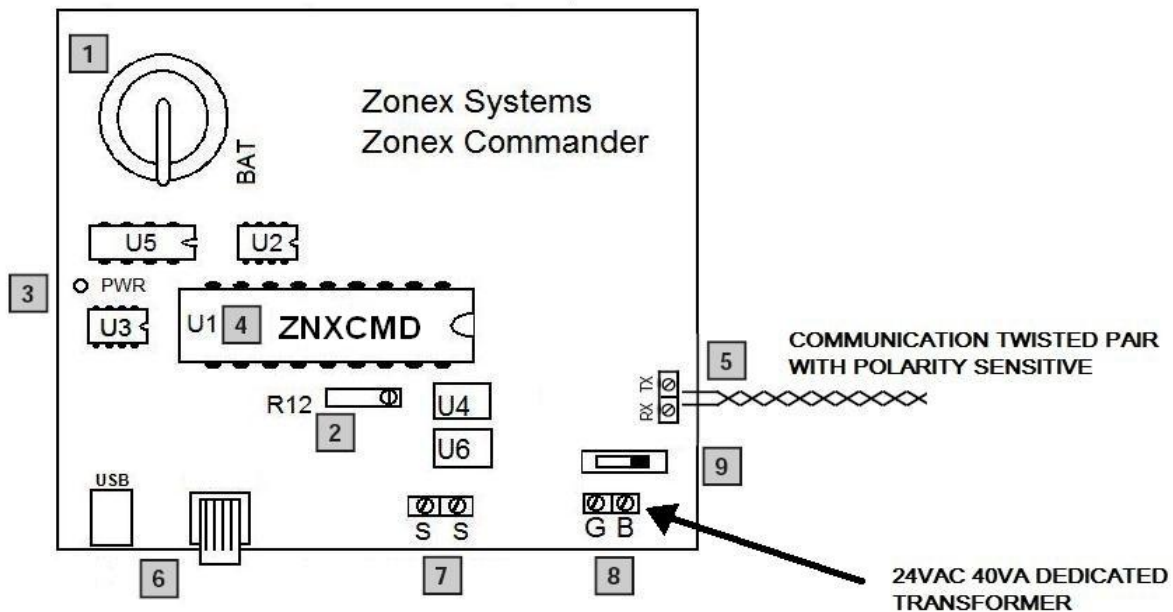
LEGEND

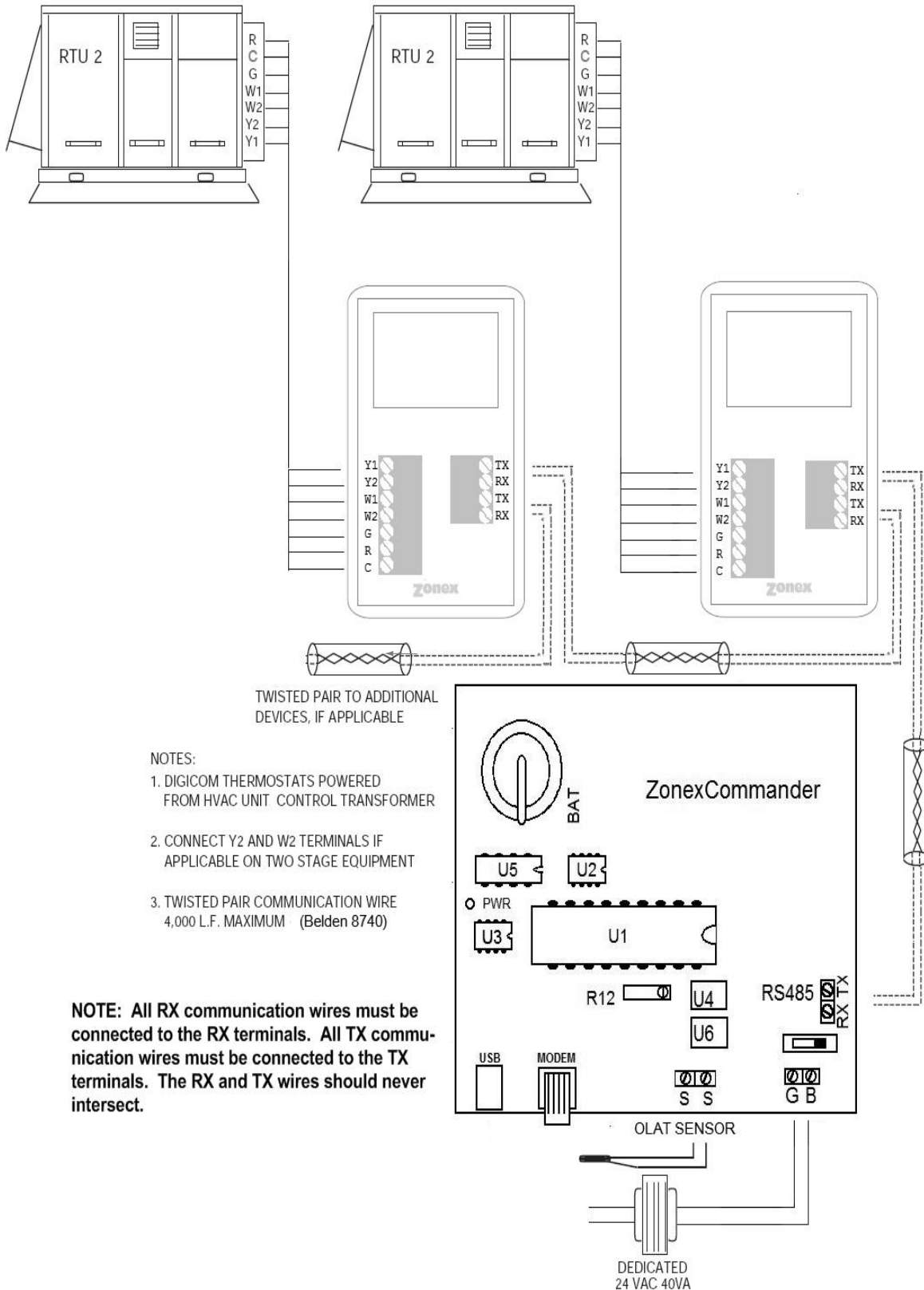|	
1	DATE AND TIME BACKUP BATTERY
2	SENSOR CALIBRATION: R12 OUTSIDE AIR (OA)
3	POWER LED INDICATOR
4	MAIN CONTROL CHIP ZONEXCOMMANDER
5	COMMUNICATION RS-485 TWISTED PAIR (POLARITY SENSITIVE) (BELDEN 8740)
6	USB COMPUTER
7	OUTDOOR AIR SENSOR TERMINAL
8	TERMINALS G AND B, 24VAC 40VA INPUT
9	ON/OFF SWITCH

ROOFTOP UNITS: UP TO 20 PER COMMAND CENTER

RTU 2

R
C
G
W1
W2
Y2
Y1

RTU 2

R
C
G
W1
W2
Y2
Y1

Y1   TX
Y2   RX
W1   TX
W2   RX
G
R
C

zonex

Y1   TX
Y2   RX
W1   TX
W2   RX
G
R
C

zonex

TWISTED PAIR TO ADDITIONAL
DEVICES, IF APPLICABLE

NOTES:

1. DIGICOM THERMOSTATS POWERED
   FROM HVAC UNIT CONTROL TRANSFORMER

2. CONNECT Y2 AND W2 TERMINALS IF
   APPLICABLE ON TWO STAGE EQUIPMENT

3. TWISTED PAIR COMMUNICATION WIRE
   4,000 L.F. MAXIMUM   (Belden 8740)

NOTE: All RX communication wires must be
connected to the RX terminals. All TX commu-
nication wires must be connected to the TX
terminals. The RX and TX wires should never
intersect.

BAT

ZonexCommander

U5   U2

O PWR

U3

U1

R12   U4   RS485

U6

USB   MODEM   S S   G B

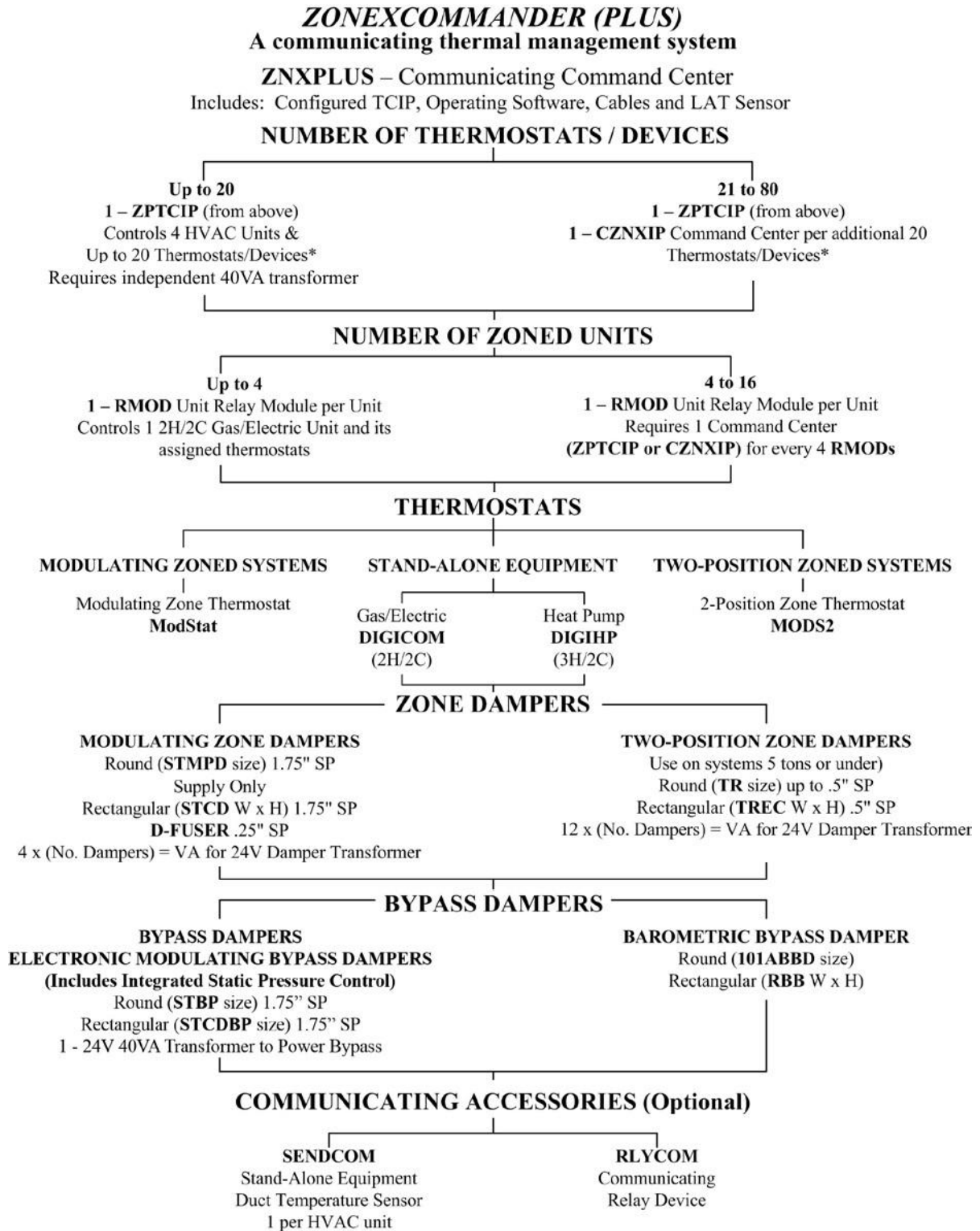OLAT SENSOR

DEDICATED
24 VAC 40VA

13

ZONEXCOMMANDER (PLUS) CONCEPT DRAWING *

The *ZonexCommander (Plus)*, **ZPTCIP**, is a DDC system for automating multiple zoned HVAC systems, stand-alone HVAC units and mechanical devices. The universal RMOD controls both Gas Electric and Heat Pump units with onboard capacity control. The modulating/two-position thermostats (**ModStat** and **MODS2**) are used to communicate calls for heat and cool, as well as modulate dampers based on zone demand. The *ZonexCommander (Plus)* system can be applied to existing HVAC systems or new installations providing central control of HVAC operations using Windows-based *ZonexCommander (Plus)* software.

* Concept Drawing Only. See Wiring Schematic on Page 16

1	*ZonexCommander (Plus)* Command Center (Part # ZPTCIP)
2	RMOD Relay Module – 1 Per Zoned Unit
3	ModStat Modulating Thermostat
4	Zone Damper
5	Bypass Damper
6	Communications Wire – Belden 8740 Twisted Pair
7	DIGICOM Thermostat for Stand Alone Equipment
8	RLYCOM To Schedule Fans, Pumps, Lighting, etc.

ZONEXCOMMANDER (PLUS)
A communicating thermal management system

ZNXPLUS – Communicating Command Center
Includes: Configured TCIP, Operating Software, Cables and LAT Sensor

NUMBER OF THERMOSTATS / DEVICES

Up to 20
1 – **ZPTCIP** (from above)
Controls 4 HVAC Units &
Up to 20 Thermostats/Devices*
Requires independent 40VA transformer

21 to 80
1 – **ZPTCIP** (from above)
1 – **CZNXIP** Command Center per additional 20
Thermostats/Devices*

NUMBER OF ZONED UNITS

Up to 4
1 – **RMOD** Unit Relay Module per Unit
Controls 1 2H/2C Gas/Electric Unit and its
assigned thermostats

4 to 16
1 – **RMOD** Unit Relay Module per Unit
Requires 1 Command Center
(ZPTCIP or CZNXIP) for every 4 **RMODs**

THERMOSTATS

MODULATING ZONED SYSTEMS

Modulating Zone Thermostat
ModStat

STAND-ALONE EQUIPMENT

Gas/Electric
DIGICOM
(2H/2C)

Heat Pump
DIGIHP
(3H/2C)

TWO-POSITION ZONED SYSTEMS

2-Position Zone Thermostat
MODS2

ZONE DAMPERS

MODULATING ZONE DAMPERS
Round (**STMPD** size) 1.75" SP
Supply Only
Rectangular (**STCD** W x H) 1.75" SP
D-FUSER .25" SP
4 x (No. Dampers) = VA for 24V Damper Transformer

TWO-POSITION ZONE DAMPERS
Use on systems 5 tons or under)
Round (**TR** size) up to .5" SP
Rectangular (**TREC** W x H) .5" SP
12 x (No. Dampers) = VA for 24V Damper Transformer

BYPASS DAMPERS

BYPASS DAMPERS
ELECTRONIC MODULATING BYPASS DAMPERS
(Includes Integrated Static Pressure Control)
Round (**STBP** size) 1.75" SP
Rectangular (**STCDBP** size) 1.75" SP
1 - 24V 40VA Transformer to Power Bypass

BAROMETRIC BYPASS DAMPER
Round (**101ABBD** size)
Rectangular (**RBB** W x H)

COMMUNICATING ACCESSORIES (Optional)

SENDCOM
Stand-Alone Equipment
Duct Temperature Sensor
1 per HVAC unit

RLYCOM
Communicating
Relay Device

*Devices include Part #s: **ModStat, MODS2, DIGICOM, & DIGIHP** thermostats and **RLYCOM**.
Each Command Center supports up to 20 themostats. If multiple **RMODs** are utilized, the 20 thermostats
must be allocated among the 1-4 **RMODs** per Command Center.

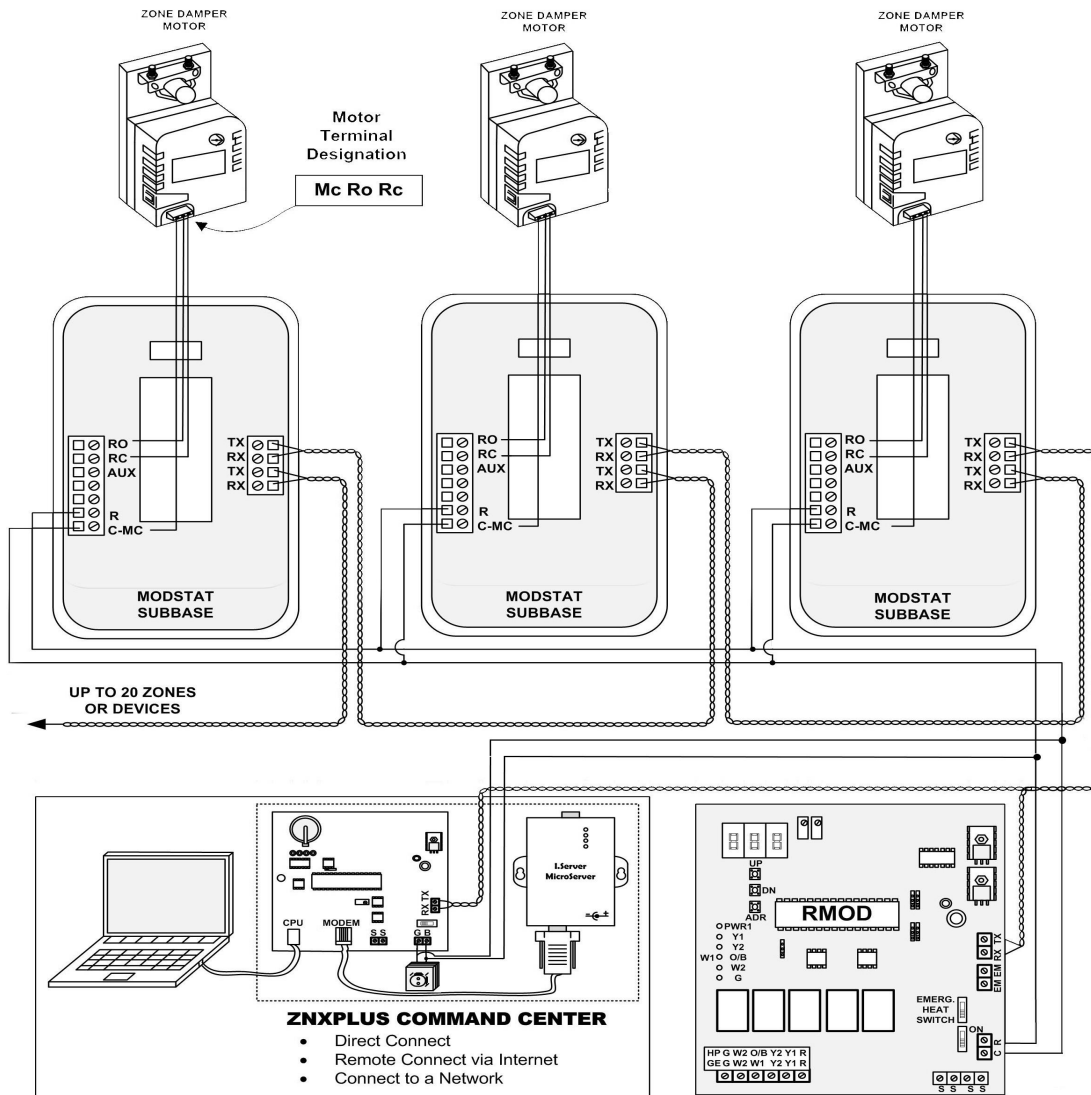# ZONEXCOMMANDER (PLUS) INSTALLATION WIRING DIAGRAM

Fig. 1

NOTE: Each Command Center supports up to 4 **RMODs** and a maximum of 20 communicating devices. When the application requires more than 4 **RMODs** or more than 20 communicating devices, additional Command Center(s) will be required. There must be separate communications circuit (twisted pair Belden 8740) for each Command Center (channel). *(See Fig. 1)*

All RX communication wires must be connected to the RX terminals.
All TX communication wires must be connected to the TX terminals.
The RX and TX wires should never intersect.

ELECTRIC HEAT FAN CYCLING
AUXILIARY BLOWER FAN RELAY

When W1 is energized from the **DIGICOM, ModCC** or **RMOD**, the fan circuit (G) is not energized. For applications requiring the blower to be cycled on a W1 heat output, a field supplied, 24-volt coil SPDT relay must be used. The W1 output signal is connected to the heating device input terminal and the coil of the fan relay. This is required for electric heat and gas furnaces with no fan control. *(See Fig. 2)*

Fig. 2

16
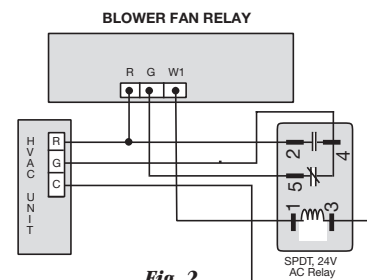
SYSTEM OVERVIEW

The **ZPTCIP** is the primary Command Center, which provides a source for communication and control with the zoning and stand-alone thermostats, along with various communicating devices. The **ZPTCIP** provides interface between the communicating system and a Windows-based PC computer over the Internet. Included with the **ZPTCIP** are a TCIP driver, Operating Software, Cables, and Sensor.

The **ZPTCIP** Command Center manages 1 to 4 HVAC systems with modulating zones totaling 20 system devices. Twenty thermostats are available to be allocated to the 1-4 **RMODs** associated with each Command Center. Communication is accomplished through a two-conductor twisted pair RS-485 link (Belden 8740), which is daisy chained between all system communicating components.

The **CZNXIP** controller is the **ZPTCIP** Command Center without software to expand communication for an additional 20 devices per each **CZNXIP** Command Center. When using additional **CZNXIP** Command Centers, an additional TCIP device and an individual IP address must be used for interface communications.

OPERATION

The *ZonexCommander (Plus)* Command Center polls every minute. When the Command Center polls, it goes to each **ModStat** to gather information on whether it is making a cool call, heat call or no call. Based on this information the Command Center then sends calls for cool, heat or no call to **RMOD** and **ModStats**.

ModStat/MODS2
Cool Call

If room is one or more degrees above setpoint, a call for cool will be made to the Command Center. If a majority of thermostats assigned to the same **RMOD** is calling for cooling, the Command Center will communicate to **RMOD** to make a call for cool. Command Center will also send a mode call to all thermostats assigned to this **RMOD** for cool. This tells **ModStat** what the system mode is so that damper control may be made. If the room is calling for cooling and the **RMOD** is in the cool mode, the **ModStat** will modulate the dampers calling and closed to satisfy room demand. If the room temperature is two or more degrees above setpoint, the damper will be between 100% and 0% open, based on room load desire. If using a **MODS2** with a two-position damper, the damper will be open. When call is satisfied, the damper will close.
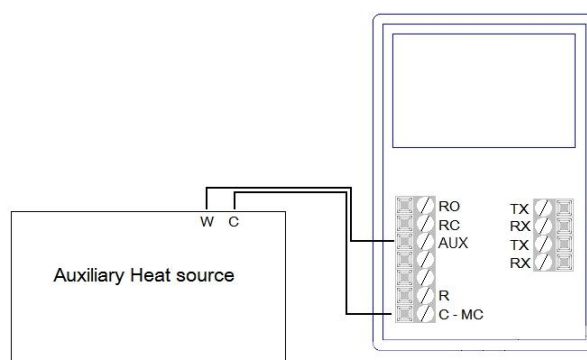
Heat Call

ModStats will place a call for heat if room temperature is two or more degrees below setpoint. When the Command Center polls, if there is a majority call for heat from **ModStats** that are assigned to the same **RMOD** and the system is not in cooling mode, then the Command Center will communicate a call for heat to the **RMOD** and a heat call will be initiated. If there is a current call for cooling and a majority heat call has been received, a changeover sequence will begin. After two minutes the cool call will end,

a two-minute purge will start, and at the end of the purge a heat call will be made. The Command Center will communicate a heat mode call to the **RMOD**, and **ModStats** will control dampers. If the room temperature is two degrees or more below room temperature, **ModStat** will modulate the damper to 100% open. If the room temperature is within two degrees of setpoint, the **ModStat** will control the damper from 100% open to 0% open based on deviation of setpoint. If using a **MODS2** in the heat mode, the damper will be open.

Auxiliary Heat

If the space temperature drops 2°F below the Heat setpoint temperature, the AUX heat output will energize initiating auxiliary heat.

RMOD

When heating or cooling calls are sent to the **RMOD** Relay Module by the thermostat, the **RMOD** will treat these calls as votes to determine mode of operation. Adjustable factory limits are 45°F cool and 145°F heat.

Cool Mode

If the majority of calls are for cooling, the **RMOD** will energize Y1 and G for 1st stage cooling. After four minutes, the **RMOD** will check the leaving air temperature. If the leaving air temperature is 10° above cutout (45° + 10° = 55°F), then Y2 will energize. Y2 will stage off 4° above cutout (45° + 4° = 49°F) and Y1 will stage off on low temperature at 45°F. A four-minute off delay between operations is provided for compressor safety.

Heat Mode

If the majority of calls are for heating, the **RMOD** will energize W1 for 1st stage heating. After four minutes, the **RMOD** will check the leaving air temperature. If the leaving air temperature is 15° below high limit cutout (145° - 15° = 130°F), then W2 will energize. W2 will stage off at 5° below temperature cutout (145° - 5° = 140°F), and W1 will stage off on high temperature at 145°F.

Changeover

If the system is running in one mode and the majority of calls change to the other mode, a timer will start. The **RMOD** will give the current operating mode another four minutes to try to satisfy the zone(s). It will then go into the purge cycle before switching modes to the majority.

Purge Mode

When a heat or cool call is satisfied or before changing modes, the **RMOD** will go into a three-minute purge cycle. The call for heat or cool will be removed, and the dampers will remain in their last position to allow time for air to adjust to room temperature before going into ventilation mode or changeover.

Fan Operation

Fan operation in the *ZonexCommander (Plus)* is controlled by the **RMOD**. The fan jumper on **RMOD** allows for the option of fan continuous in Occupied and intermittent in Unoccupied. Fan intermittent can be selected in both Occupied and Unoccupied modes. Place fan jumper in desired position.

Ventilation

When no zone is calling for heat or cool, the dampers will open 50%. This permits ventilation in all zones if the blower fan is on continuously.

COMMUNICATION FAILURE

If the **RMOD** cannot communicate with any of the thermostats, it will control the HVAC unit based on return air temperature. The **RMOD** will try to maintain 70°F heat and 75°F cool return air.

TEMPERATURE LIMITS AND STAGING

The **RMOD** monitors the leaving air temperature for staging and Hi /Low limit. The adjustable factory low limit is 45° F and the high limit is 145° F. Staging is based on the limit settings.

Gas Electric & Heat Pump

Cooling Y2 cut-in temperature is low limit plus 10°F (45° + 10° = 55°F). The Y2 cut-out is cut-in minus 8°F (55° − 8° = 47°F).
Example:
Adjustable low limit = 45°F
Y2 Cut-in = 55°F (low limit plus ten)
Y2 Cut-out = 47°F (cut-in minus eight)

Gas Electric

Heating W2 cut-in temperature is high limit minus 15° F (145° − 15° = 130° F). The W2 cut-out is cut-in plus 10° F (130° + 10° = 140° F).
Example:
Adjustable high limit = 145°
W2 Cut-in = 130° F (high limit minus fifteen)
W2 Cut-out = 140° F (cut-in plus ten)
W1 cut out = 145°

Heat Pump

Heating – When the **RMOD** is configured for HP operation, the high cut-out is automatically set to 121°.

- W2 energizes when the SA temperature is 88° or less after 4 minutes of run time. W2 de-energizes when the SA temperature rises to 100°.
- Y2 energizes when the SA temperature is below 100° after 2 minutes of run time and de-energizes above 115°.
- Y1 cuts out for 4 minutes when the SA temperature is above 120°.

TEMPERATURE LIMIT ADJUSTMENT

Low Limit –
1. Push **DN** button until display shows C.
2. Current setpoint will be displayed.
3. Push **UP** or **DN** button until desired setpoint is displayed.
4. Release button.

High Limit –
1. Push **UP** button until display shows H.
2. Current setpoint will be displayed.
3. Push **UP** or **DN** button until desired setpoint is displayed.
4. Release button.

NOTE: The RA and SA air sensors (P# **LAT**) must be installed for unit operation. A shorted sensor or wiring will display low temperature, and an open sensor or wiring will display high temperature.

RLYCOM

The **RLYCOM** energizes and de-energizes the two SPDT relays based on the schedule input on the *Commander* software. When the Command Center sends an Occupied call, the **RLYCOM** energizes. When the Command Center sends an Unoccupied call, the **RLYCOM** de-energizes. Manual changes are performed from the Toggle button on the **RLYCOM**. When the red LED is illuminated, the **RLYCOM** is energized.

Supply and Return Air Temperature Display

System supply and return air temperatures can be read from each **RMOD** and the REVIEW screen of the *ZonexCommander (Plus)* program. On the REVIEW screen simply double-click on the Current Room Temperature of address 1, 2, 3, 4. The address number is displayed on the left hand column. The Read Sensors Screen will appear with the supply and return temperatures for the specific **RMOD**.

Address:　1 = RMOD 92
　　　　　2 = RMOD 93
　　　　　3 = RMOD 94
　　　　　4 = RMOD 95

To obtain this information from stand-alone equipment, include a **SENDCOM** sensor.

SENDCOM

On the *ZonexCommander (Plus)* system, the supply and return temperatures from the stand-alone **DIGICOM** and **DIGIHP** thermostats are provided by the **SENDCOM**. One **SENDCOM** is installed for each stand-alone system. When assigning addresses for the stand-alone thermostats and **SENDCOMs**, you must start at #75 through #90 (5 through 20). The first 4 address numbers on the program are for **SENDCOMs** associated with the 4 **RMODs** only. Pay particular attention to this issue. Each **RMOD** has a **SENDCOM** associated with it. If 4 **RMODs** are utilized with 1 Command Center, the information from those **SENDCOMs** will be retrieved on the Zonex software from thermostat locations 1, 2, 3, or 4.
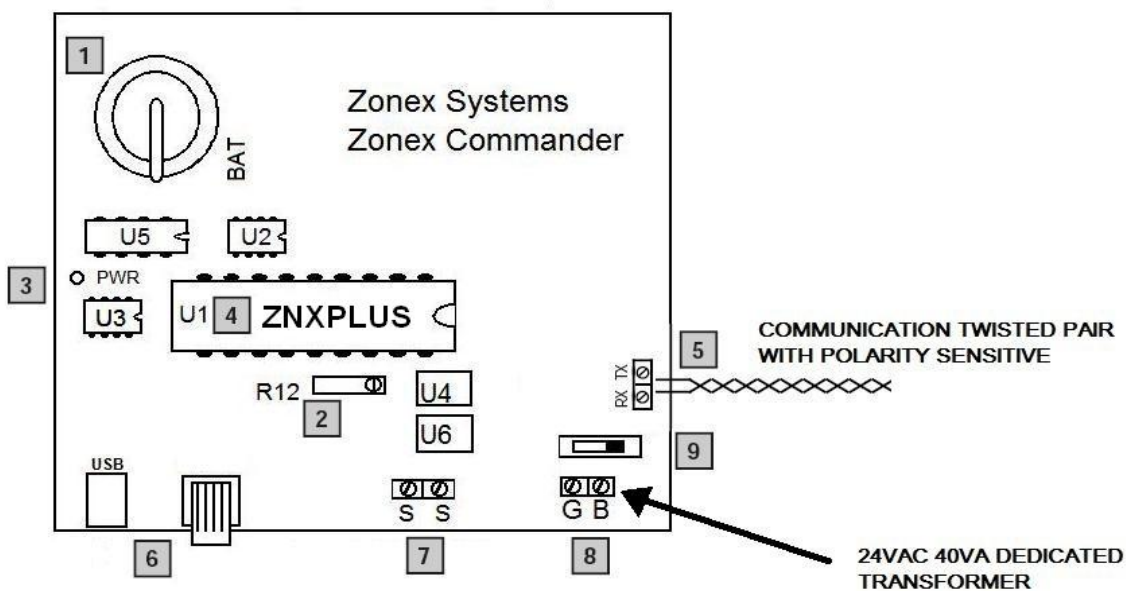
LEGEND

1	DATE AND TIME BACKUP BATTERY
2	SENSOR CALIBRATION: R12 OUTSIDE AIR
3	POWER LED INDICATOR
4	MAIN CONTROL CHIP ZONEX COMMANDER (PLUS)
5	COMMUNICATION RS-485 TWISTED PAIR (POLARITY SENSITIVE) (BELDEN 8740)
6	USB COMPUTER
7	SENSOR TERMINAL OA (OUTSIDE AIR) ONLY
8	TERMINALS G AND B, 24VAC 40VA INPUT
9	ON/OFF SWITCH

ZPTCIP/CZNXIP Command Centers

1. Install the Command Center on a wall or mounting board in a dry interior space where the temperatures will be between 32-125° non-condensing.

2. When additional Command Centers are used, mount all together on the same wall or mounting board.

3. If the installation calls for an on-site computer to be directly connected to the Command Center, the computer must be located within 10 feet of the Command Center.

4. Install a 24vac 40va dedicated transformer for each individual Command Center, and wire to terminals "G" and "B." Power supply voltage on G and B should be 24 to 28vac.

5. For system TCIP configuration, you must provide a 120vac outlet for the power supply.

6. The only sensor connected to the Command Center is the Outside Air Sensor (OA), which is Part # **OLAT**. The Outside Air Sensor is not polarity sensitive.

   The outside air temperature is displayed on the SYSTEM screen in the *Commander* program.

7. The twisted pair communication wire (Belden 8740) is to be daisy chained to each communicating device, which is controlled by the specific Command Center. When multiple Command Centers are used, each Command Center is to have a dedicated communication loop. The communication loop is polarity sensitive on RX and TX. Wire nuts are never to be used on the communication wire. When making connections, use screw type terminal strips or solder.

   NOTE: for systems with potential electrical interference, such as large transformers, VFDs, etc, use shielded twisted pair (Belden 8450) for the communications loop.

ZONEXCOMMANDER (ZPTCIP / CZNXIP)
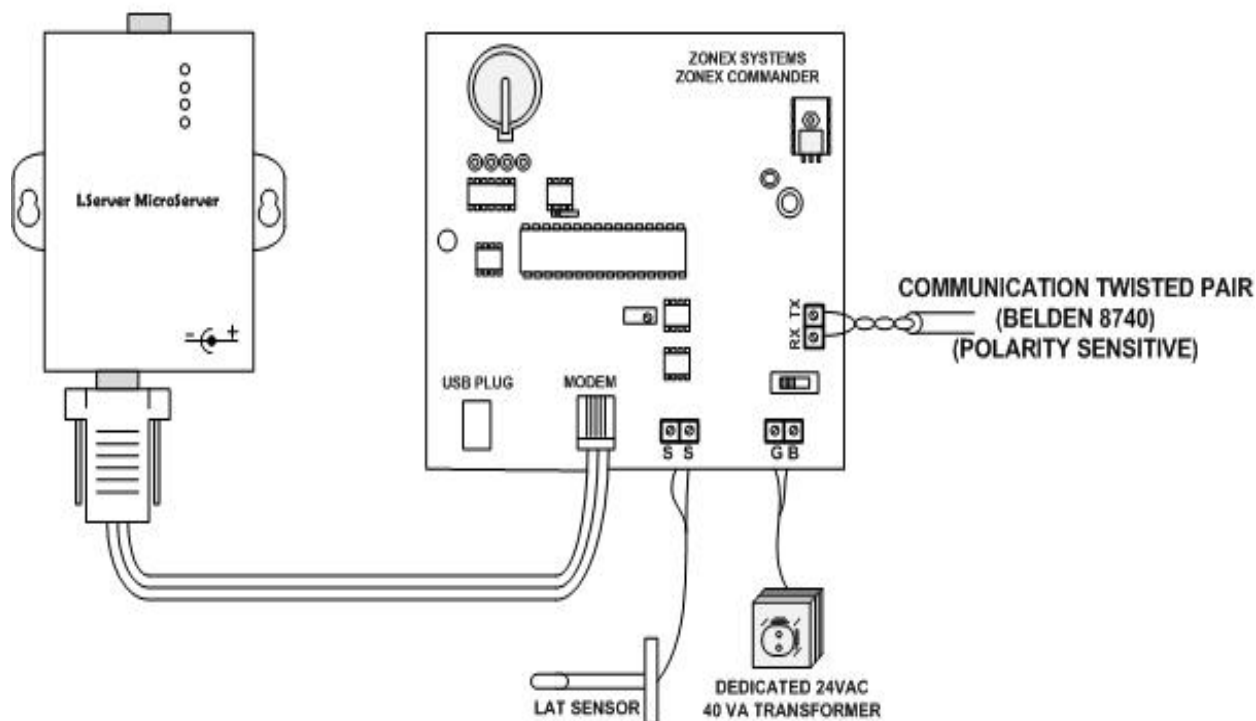
Fig. 1

ModStat / MODS2 THERMOSTATS

DESCRIPTION

The LCD **ModStat** is available for the *ZonexCommander (Plus)* DDC control system. It is also utilized with the System 2000 *GEN II* product. The **ModStat** version drives medium pressure, power open / power close dampers for modulating applications. The **MODS2** version drives low pressure, power close / spring open dampers for 2-position systems, which are 2000 CFM or less.
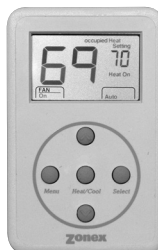
The unique grey display backlight is constantly illuminated in the Occupied mode. The display backlight will go out in the Unoccupied mode. If any button is pressed while the thermostat is in the Unoccupied mode, the backlight will illuminate for 5 seconds. The backlight will also be illuminated when the thermostat is in the 2-hour override mode.

INSTALLATION

Thermostat and terminal base

1. The thermostat is to be installed on an interior wall, away from drafts, supply air currents and direct sunlight or any heat generating source.
2. To remove the thermostat cover, grasp the cover at the top and pull straight off; do not pivot the cover from the base.
3. Install the thermostat terminal base to the wall using the provided anchors and screws. The thermostat can also be mounted on a 2x4 electrical box using two #6-32" screws.

WIRING

The Zonex Systems **ModStat** and **MODS2** thermostats have been specifically designed to make wall mounting and wire connections very easy. The thermostat terminal base has two separate terminal blocks: the left side terminal block is for the 24vac control circuits, and the right side terminal block is for the RX TX communication circuits. There are two sets of RX TX terminals on the base to make daisy chain wiring from device to device straightforward and simple.

1. Use minimum 18-gauge AWG thermostat wire for the 24vac control circuits. The load on the auxiliary heat circuit must not exceed 1 amp at 24vac. The voltage range on R and C must not exceed 28vac.
2. Connect the communication wires to the RX TX terminals. There are 2 sets of RX TX terminals for "daisy chain" installation of this circuit. The communication wire specification is: twisted pair (Belden 8740) or shielded twisted pair wire (Belden 8450). Refer to manual (ZCMAN). NOTE: When using shielded twisted pair wire (Belden 8450), just connect the shield conductors together, as there is no electrical connection on the thermostat base terminals. The shield will be landed on the Command Center on the G or TR2 terminal.
3. On the **ModStat**, connect the damper control wires from MC, RC and RO to the actuator terminals. For **MODS2**, connect MC and RC to the damper motor.
4. Auxiliary Heat – The **ModStat** and **MODS2** provide a 24vac signal output on the "AUX" terminal for Auxiliary Heat. This signal is energized when the space temperature is 2° below the heat setpoint. The signal is de-energized at setpoint temperature.
5. Reheat - The **ModStat** can be field configured for Reheat applications, including Fan Powered VAV boxes. The terminal base provides a 24 volt output on terminal "AUX" for the heat elements and the fan relay circuit (if applicable).

NOTE: An Air Proving Switch must be wired into the "AUX" output to protect the electric heating devices.

CONFIGURATION

Addressing (1-20). Each thermostat must have a unique address from 1 to 20.

1. Press and hold the **Menu** button until you see the system mode display on the lower right begin to scroll and change modes; then press and hold the **Heat/Cool** button with the **Menu** button.
2. When the display shows "address," release the **Menu** and **Heat/Cool** buttons; and press the **UP** or **DN** button until the correct address is displayed in the upper right of the display.
3. After setting the address, the thermostat will automatically go back to normal operation; and the setpoint temperature will replace the address number just programmed.

Manual Operation - Adjusting Setpoints

The Heat or Cool setpoints can be displayed by pressing the **Heat/Cool** button; the setpoint will be displayed on the upper right of the display.

Heat – If "Heat Setting" is displayed on the top right of the display, simply press the **UP** or **DN** button to change the heat setpoint. If "Cool Setting" is displayed and you want to change the Heat setpoint, press and hold the **Heat/Cool** button twice to change from "Cool Setting" to "Heat Setting." Then press the **UP** or **DN** button to change the setpoint.

Cool – If "Cool Setting" is displayed on the top right of the display, simply press the **UP** or **DN** button to change the cool setpoint. If "Heat Setting" is displayed and you want to change the Cool setpoint, press and hold the **Heat/Cool** button twice to change from "Heat Setting" to "Cool Setting." Then press the **UP** or **DN** button to change the setpoint.

Changing Mode

The thermostats are auto changeover, but specific modes may be selected. Auto mode is the default.

Heat only – Press and hold the **Menu** button, and note the mode display begin to change. Press the **Select** button when Heat is displayed.

Cool only – Press and hold the **Menu** button, and note the mode display begin to change. Press the **Select** button when Cool is displayed.

System Off – Press and hold the **Menu** button, and note the mode display begin to change. Press the **Select** button when Off is displayed.

Auto mode – Press and release the **Menu** button.

Override

When the thermostat displays "Unoccupied" (top of display), a 2-hour temporary override may be initiated by pressing the Override/**Select** button. When additional override time is required, press the Override/**Select** button again.

Display Temperature Calibration

Thermostats are calibrated at the factory and should require no further adjustment. However, the display space temperature may be field calibrated by the following procedure:

1. Press and hold the **Heat/Cool** and **Select** buttons together; then press and release the **UP** button to increase the display temperature by 1°.
2. To lower the temperature display, press the **DN** button once, after pressing the **Heat/Cool** and **Select** buttons. This makes a 1° change.
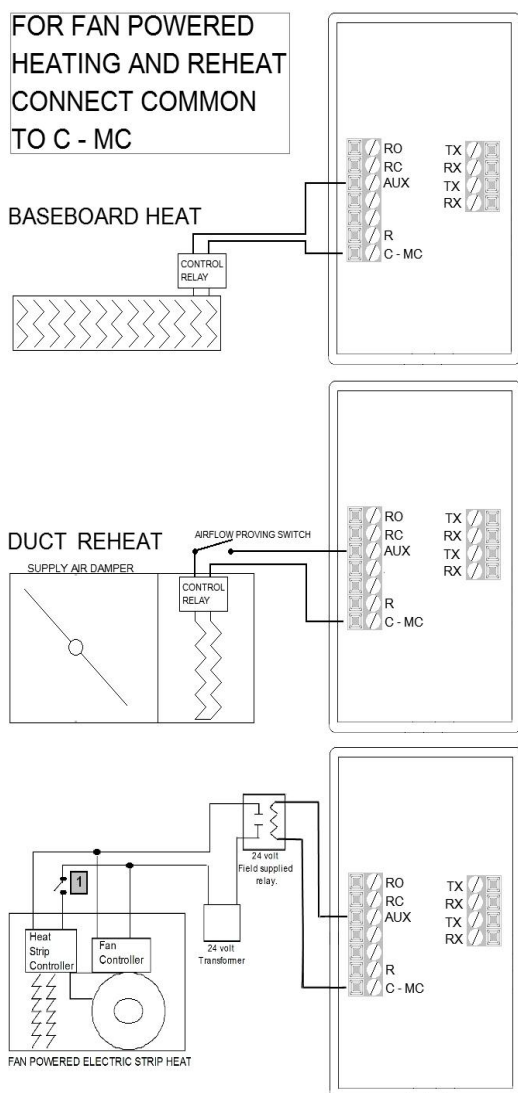
ModStat / MODS2 THERMOSTATS

GENERAL OPERATION

Ventilation – No active Heat or Cool calls

With no active calls, the **ModStat** or **MODS2** will open the damper for blower ventilation.

Cool Call – The **ModStat** and **MODS2** will send a signal for demand cooling when the space temperature exceeds the cool setpoint temperature by 1°. The thermostat will end the active call when the space temperature meets the cool setpoint.

SUPPLEMENTAL HEAT APPLICATIONS

FOR FAN POWERED HEATING AND REHEAT CONNECT COMMON TO C - MC

BASEBOARD HEAT

DUCT REHEAT

FAN POWERED ELECTRIC STRIP HEAT

Note 1: Sail switch or pressure switch should be used to prove fan operation.

Heat Call – The **ModStat** and **MODS2** will send a signal for demand heating when the space temperature drops 1° below the heat setpoint temperature. If the temperature drops 2° below the heat setpoint temperature, the "AUX" output will energize for auxiliary heat. The thermostat will end the active call when the space temperature meets the heat setpoint.

When configured for Reheat, if the space temperature drops 1° below the heat setpoint, the **ModStat** will energize the "AUX" output and modulate the damper open. The heat call will terminate when the space temperature reaches the heat setpoint temperature. The "AUX" output will de-energize, and the damper will modulate closed. If the system goes into the ventilation mode, the damper will then modulate open.

Reheat - The **ModStat** can be field configured for Reheat operation by pressing the **Heat/Cool** and **Select** buttons together, and then press the **Menu** button and release all three buttons. The Heat/Cool setpoint display will show the ° symbol to verify Reheat configuration.

MODSTAT
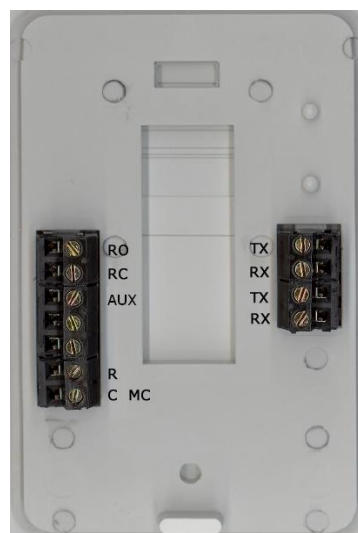
SUBBASE

ModStat Terminal Designations:

TX – Data transmit
RX – Data receive
AUX – Reheat/AUX Heat Fan

RO – Run Open, damper
RC – Run Closed, damper
R – 24vac power input
C-MC – 24vac power common

NOTE: A larger transformer may be needed to power fan relay and/or heat strip relay.

RMOD SEQUENCE OF OPERATION

OPERATION

When heating or cooling calls are sent to the **RMOD** Relay Module by the thermostat, the **RMOD** will treat these calls as votes to determine mode of operation. Adjustable factory limits are 45°F cool and 145°F heat.

When configured for Heat Pump operation, the cut-out is automatically set for 121° heat.

COOL CALLS

If the majority of calls are for cooling, the **RMOD** will energize Y1 and G for 1st stage cooling. After 4 minutes, the **RMOD** will check the leaving air temperature. If the leaving air temperature is above 55° F, then Y2 will energize. Y2 will stage off at 47° F and Y1 will stage off on low temperature at 45° F. Four-minute minimum run and four-minute off delays are provided for compressor safety.

HEAT CALLS

If the majority of calls are for heating, the **RMOD** will energize W1 for 1st stage heating. The **RMOD** will bring on additional stages in 3-minute increments. See Gas Electric and Heat Pump staging.

CHANGEOVER

If the system is running in one mode and the majority of calls changes to the other mode, a timer will start. The **RMOD** will give the current operating mode another 4 minutes to try to satisfy the zone(s). It will then go into the purge cycle before switching modes to the majority.

PURGE MODE

When a heat or cool call is satisfied, or before changing modes, the **RMOD** will go into a 3-minute purge cycle. The call for heat or cool will be removed, and the dampers close.

VENTILATION MODES

The **RMOD** can be field configured for FAN Constant in the Occupied mode or FAN Automatic. When all zones are satisfied, dampers will modulate to 50% open.

EMERGENCY HEAT

Selected by the on-board switch or remote switch.

COMMUNICATION FAILURE

If the **RMOD** loses communications, it will then control the HVAC unit based on the return air temperature. The **RMOD** will maintain 70° F heat and 75° F cool as measured by the MIX Air sensor in the return air.

TEMPERATURE LIMITS AND STAGING

The **RMOD** monitors the leaving air temperature for staging and Hi /Low limit. The adjustable factory low limit is 45° F and the high limit is 145° F. Staging is based on the limit settings.

Gas Electric & Heat Pump
Cooling Y2 cut-in temperature is low limit plus 10°F (45°+ 10°= 55°F). The Y2 cut-out is cut-in minus 8° F (55° − 8° = 47° F).
Example:
Adjustable low limit = 45° F
Y2 Cut-in = 55° F (low limit plus ten)
Y2 Cut-out = 47° F (cut-in minus eight)

Gas Electric
Heating W2 cut-in temperature is high limit minus 15° F (145° - 15° = 130° F). The W2 cut-out is cut-in plus 10° F (130° + 10° = 140° F).
Example:
Adjustable high limit = 145° F
W2 Cut-in = 130° F (high limit minus fifteen)
W2 Cut-out = 140° F (cut-in plus ten)
W1 cut out = 145°

Heat Pump
Heating – When the **RMOD** is configured for HP operation, the high cut-out is automatically set to 121°.
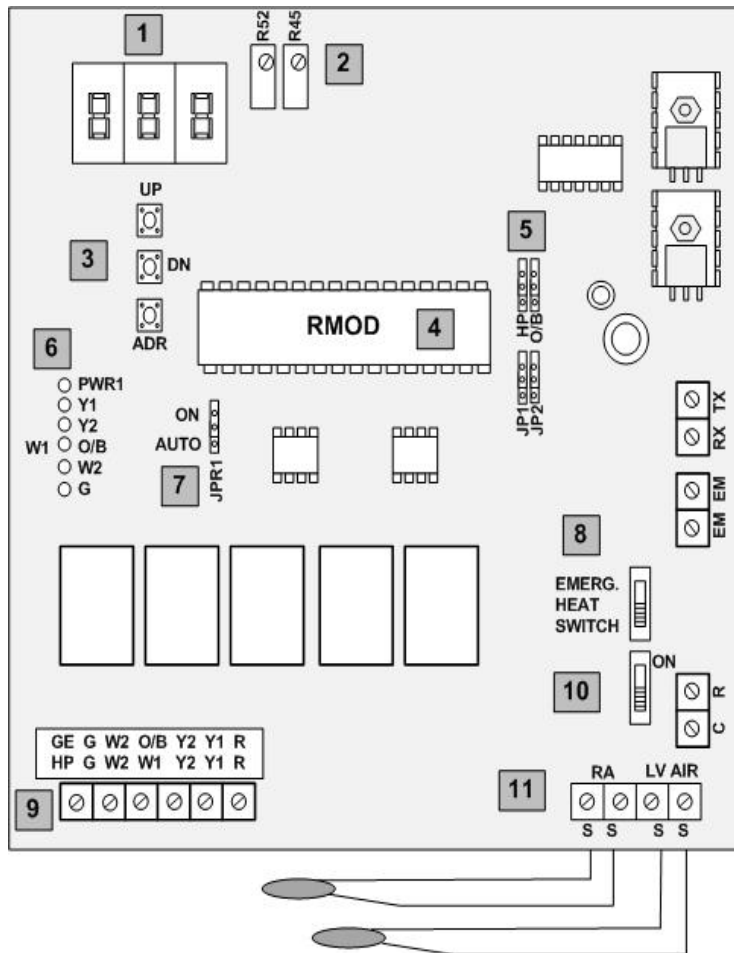- W2 energizes when the SA temperature is 88° or less after 4 minutes of run time. W2 de-energizes when the SA temperature rises to 100°.
- Y2 energizes when the SA temperature is below 100° after 2 minutes of run time and de-energizes above 115°.
- Y1 cuts out for 4 minutes when the SA temperature is above 120°.

TEMPERATURE LIMIT ADJUSTMENT
The high and low cut-out temperatures are field adjustable.

NOTE: The RA and LV AIR sensors (P# **LAT**) must be installed for HVAC unit operation.

RMOD TERMINAL DIAGRAM

TERMINAL DESIGNATIONS

TX – Data transmit
RX – Data receive

R – 24vac power input
C – 24vac power common

RA – Return air sensor
LV AIR – Supply Air sensor input

R45 – RA calibration
R52 – LV AIR calibration

Gas/Electric
G – Fan output
W2 – Stage 2 heat output
W1 – Stage 1 heat output
Y2 – Stage 2 cool output
Y1 – Stage 1 cool output
R – 24vac from HVAC unit transformer

Heat Pump
G – Fan output
W2 – Aux heat output
O/B – Reversing valve signal
Y2 – Stage 2 compressor
Y1 – Stage 1 compressor
R – 24vac from HVAC unit transformer

LEGEND

1 LEAVING AIR TEMPERATURE DISPLAY, TO DISPLAY RETURN TEMP, HOLD BOTH HEAT/COOL BUTTONS

2 SENSOR CALIBRATION:
R52 SUPPLY AIR TEMP
R45 RETURN AIR TEMP

3 HEAT (UP) / COOL (DN) / ADDRESS BUTTON

4 MAIN CONTROL CHIP

5 2-PIN SELECTABLE HEAT PUMP/GAS ELECTRIC (JUMPED FOR HEAT PUMP)
O/B MODE SELECT (JUMPED "O" OUTPUT IN COOLING)

6 STATUS LEDs - PWR1, Y1, Y2, W1 and O/B, W2, G

7 FAN JUMPER:
CENTER AND TOP = ON
CENTER AND BOTTOM = AUTO FAN

8 EMERGENCY HEAT SWITCH, USED IN HP MODE ONLY

9 TO HVAC UNIT TERMINALS

10 ON/OFF SWITCH

11 SENSOR TERMINALS RA AND LV AIR MUST BE INSTALLED.

HVAC UNIT CONTROLLER

DESCRIPTION

The Zonex Systems **RMOD** is a microprocessor based digital communicating HVAC Relay Module for the *ZonexCommander (Plus)* system. The **RMOD** controls Gas/Electric 2-stage heat and cool, as well as Heat Pump, 2-stage cool and 3-stage heat, based on supply air temperature. The **RMOD** provides high and low limits to protect HVAC system components.

Each **RMOD** can communicate with up to 20 thermostats. There can be up to 4 **RMOD** controllers per Command Center; however, each Command Center controls up to 20 thermostats. The total number of thermostats cannot exceed 20 on each Command Center.

The **RMOD** and corresponding **ModStats** must be configured into the *ZonexCommander (Plus)* system before the **RMODs** will communicate. See Installation Guide.

INSTALLATION

RMOD circuit board

The **RMOD** can be installed with the Command Center or in the HVAC unit it is controlling. It must be protected from the elements in an area where the temperature range is from 25° to 125° non-condensing. DO NOT install the Command Centers or **RMODs** in close proximity to large transformers, VFDs, or any device that produces electrical energy fields.

1. Install the **RMOD** where it can be properly accessed.

2. The **RMOD** is powered by the Command Center transformer by daisy chaining the 24vac from Command Center to the **RMOD**. You will need to properly size the transformer to the total number of dampers on the system.

3. The **RMOD** is shipped from the factory to operate in the Gas Electric mode. For Heat Pump operation, place the HP jumper tab over both pins.

4. For Heat Pump "O" reversing valve operation the O/B jumper tab is on one pin. For reversing valve "B" operation, place the jumper tab over both pins.

5. Set the FAN jumper tab (JPR1) on the center and lower pin (AUTO) for intermittent fan. For Constant FAN in the Occupied mode, place the jumper tab over the middle and upper pins (ON).

Sensors – Supply and Return (LAT)

1. Install the RA sensor (**LAT**) in the return duct, <u>ahead</u> of the bypass take-off.
2. Install the LV AIR sensor (**LAT**) in the supply duct ahead of the bypass take-off (Gas Electric), or between the indoor coil and strip heat elements (Heat Pump AHU).

3. When the sensor leads are too short, you may extend the wire with 18 AWG thermostat wire.

Addressing & Calibration

1. Set the address for the **RMOD** (92, 93, 94 or 95) by switching the **RMOD** to ON from S1, and press the **ADR** button. To change the address from 92, continue to hold the **ADR** button; and press the UP button until the correct address appears, and release.

2. Energize the FAN only and check **RMOD** display calibration.

3. Constant display indicates supply air temperature. Rotate R52 to adjust calibration.

4. Return air temperature is displayed when the UP and DN buttons are pressed simultaneously. Rotate R45 to adjust the calibration, while holding down these buttons.

Wiring

1. Connect the twisted pair communication wires to RX and TX (Belden 8740).

   NOTE: The twisted pair communication wire cannot be installed with any other ac voltage wiring; it must be run completely separate. Use shielded twisted pair (Belden 8450) if there is any potential for electrical interference.

2. Connect the Return Air sensor to the RA terminal screw block.

3. Connect the Supply Air sensor to the LV Air terminal screw block.

4. Connect the **RMOD** outputs to the HVAC system.

5. If Emergency Heat is to be controlled by a remote switch, wire a SPST switch to the EM terminals on the **RMOD**.

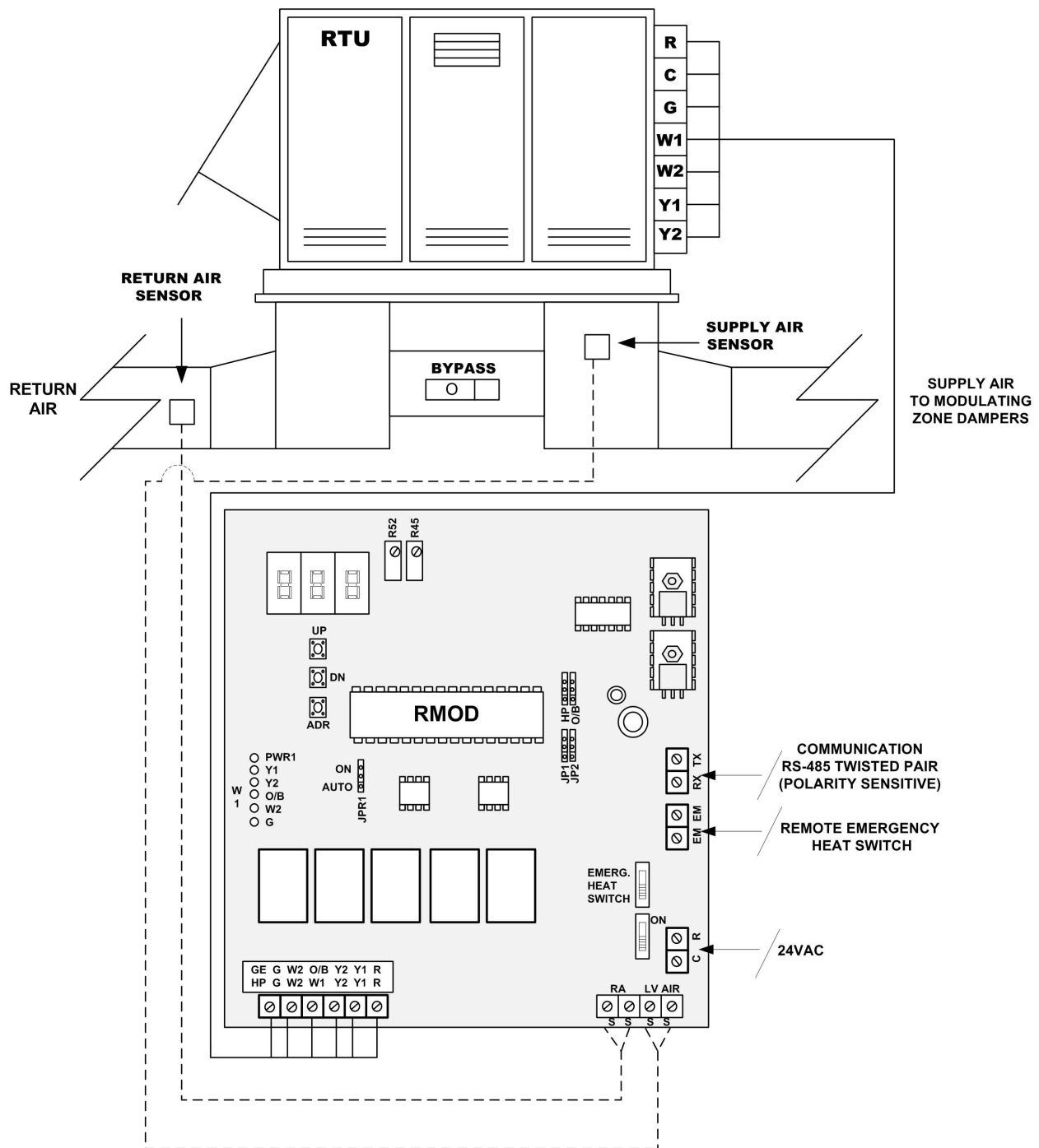The **RMOD** is ready to be configured in the *ZonexCommander (Plus)* program.
See Installation Guide.
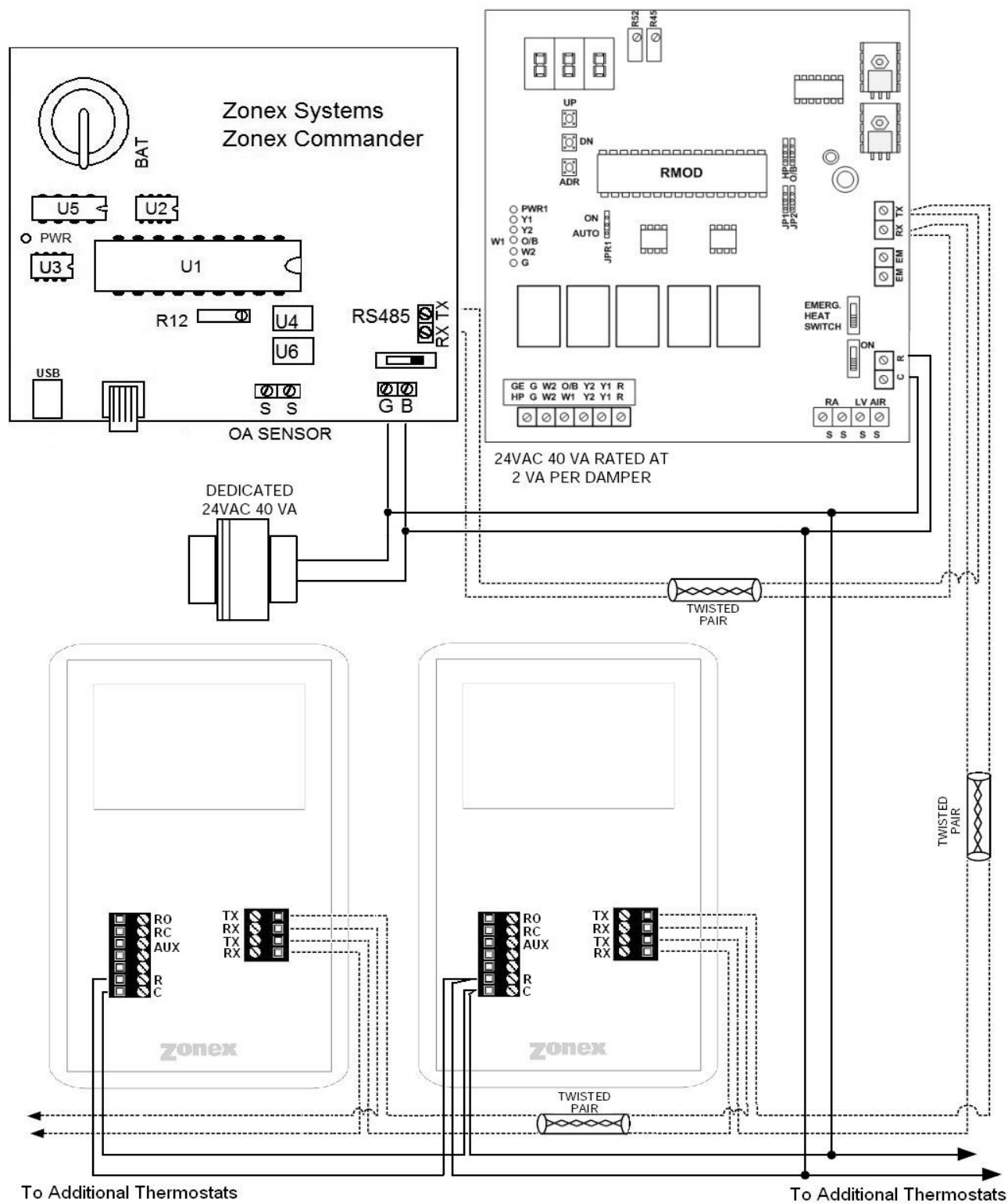
All RX communication wires must be connected to the RX terminals.
All TX communication wires must be connected to the TX terminals.
The RX and TX wires should never intersect.

RMOD (RELAY MODULE) TO UNIT WIRING DIAGRAM

- Minimum 18 AWG thermostat wire.
- Use 18 AWG for RA & LV.
- Y2 & W2 terminals are not used for gas/electric single stage units.
- SA (supply air sensor) controls low and high temperature limits and heat/cool staging.
- RA (return air sensor) controls unit operation in communication failure mode.
- Part# **LAT** for all sensors.
- Keep sensor wires and power wires separate.

NOTE: Shorted wiring or sensors cause a low temperature reading. Open wiring or sensors cause a high temperature reading.

SENDCOM DESCRIPTION

SENDCOM Communicating Duct Temperature Sensor – Part # SENDCOM

DESCRIPTION

The Zonex Systems **SENDCOM** is a microprocessor based, communicating air duct temperature sensor. The **SENDCOM** is used to display the discharge air and return air temperature of a single HVAC unit. The temperatures are displayed within the *ZonexCommander* software on the REVIEW page. Double Click on **Current Room Temp** where a **SENDCOM** is attached to display duct temperatures.
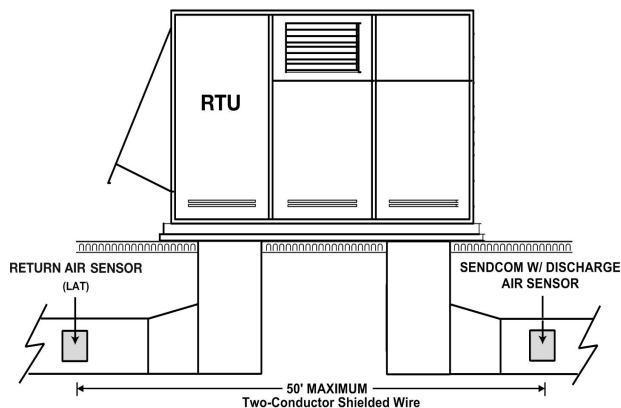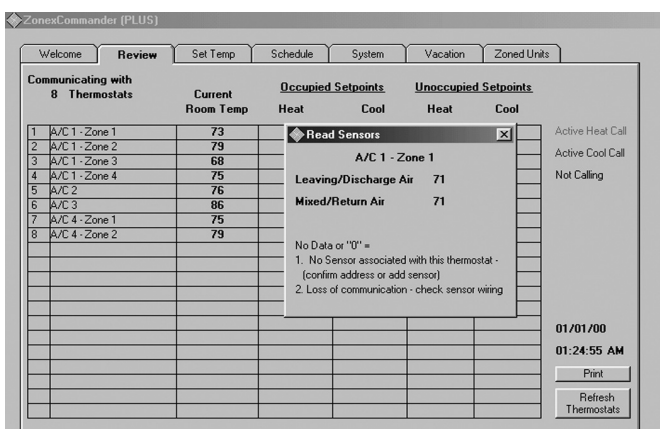
SENDCOM

1. The **SENDCOM** communicates both supply and return temperatures, and is mounted directly to the supply trunk or plenum of the HVAC unit.

2. The **SENDCOM** must be mounted in a dry, protected atmosphere not subject to the elements.

TERMINAL FUNCTIONS

SENDCOM COMMUNICATING DUCT
TEMPERATURE SENSOR
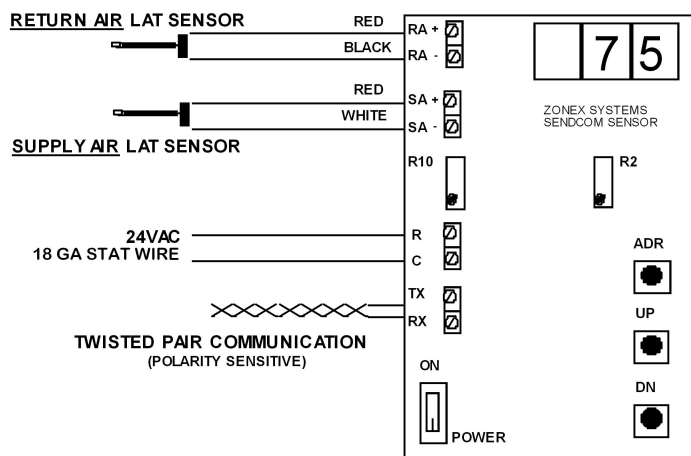
TERMINAL FUNCTIONS

TX / DATA TRANSMIT	RA+ / RETURN SENSOR INPUT
RX / DATA RECEIVE	RA - / RETURN SENSOR COMMON
C / 24VAC POWER COMMON	SA + / SUPPLY SENSOR INPUT
R / 24VAC POWER INPUT	SA - / SUPPLY SENSOR COMMON

3. Locate the position of the **SENDCOM** enclosure with the attached supply air sensor, on to the supply duct or plenum.

4. Drill a 1/4" hole for the sensor and attach the **SENDCOM** assembly so that the sensor fits through the 1/4" hole.

5. Attach the **SENDCOM** assembly to the duct or plenum with the sheet metal screws provided.

6. Locate the position in the return duct or plenum for the return sensor and drill a 1/4" hole.

7. Install the sensor assembly labeled LAT SENSOR with the provided sheet metal screws, and extend the sensor wire to the **SENDCOM** RA terminal block.

8. Connect the shield conductor of the return air sensor lead wire to – on the RA terminal block.

9. Connect 24 volts using 18 AWG wire minimum, to the "R" and "C" terminals of the **SENDCOM**. Power can be taken from the HVAC unit control transformer.

10. Connect the communication wire to RX and TX. The communication wire must be separate from any 24-volt or higher wiring.

11. Each **SENDCOM** must be addressed to the corresponding stand alone thermostat. Determine the thermostat address to which the **SENDCOM** is applied and add 70 to that address. Press and hold the **ADR** button, and then press the **UP** or **DN** button to raise or lower the displayed address number (see Page 29).

NOTE: After setting the address switches, cycle power to the **SENDCOM** to set the address.

SENDCOM DESCRIPTION

12. Set the individual **SENDCOM** address to correlate to the thermostat for that HVAC unit.

EXAMPLE: If the **DIGICOM** or **DIGIHP** thermostat has an address of 01, to address the **SENDCOM,** add 70 to the address number of the thermostat. This makes the **SENDCOM** address 71. If the address on the **DIGICOM** or **DIGIHP** is 02; add 70 to make the **SENDCOM** address 72, etc. Applications with *ZonexCommander (Plus)* will not use **SENDCOMs** to see supply and return air temperatures. These are reported from the **RMODs** and will be seen on address 1, 2, 3, and 4 current room temperatures. On *ZonexCommander (Plus)* systems a **SENDCOM** cannot be addressed for thermostats 1, 2, 3, or 4, so start addressing any stand alone equipment in a *ZonexCommander (Plus)* system at 75.

13. The **SENDCOM** is calibrated at the factory but can be field calibrated by adjusting the R2 potentiometer for Supply Air or the R10 potentiometer for return air.

ADDRESSING

THERMOSTAT ADDRESS	SENDCOM	
	TENS	ONES
1	7	1
2	7	2
3	7	3
4	7	4
5	7	5
6	7	6
7	7	7
8	7	8
9	7	9
10	8	0
11	8	1
12	8	2
13	8	3
14	8	4
15	8	5
16	8	6
17	8	7
18	8	8
19	8	9
20	9	0

Determine the thermostat address to which the **SENDCOM** will be applied, and add a value of 70.

RLYCOM DESCRIPTION

RLYCOM Communicating Relay Module – Part# RLYCOM

DESCRIPTION

The Zonex Systems **RLYCOM** is a communicating relay module, which provides programmed on and off schedules for auxiliary devices such as blowers, fans, lighting, etc. As with the communicating thermostats, the *Commander* Schedule program provides up to 4 Occupied/Unoccupied events per day for each **RLYCOM**, including vacation days. The control status of the **RLYCOM** is displayed on the REVIEW screen of the *Commander* program.

The **RLYCOM** consists of 2 **SPDT** relays for controlling auxiliary devices such as lighting, blowers, etc. The relay contacts are designed for 24vac circuits only, with a maximum one amp load. Power for the **RLYCOM** is provided by a separate 24vac 40va transformer.

The **RLYCOM** requires a unique address from 01 to 20 (**except *Zonex Commander (Plus)* 05-20**). Communication is through the RS-485 twisted pair wire.

OPERATION

The **RLYCOM** address is selected by simultaneously pressing the ADDR button and either the UP or DN button to raise or lower the address.

When the **RLYCOM** is in the Occupied mode, the on-board relays are energized. In the Unoccupied mode, the relays are de-energized. The mode status is displayed on the REVIEW screen of the *Commander* program and on the **RLYCOM** circuit board. On the *Commander* program the **RLYCOM** is displayed with a row of 0's. Occupied mode is displayed with a RED "0" in the Unoccupied Heat column. Unoccupied mode is displayed with a BLUE "0" in the Cool Unoccupied column. The mode is displayed on the **RLYCOM** circuit board with the red PWR LED. When the LED is illuminated, the device is in the Occupied Mode. When the LED is OFF, the **RLYCOM** is in the Unoccupied mode. The mode can be changed manually at the **RLYCOM** by pressing the Toggle button. The mode can also be changed from the *Commander* program from the SYSTEM tab.

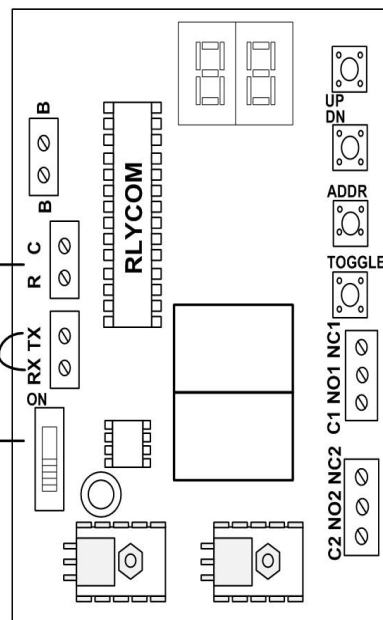The SPDT relays are dry contacts for maximum 2 amp 24-volt circuits only.

Relay Contact Legend
C2 – K2 Common
NO2 – K2 Normally Open
NC2 – K2 Normally Closed
C1 – K1 Common
NO1 – K1 Normally Open
NC1 – K1 Normally Closed
TOGGLE – Switch On / Off
B – Not Used

24VAC Power Supply
    See Notes #1 & #2

Twisted Pair
    RX TX

Power Switch

NOTES:
1. Install separate twisted pair cable for TX / RX and 18/2 for "C" and "R" terminals. Do not group conductors within the same cable.

2. If sharing a transformer:
    Connect "R" to unit transformer "R" terminal.
    Connect "C" to unit transformer "C" terminal.

3. RLYCOM relay contacts are energized in the Occupied mode.

4. PWR LED SOLID = Occupied mode.
   PWR LED OFF = Unoccupied mode.

ZONE DAMPERS

Zonex Systems zone dampers are used in cooling/heating systems to provide room by room zone control. The damper is provided with a factory mounted actuator. Each zone damper is controlled by a zone thermostat. More than one damper can be controlled by one zone thermostat. Use this table to determine which zone dampers to use.

DAMPER MODEL	MAXIMUM DIFFERENTIAL PRESSURE	MAXIMUM SYSTEM SIZE	MAXIMUM DUCT SIZE
STMPD ROUND MEDIUM PRESSURE	1.75"	ANY SIZE	18"
STMRTD RECT. – MED. PRESSURE	1"	7.5 TONS	24"W x 20"H
STCD RECT. – HEAVY DUTY	1.75"	ANY SIZE	48"W x 48"H
D-FUSER	0.1"	ANY SIZE	10"

Maximum Differential Pressure refers to the maximum static pressure drop in inches of water column between the input (upstream) of the zone damper and the output (downstream) when the damper is closed.

ROUND MEDIUM PRESSURE ZONE DAMPERS

Zonex Systems round medium pressure zone dampers are recommended for systems with a maximum differential static pressure up to 1.75". This modulating power open/power close damper is manufactured from 20-22 gauge galvanized steel with rolled-in stiffening beads for superior rigidity. Mechanical minimum and maximum set stops are provided and easily adjustable. The damper is elliptical, which allows the airflow to be tracked linearly. The damper pipe is furnished with one crimped end and one straight end for easy installation. Do not install damper in an inverted position. A hat section supports a reversing, 24vac, 60Hz, 2 VA motor. A magnetic clutch allows for continuous power to the motor and longer motor life. Motor drive time from full open to full close is 90 seconds.
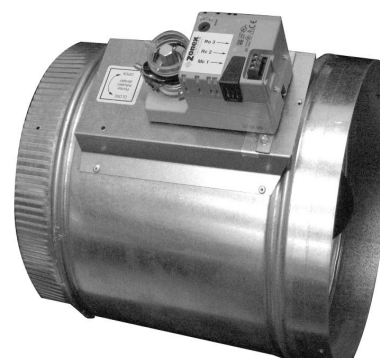
MEDIUM PRESSURE (STMPD)

MODSTAT
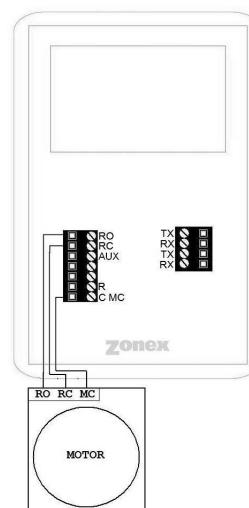
DAMPER TO MODSTAT WIRING

ROUND MEDIUM PRESSURE DAMPER PART NUMBERS AND SIZES

ROUND DIMENSIONAL DATA

PART #	SIZE	D	L	W
STMPD06	6	6"	10"	9"
STMPD08	8	8"	10"	11"
STMPD10	10	10"	12"	13"
STMPD12	12	12"	14"	15"
STMPD14	14	14"	16"	17"
STMPD16	16	16"	18"	19"
STMPD18	18	18"	20"	21"

TYPICAL ROUND CAPACITIES

These air quantities were derived from a duct sizing chart 0.1" friction loss per 100' of duct. All CFMs listed are approximate. For accurate selection use duct sizing table or device.

Duct Diameter	Nominal CFM	Duct Velocity FPM	Damper ΔP " WC
6"	110	540	.014
8"	250	700	.015
10"	410	750	.015
12"	660	850	.022
14"	1000	925	.035
16"	1450	1070	.036
18"	2000	1100	.036

ZONE DAMPERS
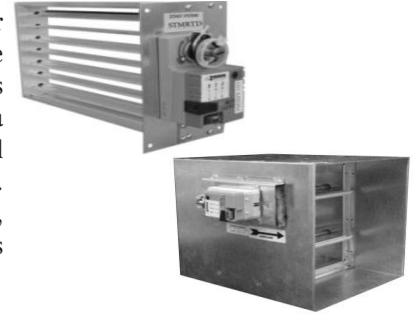
RECTANGULAR ZONE DAMPERS

The rectangular zone dampers come in either medium pressure or heavy duty. For systems under 7.5 tons use medium pressure dampers. For systems 7.5 tons or over use heavy duty dampers. Motor drive time open and close is 90 seconds.

RECTANGULAR MEDIUM PRESSURE ZONE DAMPERS

Zonex Systems rectangular medium pressure dampers are recommended for systems under 7.5 tons with a maximum differential static pressure of 1". These are fully modulating power open, power close dampers. They are constructed from heavy duty aluminum and stainless steel. The damper is an opposed blade type that slips into a 3-1/4 inch wide cutout in the existing duct and attaches with screws via a duct mounting plate. The duct mounting plate is 5 inches wide. A hat section supports a reversing 24vac, 60 Hz, 2 VA motor. A magnetic clutch allows for continuous power to the motor and longer motor life. Two set screws connect the motor to the damper shaft, allowing quick motor replacement, if necessary. Motor drive time from full open to full close is 90 seconds.

RECTANGULAR HEAVY DUTY ZONE DAMPERS

Zonex Systems rectangular heavy duty dampers are recommended for systems 7.5 tons or larger with a maximum differential static pressure of 1.75". These are power open, power close dampers made of 20 gauge "snap-lock" steel frame with S & Drive duct connections. Allow a 16 inch gap in the duct for the damper.

MEDIUM PRESSURE (STMRTD) AND HEAVY DUTY (STCD) RECTANGULAR DAMPERS

Formed steel blade stops incorporate a gasket for quiet operation and improved structural rigidity. Rectangular dampers under 10" in height incorporate a single blade design. Dampers 10" or over use opposed blade design. A full stall motor, drawing 2 VA, drives the motor from full open to full close in 90 seconds.

MEDIUM PRESSURE RECTANGULAR DIMENSIONAL DATA
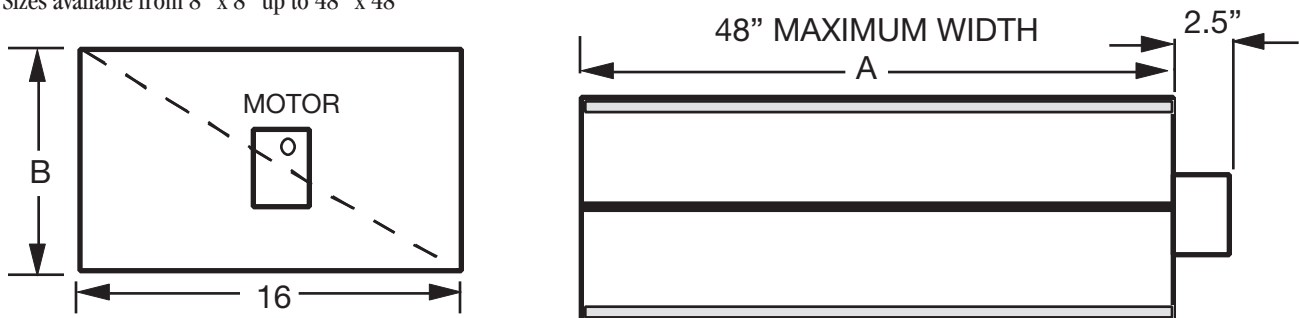
Part Number **STMRTD** W x H
Sizes available from 8" x 6" up to 24" x 20"
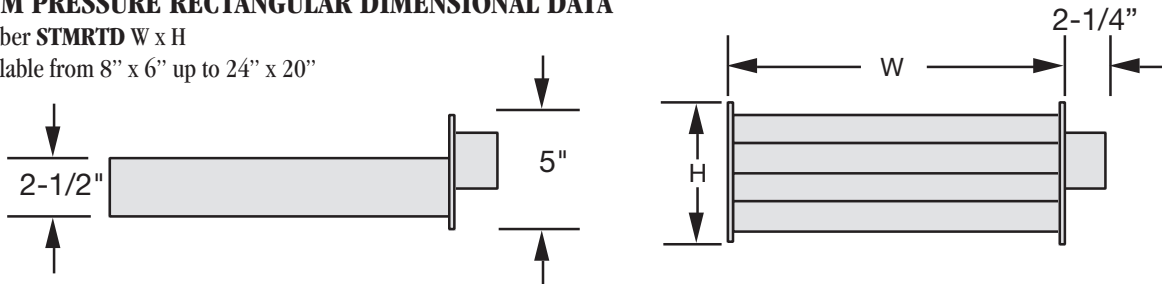
HEAVY DUTY RECTANGULAR DIMENSIONAL DATA

Part Number **STCD** W x H
Sizes available from 8" x 8" up to 48" x 48"

| WIDTH	HEIGHT	DEPTH
A	B	16"

ZONE DAMPERS

RECTANGULAR DAMPER CAPACITIES*

Dampers listed below are standard sizes. For larger sizes and capacities contact the factory.

WIDTH IN INCHES

HEIGHT IN INCHES	8	10	12	14	16	18	20	22	24	26	28	30	32
8	300	400	500	610	710	820	925	1050	1175	1250	1400	1500	1600
10	400	540	680	825	975	1125	1300	1400	1590	1750	1975	2100	2175
12	500	680	850	1000	1200	1400	1600	1850	2000	2300	2550	2700	2850
14	610	825	1000	1250	1500	1750	2000	2250	2500	2900	3150	3425	3625
16	710	975	1200	1500	1800	2100	2450	2700	3000	3600	3950	4200	4425
18	820	1125	1400	1750	2100	2500	2850	3080	3600	4400	4600	4950	5100
20	925	1300	1600	2000	2450	2850	3400	3775	4000	4800	5500	5700	6000
22	1050	1400	1850	2250	2700	3080	3775	4300	4800	5100	6000	6350	6800
24	1175	1590	2000	2500	3000	3600	4000	4800	5400	6100	7000	7150	7600
26	1250	1750	2300	2900	3600	4400	4800	5100	6100	6700	7800	8400	8900
28	1400	1975	2550	3150	3950	4600	5500	6000	7000	7800	8400	9150	10000
30	1500	2100	2700	3425	4200	4950	5700	6350	7150	8400	9150	10000	11000
32	1600	2175	2850	3625	4425	5100	6000	6800	7600	8900	10000	11000	11250

* These air quantities were derived from a duct sizing chart .1" friction loss per 100' of duct. All CFMs listed are approximate. For accurate selection use duct sizing table or device.

D-FUSER ZONE DAMPER

Zonex Systems D-Fuser is a combination zone damper and diffuser. It mounts in a standard 2' x 2' T-bar ceiling opening, providing for simple installation and easy maintenance access. The D-Fuser is a cone shaped fluidic nozzle with a platen that modulates up and down to control air flow. As the platen moves up, the air volume is reduced but the air velocity and throw remain constant. This keeps the air hugging the ceiling which maximizes room air mixing and minimizes the "waterfall" effect. The D-Fuser is a fully modulating power open, power close damper using a 24vac 60Hz 2 VA motor. Motor drive time from full open to full close is 90 seconds. The D-Fuser connects to round duct either on the side or top. Collars are available for 6", 7", 8", 9" and 10" duct.

COLLAR: PLACE ON SIDE OR TOP

12"

12"

2"

24"

AT NECK VELOCITIES UP TO 700 FPM
NC LESS THAN 30
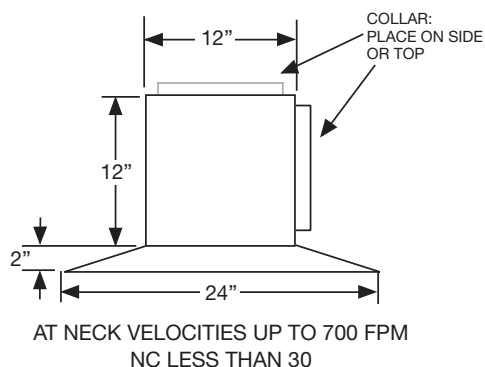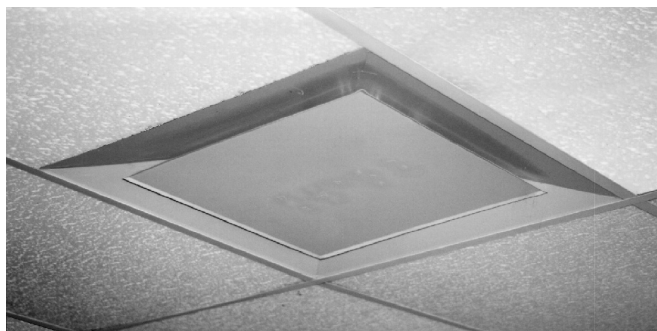
6"	Neck Vel	400	500	600	700	800	900
	ΔP	0.011	0.016	0.023	0.035	0.04	0.055
	CFM	80	98	120	135	157	176
	Throw 50 FPM	4'	4'	5'	6'	6'	7'
8"	Neck	400	500	600	700	800	900
	ΔP	0.019	0.03	0.045	0.056	0.041	0.093
	CFM	140	170	207	247	280	315
	Throw 50 FPM	5'	6'	7'	8'	9'	10'
10"	Neck Vel	400	500	600	700	800	900
	ΔP	0.029	0.045	0.066	0.09	0.12	0.146
	CFM	218	273	330	382	438	497
	Throw 50 FPM	6'	8'	9'	10'	11'	12'

ZONE DAMPERS

SIZING ZONE DAMPERS

If the ductwork already exists, simply size the damper to fit the ductwork. For new systems or retrofit jobs:

  a) Determine CFM from heat gain or loss calculations.
  b) Select damper size using either the round capacities chart, the rectangular capacities chart or by using a duct sizing table or calculator.
  c) Select a Zonex Systems damper to fit the duct size selected for that zone.

Make sure your zone dampers match the type specified in the table showing Maximum Differential Pressure.

INSTALLATION NOTES

 1. Do not exceed 700 FPM in a register/diffuser branch duct.
 2. If a damper is installed within 3 feet of register/diffuser, install sound attenuating flex duct between damper and outlet.
 3. Zone dampers should be preceded by 2'-4' of straight pipe where possible.
 4. In attic installations and high humidity areas, the *Zonex Systems* damper should be insulated along with the duct work. The hat section on the round damper is delivered with insulation between the hat section and pipe. Therefore, insulation should be applied to the round pipe and be butted against the hat section, (do not insulate the motor). The motor generates enough heat so that no condensation will develop on it.
 5. Remember to allow a 16-inch gap in the duct for Heavy Duty rectangular dampers.
 6. Medium pressure rectangular dampers slide into a 3¼-inch wide cutout in the side of the preexisting ductwork.
 7. Minimum open and close positioning is field adjustable on the actuator. The damper is shipped from the factory to close 100%.

NOTE: Dampers should not be installed with motor upside down in the 6:00 position.

SLAVING UP TO THREE ZONE DAMPERS

Up to three dampers can be directly controlled by one thermostat. To wire two to three zone dampers to one thermostat, use the following diagram shown. Remember to size the damper power transformer for the total number of zone dampers. Each actuator draws 2 VA.
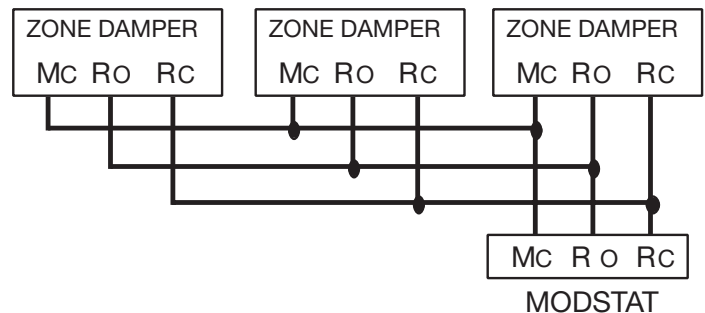
SLAVING MORE THAN THREE ZONE DAMPERS

Use the following diagram when a thermostat will be controlling more than three zone dampers. Use an additional 24V transformer sized at 2VA per damper to power the slaved dampers.
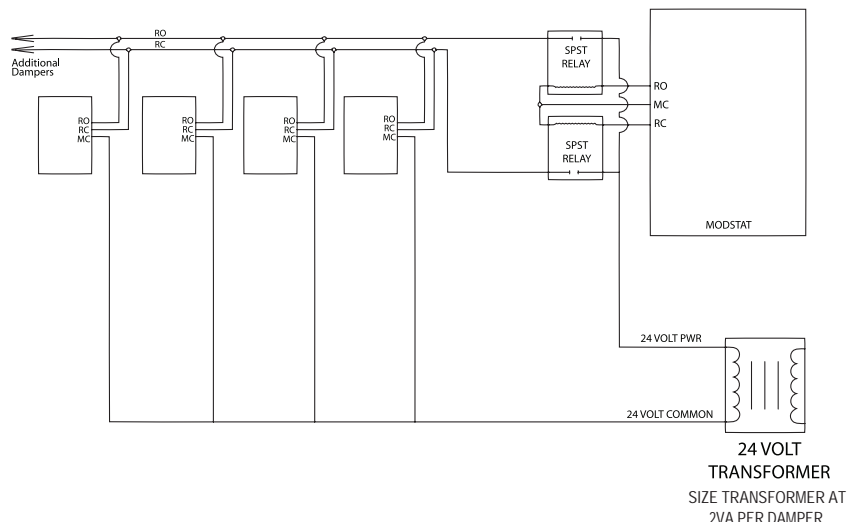
BYPASS DAMPERS – ELECTRONIC

ELECTRONIC BYPASS DAMPERS

Bypass dampers are used to provide constant air delivery through the air handling unit. This is done by bypassing excess air from the supply duct back to the return duct. As a zone is satisfied its zone damper closes. When this happens, the bypass damper opens just enough to bypass the excess air. This will control static pressure and noise at the diffusers.

The Electronic Bypass Damper is used on any size system over 5 tons. The damper can be round or rectangular and multiple dampers can be slaved together. The Electronic Bypass Damper consists of a medium pressure round or a heavy duty rectangular damper and a static pressure sensor.

RECTANGULAR & ROUND BYPASS DAMPER WITH THE STATIC PRESSURE CONTROL

SIZING ELECTRONIC BYPASS DAMPERS

The bypass damper is to be sized for the total system CFM @1500 FPM. System CFM should be calculated at 400 CFM per ton.

Example: A 5-ton system is rated at 2000 CFM (5x400 = 2000). When calculated at 1500 FPM, the bypass damper should be 16". Never undersize the bypass damper.

ROUND BYPASS DAMPER SELECTION

The Zonex Systems STMPD damper is used for round bypass applications. When you know the bypass CFM requirements, use the ROUND BYPASS SELECTION TABLE to confirm the round damper size.

NOTE: multiple round dampers can be slaved from one static pressure control to provide the correct capacity. One large rectangular bypass damper may be used instead of multiple round dampers. See below.

ROUND BYPASS SELECTION TABLE

Diameter	CFM
8"	560
10"	900
12"	1250
14"	1700
16"	2200
18"	2600

PART #	SIZE	D	L	W
STMPD08	8	8"	10"	11"
STMPD10	10	10"	12"	13"
STMPD12	12	12"	14"	15"
STMPD14	14	14"	16"	17"
STMPD16	16	16"	18"	19"
STMPD18	18	18"	20"	21"
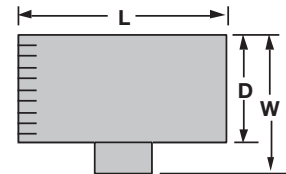
RECTANGULAR BYPASS DAMPER SELECTION

The Zonex Systems STCD WxH damper is used for rectangular bypass applications. These dampers are also sized for the total system CFM rated at 1500 FPM. Multiple dampers can be slaved from a single static pressure control.

RECTANGULAR BYPASS DAMPERS
SELECT FROM 8 X 8 THRU 48 X 48

48" MAXIMUM WIDTH
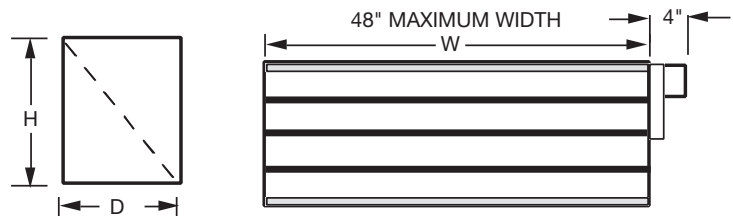
WIDTH	HEIGHT	DEPTH
W	H	16"

PART # STCD W x H

RECTANGULAR BYPASS SELECTION TABLE

HEIGHT IN INCHES ↓ / WIDTH IN INCHES →	8	10	12	14	16	18	20	22	24	28	32	36	40	44	48
8	667	833	1000	1167	1333	1500	1667	1833	2000	2333	2667	3000	3333	3667	4000
10	833	1042	1250	1458	1667	1875	2083	2292	2500	2917	3333	3750	4167	4583	5000
12	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	5500	6000
14	1167	1458	1750	2042	2333	2625	2917	3208	3500	4083	4667	5250	5833	6417	7000
16	1333	1667	2000	2333	2667	3000	3333	3667	4000	4667	5333	6000	6667	7333	8000
18	1500	1875	2250	2625	3000	3375	3750	4125	4500	5250	6000	6750	7500	8250	9000
20	1667	2083	2500	2917	3333	3750	4167	4583	5000	5833	6667	7500	8333	9167	10000
22	1833	2292	2750	3208	3667	4125	4583	5042	5500	6417	7333	8250	9167	10083	11000
24	2000	2500	3000	3500	4000	4500	5000	5500	6000	7000	8000	9000	10000	11000	12000
28	2333	2917	3500	4083	4667	5250	5833	6417	7000	8167	9333	10500	11667	12833	14000
32	2667	3333	4000	4667	5333	6000	6667	7333	8000	9333	10667	12000	13333	14667	16000
36	3000	3750	4500	5250	6000	6750	7500	8250	9000	10500	12000	13500	15000	16500	18000
40	3333	4167	5000	5833	6667	7500	8333	9167	10000	11667	13333	15000	16667	18333	20000
44	3667	4583	5500	6417	7333	8250	9167	10083	11000	12833	14667	16500	18333	20167	22000
48	4000	5000	6000	7000	8000	9000	10000	11000	12000	14000	16000	18000	20000	22000	24000

Bypass air in CFM. Calculated at 1500 FPM.

Formula used: $B = W \times H / 144 \times 1500$, where B = Bypass air in CFM, W = damper width in inches, H= damper height in inches, 144 = 144 sq. inches per sq. ft., 1500 = 1500 FPM.

BYPASS POSITION INDICATOR

ROUND AND RECTANGULAR BYPASS DAMPER MOTORS

NOTE: Clockwise to close
On rectangular bypass
and counterclockwise
on round bypass.

RC
RO
MC

Integrated Static Pressure Control (Part # IPC)
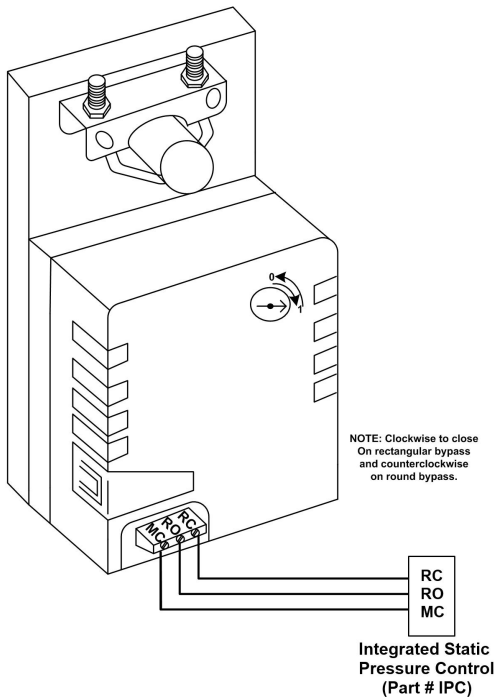
SLAVING BYPASS DAMPERS

Use only one Pressure Sensor when slaving two or more Bypass Dampers together. Connect the Pressure Sensor to one damper as described above. Connect the slave dampers in parallel as shown. Up to 4 dampers can be slaved to one Sensor. The slaved dampers will self synchronize each time the dampers reach full open or full close.

DAMPER ACTUATOR — RC RO MC

SLAVE DAMPER ACTUATOR — RC RO MC

TO NEXT SLAVE BYPASS DAMPER IF APPLICABLE

RC
RO
MC

To Static Pressure Controller As Shown On The Bypass Wiring Diagram On The Next Page.
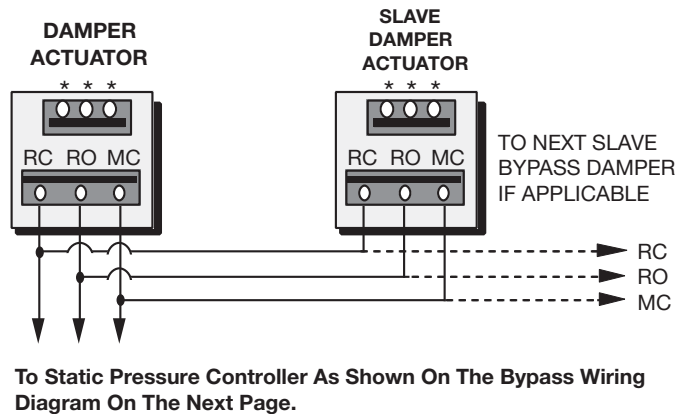
BYPASS DAMPER WITH INTEGRATED PRESSURE CONTROL

Bypass Damper with Integrated Pressure Control is used to control bypass operations. The bypass damper modulates to maintain static pressure as zone dampers open and close. The bypass system reduces air noise from the supply registers caused by excessive air velocity. If the system is configured for intermittent fan mode and the system satisfies, there will be a 3-minute delay to allow for system purge, after which the bypass damper will open to 25%, preventing noisy rush of air through supply registers when fan starts up on a call for heat or cool. If the system is configured for fan continuous operation, the **STBP** (Round) or **STCDBP** (Rectangular) Electronic Bypass will monitor static pressure continuously, providing constant control of system static.

INTEGRATED PRESSURE CONTROL DESCRIPTION

A. Supply air tube
B. 24vac R and C
C. Damper Terminal RO, RC, MC
D. LED lights
E. Adjustable Potentiometer
F. TP1 Test Point
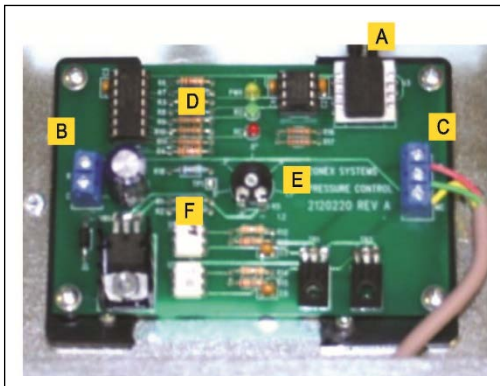
 Fig. 1

BYPASS DAMPER INSTALLATION
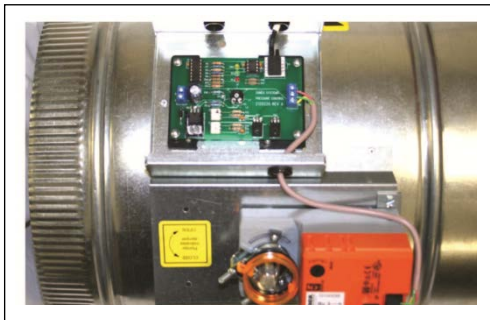
1. Verify the bypass damper is sized properly to the system and not undersized. (Bypass damper sizing is recommended for 100% of system CFM.)

2. Bypass damper and controller are powered by a dedicated 24vac 40VA transformer.
3. Do not install the bypass damper outside.
4. Locate the Integrated Pressure Control (**IPC**) and air tube on the bypass damper.
5. Drill ¼" hole into the side of the supply duct 2' after the bypass and before the 1st supply take-off. Mount pressure supporting block over ¼" hole, align hole in block with hole in duct. Use provided sheet metal screws.
6. Install air tube into supply air duct by slipping supplied plastic tubing into holes in support block and duct. Slip tube 3" into the duct. Pickup tubing fits snugly into provided hole.
7. Connect pressure tube from static air pickup to Integrated Pressure Controller (port closest to you).
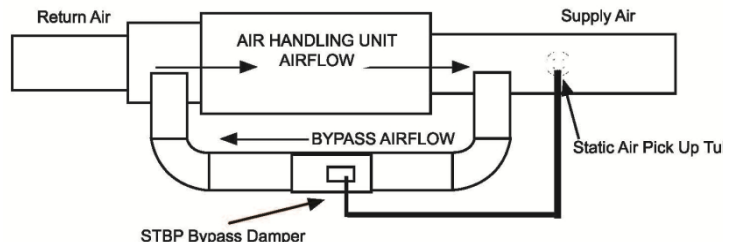
Fig. 2

BYPASS DAMPER WITH INTEGRATED BYPASS CONTROL SETUP

1. Run all supply dampers to the full open position and have blower motor running at 100% fan speed. (See Note #1)
2. Manually close the bypass damper by pressing in the release lever on the motor side of the actuator. With the release lever pressed, rotate the damper actuator collar to close the damper and release the lever to lock the damper closed.

3. **Quick Set Option:** Turn the potentiometer on the damper control board to the full left position and slowly rotate RIGHT, until the "RC" RED LED turns on. Now rotate LEFT just slightly, until RC LED turns off. The **IPC** is ready for operation.

   "**RC**" RED LED means damper closing.
   "**RO**" GREEN LED means damper opening.

4. **Static Pressure Option:** The Integrated Pressure Control Board can be field configured for specified static pressure using a multi meter and the static pressure – voltage chart. *(Exhibit A)*. This chart shows voltage (DC) to inches of W.C. (static pressure) relationship. Use a multi meter set on VDC and place the leads on the "C" terminal and "TP1" (test point one) next to the potentiometer. The Voltage reading translates to inches of W.C.

Static Pressure Voltage Chart

Static Pressure	TP1	Static Pressure	TP1
INCH W.C.	Voltage (DC)	INCH W.C.	Voltage (DC)
0.1	1.49	0.5	2.22
0.15	1.62	0.55	2.27
0.2	1.69	0.6	2.42
0.25	1.81	0.65	2.48
0.3	1.85	0.7	2.6
0.35	1.91	0.75	2.68
0.4	1.94	0.8	2.81
0.45	2.06		

Note #1: To open all dampers, it may be necessary to remove Y outputs to unit on the zone control board and to make full cool calls on all thermostats. This will modulate dampers fully open and lock out compressor.

On Zonex Systems **GEN II** and **ModCom II**, use air balance modes for simplified bypass setup.

BYPASS CHECKOUT FOR STATIC PRESSURE CONTROLLER

1. Make cool call at the zone thermostat of smallest zone.
2. Verify all zone dampers are closed except calling zone.
3. Verify noise at zone registers is not excessive. Adjust the Integrated Pressure Control LEFT to lower noise (airflow) or RIGHT to increase airflow until too noisy.

BYPASS DAMPER WIRING DIAGRAM WITH INTEGRATED BYPASS CONTROL

Bypass Damper with Integrated Bypass Control
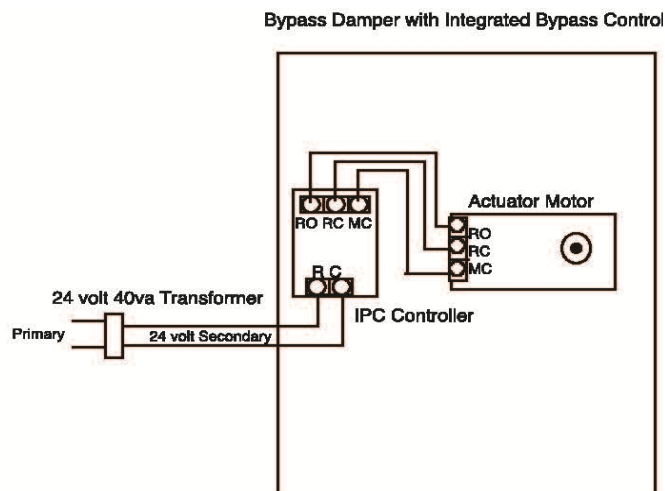
SYSTEM START-UP PROCEDURE

Installing System Software

1. Place Systems Software Master CD in the CD drive.
2. Click on **My Computer**.
3. Click on the CD or DVD RW drive; i.e., "D" or "E."
4. Double click on the **Commander.exe** file.
5. Click on **OK** to start the Installation Wizard.
6. Please answer the questions as the Installation Wizard is loading.
7. When the Wizard has completed the loading process, confirm the Zonex icon is located on the Desktop:
   NOTE: A second icon with our trending or Zonex charts icon will also reside on your desktop.

ZonexCommander and *ZonexCommander (Plus)*
USB Driver Installation for Windows XP and Vista

1. Connect USB cable to computer and USB plug on Command Center.
2. Start with Commander program closed, and switch on the Command Center with on/off switch. Verify Command Center is on by the power LED. "Found new hardware" wizard should appear on computer screen.
3. Insert the Driver CD into the CD drive on computer, and follow the installation wizard prompts to install.
   A. Can Windows connect to Windows Update to search for software? Select **"YES, this time only"**
   B. "This Wizard helps you install software for: *ZonexCommander*. What do you want the wizard to do?" Select: **"Install the software automatically"**
   C. When the message "*ZonexCommander* has not passed Windows logo testing…" Click **"Continue Anyway"**
   D. When the wizard has finished installing the software for the *ZonexCommander*, *Zonex Commander (Plus)*, the message **"Completing the Found New Hardware Wizard"** will appear.
4. Remove the Driver CD from computer.
5. Proceed to **Assigning COM Port Instructions** (below).

USB Driver Installation for Windows 7 and 8

1. With the ZonexCommander (Plus) Command Center in the OFF position, connect the USB cable to the Commander board and USB port on the computer. Turn on the Command Center. The message, **"New Hardware Found"** will appear, followed by **"Device Driver software was not successfully installed."**
2. Click on the **Start** menu and select **Control Panel**. Then select **Hardware and Sounds**. Locate and click on **Device Manager.** Select **Other Devices**, and locate the ZonexCommander listing and note the COM Port assigned. Right click on **ZonexCommander,** and then click on **Properties**.
3. Insert the USB Driver CD into the computer drive, and note which drive is being used.

4. Under the **General** Tab for properties, click on **Update Drivers**; select **"Browse My Computer for Driver Software."**
5. Select the Drive which has the CD installed; and click on **Next.** A warning may appear; click on **"Install the software anyway."**
6. After installation, a message will appear, stating **"Windows has successfully updated driver."**
7. Remove the Driver CD from computer.
8. Proceed to **Assigning COM Port Instructions** (below).

Assigning COM Port Instructions for Windows 7, 8, XP and Vista

1. From the computer desktop, right click on **MY COMPUTER**.
2. Select **PROPERTIES.**
3. Select **Hardware** on **System Properties** page.
4. Select **Device Manager**.
5. On **Device Manager** page, find **COM & LPT** ports and expand by clicking on the + next to **COM & LPT**.
6. *ZonexCommander or ZonexCommander (Plus)* should be listed with COM1, 2, 3 or 4.
7. If the COM assignment is higher than 4, you must manually change it to an open COM1, 2, 3 or 4.
8. Reboot computer.
9. Once computer has restarted, select the *ZonexCommander* or *ZonexCommander (Plus)* icon on display; and click on **Connect Now**.
10. Select **COM1, 2, 3 or 4** from connection settings window.
11. When **Connection Successful** window appears, click **OK**.

Continue with system setup and configuration steps in *Zonex-Commander* Installation manual.

Connecting to the System

Direct Connect - Computer connected directly to a single Command Center.
NOTE: It is recommended to first set up and configure a new system with a direct connected computer (laptop or desktop), and verify operation.

Setup

Zonex Commander/Commander (Plus) (CETCIP / ZPTCIP)

1. With the Command Center switched OFF and the Commander program closed, connect the 6' USB cable to computer and USB plug on the Command Center.
2. Switch the Command Center ON, and then bring up the Commander system program on the computer.
3. Remove the insulating tag from the backup battery on the Command Center.
4. With all components wired, addressed and powered up, perform the Common Ground Phasing procedure. See below.

SYSTEM START-UP PROCEDURE

COMMON GROUND PHASING PROCEDURES
1. With the **ModStats** powered up, set voltmeter to the AC scale.
2. Separate the thermostat circuit board and cover from the terminal base.
3. Place one meter probe on the RX terminal and the other probe on the R terminal - note the voltage reading.
4. Keeping one probe on RX, place the other meter probe on terminal C and note the voltage reading.
5. The lowest voltage reading must be on the RX to C terminals.
6. If the low voltage reading is measured on RX to R, reverse the R and C wires on the thermostat terminal base.
7. If erratic voltages are read, contact Technical Support.

Program Screens

The Zonex software provides 6 tabbed screens for System status and configuration. If you are installing *ZonexCommander (Plus)* to control multiple zoned units, your software is equipped with 7 tabs:

Welcome Tab   Use to connect to the system.

Review Tab   Display total number of thermostats and devices, along with current space and heat/cool setpoint temperatures.

Schedule Tab   Assign Occupied and Unoccupied events for each thermostat and **RLYCOM** in the system.

Set Temp Tab   Enter Occupied and Unoccupied, Heat and Cool temperatures remotely for selected thermostats.

System Tab   To access or set the Day, Date, and Time – display Outside air on all systems, Mixed air (return) and Leaving air (supply) temperatures on SYSTEMS TAB – Number of thermostats and devices (**RLYCOM**) – Override for Occupied / Unoccupied modes – Enter names or tags for thermostats and other devices – Thermostat lock feature – temperature warning alert and temperature trending.

Vacation Tab   Assign up to 20 vacation/holiday events for each thermostat and **RLYCOM**.

Zoned Units Tab Used only with *ZonexCommander (Plus)*, allocates thermostats to their respective units when multiple units are included in the system.

Accessing the Systems

WELCOME Screen – *Fig. 1*

Double click on the Zonex icon to open the program's WELCOME screen *(see Fig. 1)*
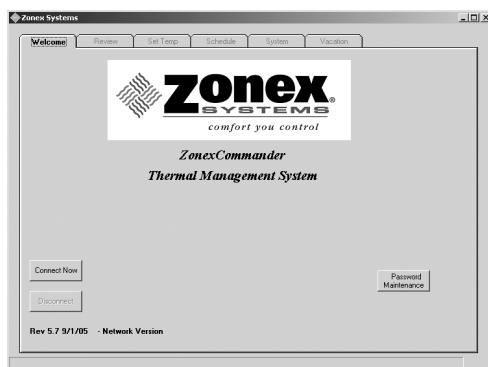
Fig. 1

Setting a Password (Optional)

If a password is required, it may be entered now or at a later time. If you do not require a password and do not need to add or modify a device, proceed to **Connecting to the Zonex System** section below.

1. Click on the **Password Maintenance** button on the lower right side of the WELCOME screen. *(see Fig. 2)*
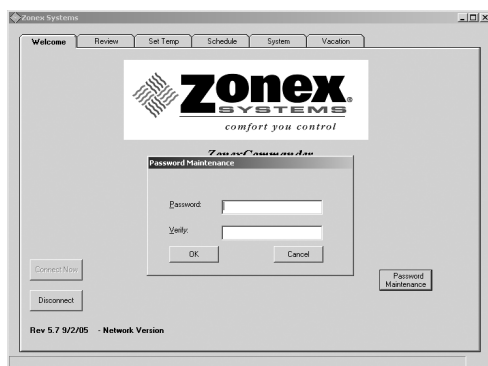
Fig. 2

2. Enter your new password. The password must not exceed 30 characters and spaces.
   NOTE: the password only affects the computer on which it is entered.

3. Re-enter your password in the **Verify** box.

4. Click on **OK** to store the password.
   NOTE: Your password should be retained elsewhere. If it is lost, the program will have to be re-installed and all information re-entered.

Adding, Modifying or Deleting Records

To add or change a project name, phone number or IP address:

1. Add a record:
   a. Click on the **Connect Now** button from the WELCOME screen.
   b. Verify that the **Connection Settings** window appears *(see Fig. 3)*.
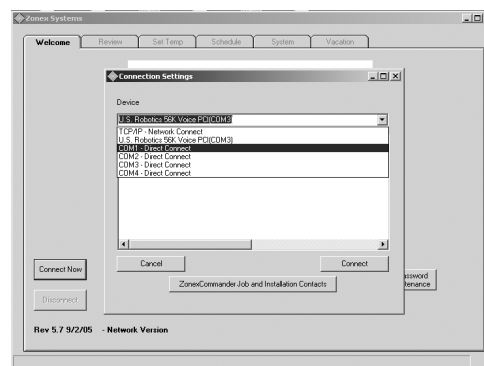
Fig. 3

   c. Click on **Commander Job** and **Installation Contacts** button.
   d. Verify that the **Contacts** window appears *(see Fig. 4)*.
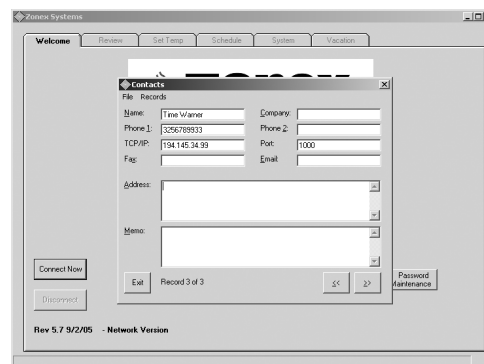
Fig. 4

   e. Click on **Records**.
   f. Click on **ADD** *(see Fig. 5)*; and enter new project name, phone number for the dedicated phone line to this job or IP address and port number, if applicable. Multiple facilities may be accessed from this software.
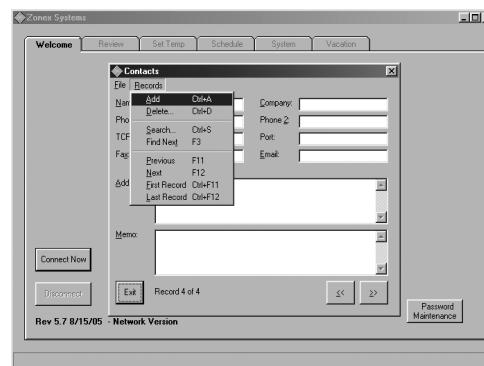
Fig. 5

   g. Click on **File**; then click on **Save**.
   h. Click on **Exit** to return to the WELCOME Tab.

2. Modify an existing record:

   a. Click on the **Connect Now** button from the WELCOME screen.
    b. Verify that the **Connection Settings** window appears.
    c. Click on **Commander Job** and **Installation Contacts** button.
    d. Verify that the **Contacts** window appears *(see Fig. 4)*.
    e. Use the **Scroll** buttons (<< or >>) at the bottom right of the Contacts screen to locate the record to be modified.
    f. Click inside the field to be changed, and revise data.
    g. Click on **File**; then click on **Save**.
    h. Click on **Exit** to return to the WELCOME Tab.

3. Delete a record:

    a. Click on the **Connect Now** button from the WELCOME screen.
    b. Verify that the **Connection Settings** window appears.
    c. Click on **Commander Job** and **Installation Contacts** button.
    d. Verify that the **Contacts** window appears *(see Fig. 4)*.
    e. Use the **Scroll** buttons (<< or >>) at the bottom right of the Contacts screen to locate the record to be deleted.
    f. Click on **Records**.
    g. Click on **Delete**.
    h. Click on **File**; then click on **Save**.
    i. Click on **Exit** to return to the WELCOME Tab.

Connecting to the Zonex System

1. Click on the **Connect Now** button from the WELCOME screen *(see Fig. 6)*.
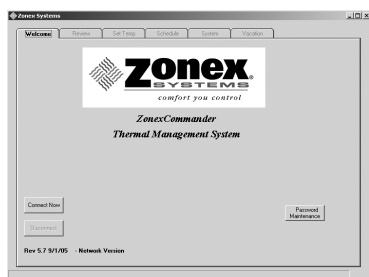
Fig. 6

2. Verify that the **Connection Settings** window appears *(see Fig. 7)*.
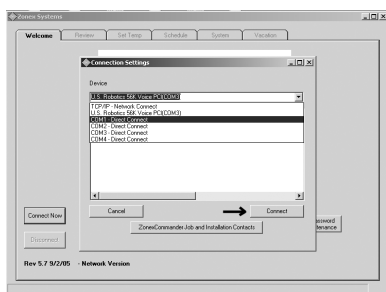
Fig. 7

3. Click on the appropriate COM port or TCP/IP network connection.

4. Click on the **Connect** button *(see arrow in Fig. 7)*. The screen then displays: ***Please wait while system is loading*** *(see Fig. 8)*. The connection should complete within 30 seconds and is verified when the **Connection Successful** window appears.
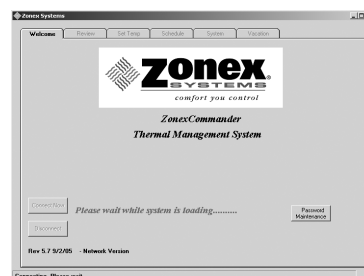
Fig. 8

5. Click on **OK** in the **Connection Successful** window *(see Fig. 9)*.
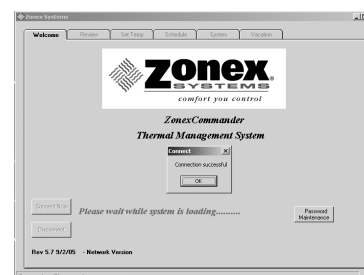
Fig. 9

For International systems equipped with Celsius thermostats, you may now select a Celsius temperature display by clicking the box labeled "Click here for Celsius." If you are not using Celsius thermostats, please ignore this step. Each time you enter the program, this step must be initiated to display Celsius Temperatures.

System Setup and Configuration
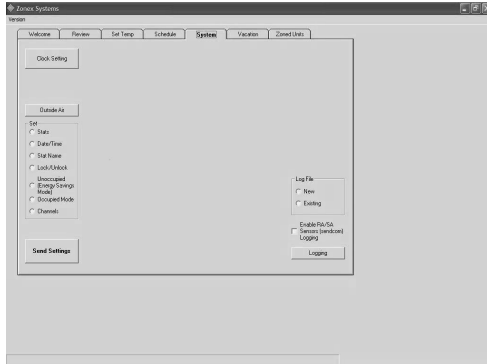
SYSTEM Screen – *Fig. 10*

Fig. 10

Stats

1. Click on the SYSTEMS Tab, and click on the radio button next to **Stats** *(see Fig. 11)*.
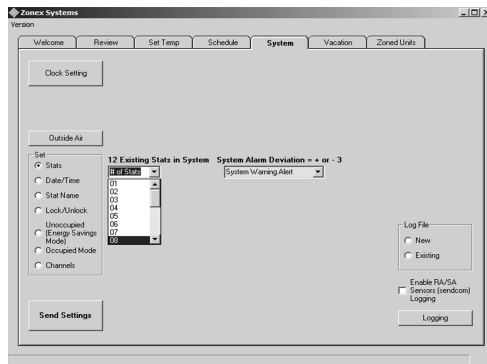

Fig. 11

2. Select the total number of system devices (up to 20 thermostats and **RLYCOMs** on the Command Center communication buss).

3. The program is equipped with a **System Alarm Deviation** function, or System warning alert *(see Fig. 11)*, which allows the user to establish out of range temperature criteria from 3-10°. Whenever a thermostat exceeds the selected deviation from its heating or cooling setpoints, the current temperature will be highlighted in Yellow on the REVIEW Screen. If this feature is not required, select **00** to disable the alert; otherwise, select the temperature deviation.

4. Click on **Send Settings** to place this information into memory.

Date/Time

1. Click on the **Date/Time** radio button *(see Fig. 12)*, and a calendar will appear on the upper right of the screen.
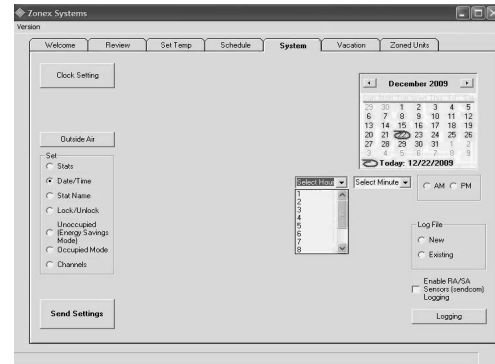
Fig. 12

2. Click on the **right or left arrow** next to the month and year to select the current month or click on today's date.

3. Click on **current day** to highlight in gray.

4. Click on the **Select Hour** and **Select Minute** down arrow buttons to select time.

5. Click on the **AM** or **PM** radio button.

6. Click on **Send Settings** to place this information into memory.

7. Verify setting by clicking on the **Clock Setting** button on the top left of the screen.

Stat Name

1. Click on the **Stat Name** radio button *(see Fig. 13)*, and enter individual thermostat names, **RLYCOM**, or **SENDCOM** designations. Do not exceed 20 characters and spaces on each entry.
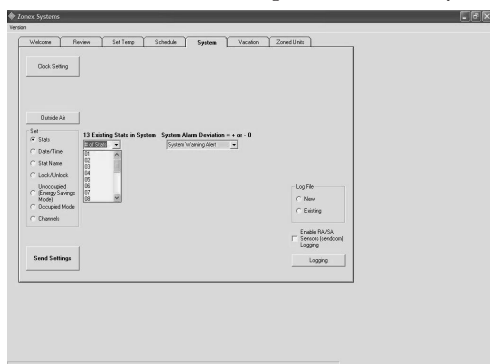

Fig. 13

2. Click on **Send Settings** after typing each address to place it into memory. Confirm that entries have been saved by clicking on the REVIEW Tab; then return to the SYSTEMS Tab to continue labeling the thermostats.

Occupied Mode

1. Click on the **Occupied Mode** radio button *(see Fig. 14)*.
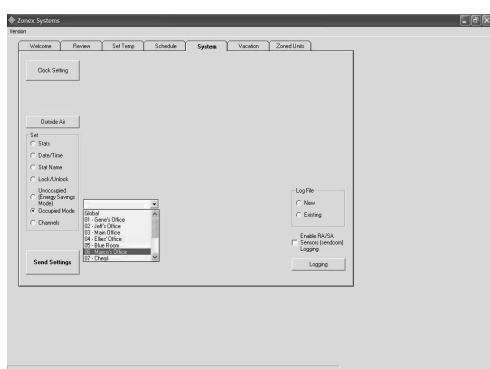
Fig. 14

2. Select **Global**, and click on **Send Settings**. This is to ensure all devices are in the Occupied mode for the start-up. Settings can be changed to **Unoccupied Mode** after initial setup.

Lock/Unlock Thermostats

1. Click on the **Lock/Unlock** radio button to lock or unlock thermostats remotely *(see Fig. 15)*.
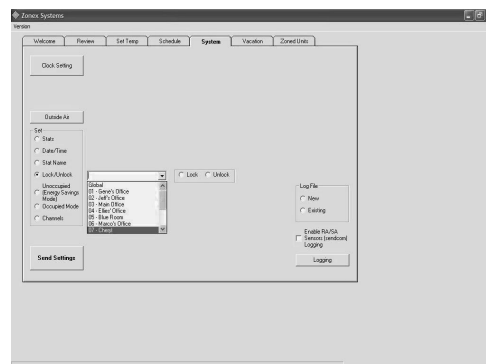
Fig. 15

2. Select the thermostat from the drop down menu, or click on **Global** to lock or unlock all thermostats, or select an individual address to lock.

3. Click on **Send Settings** to place this information into memory.

4. Confirm your lock/unlock request by returning to the REVIEW Tab. If the thermostat number you selected is Red, it is locked; if it is Black, it is unlocked. If necessary, repeat the sequence above to change to desired setting.

Reviewing System Data

SYSTEM Screen – *Fig. 16*

1. Click on the REVIEW Tab at the top of the screen to verify thermostat, **RLYCOM** and **SENDCOM** communications *(see Fig. 16)*.

Fig. 16

2. Verify that the number of thermostats and devices (upper left of screen) is correct.

3. Occupied and Unoccupied temperature setpoints and space temperatures should be displayed in each address row.

NOTE: If any thermostat shows "0" across the row, there is no communication with that thermostat. See the Troubleshooting section.

4. **RLYCOM** devices, if utilized, control generic loads and will be displayed with a **Red "0"** when energized and a **Blue"0"** when off.

   a. A **Red "0"** should appear in the **Unoccupied Heat** column, which indicates the **RLYCOM** is energized. (During setup, all devices were set to Occupied mode.)

   b. A **Blue "0"** in the **Unoccupied Cool** column indicates the **RLYCOM** is either off or de-energized.

   c. If all of the **RLYCOM** "0's" are **Black**, the device is not communicating. See the Troubleshooting section.

5. To test the **RLYCOM** operation and communications, switch to the **Unoccupied** mode and verify the result, as follows:

   a. Note the address number of the **RLYCOM** to be tested.

   b. Click on the SYSTEM Tab, and click on the **Unoccupied** mode radio button.

   c. When the address window appears, select the address assigned to the **RLYCOM** being tested.

   d. Click on **Send Settings**.

   e. Return to the REVIEW Tab, and verify the **RLYCOM** has changed to a **Blue "0"** in the **Unoccupied** column. The power light on the **RLYCOM** should be off.

   f. After testing, you may wish to adjust the mode back to the original setting.

6. **SENDCOM** communications are used to display RA/SA temperatures from stand-alone units.

   a. Place the cursor directly over a **Current Room Temperature** thermostat number with a **SENDCOM** attached; and double click on it *(see Fig. 17)*.
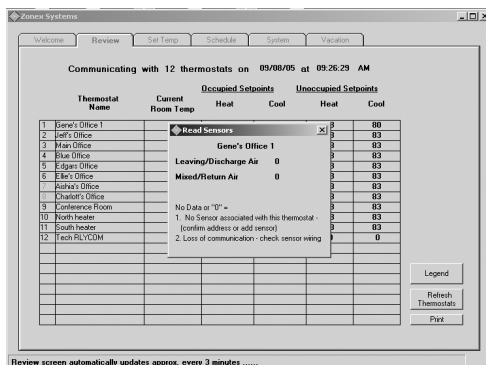

Fig. 17

   b. The **Read Sensors** window will appear, displaying Discharge and Return Air temperatures. If a single "0" is displayed for both sensors, or if the temperature appears to be incorrect, see the Troubleshooting section.

7. For multiple Command Centers repeat the above steps in this section for each Command Center.

Additional Information Displayed on the REVIEW Screen

1. Click on the thermostat number to confirm that the thermostat is in the **Occupied** or **Unoccupied** mode *(see Fig. 18)*.

   This feature is not available with a **RLYCOM**. Its status is indicated by a **Red "0"** for either **ON** or **HOT** (Occupied) and a **Blue "0"** (for **OFF** or **de-energized**.).
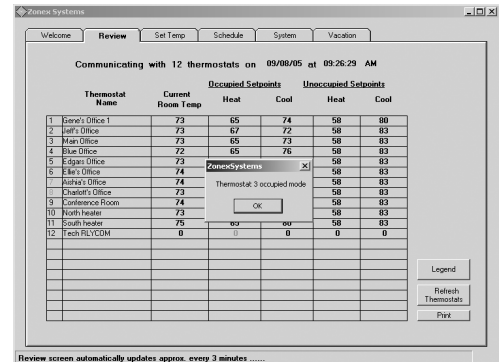

Fig. 18

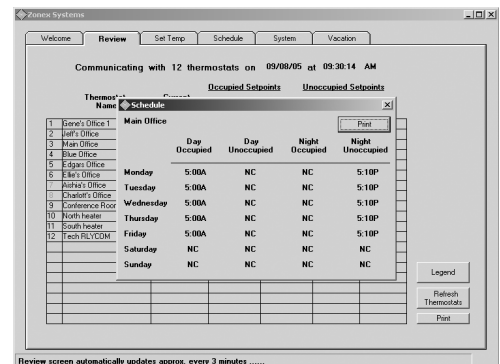2. Click on a thermostat name to display Schedules after they have been entered *(see Fig. 19)*.

Fig. 19

3. Click on the **Legend** button for an explanation of activities displayed on the REVIEW Screen *(see Fig. 20)*.
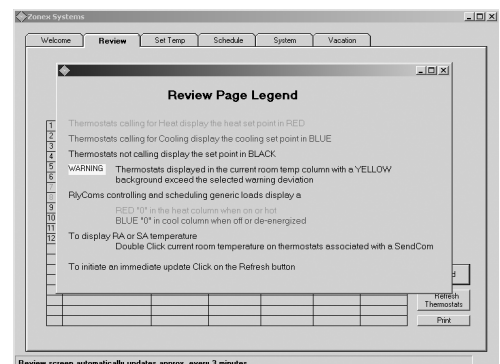

Fig. 20

45

4. The REVIEW Screen is dynamic and automatically updates every three minutes. To initiate an immediate update, click on the **Refresh Thermostat** button.

5. To print a copy of the REVIEW Screen, which displays all current temperature data, as well as a date and time stamp, click on the **Print** button.
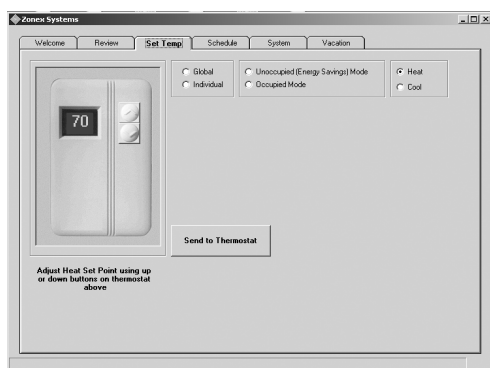
Thermostat Management

SET TEMP Screen – *Fig. 21*

Fig. 21

Everything the on-site user can perform at the thermostat can be performed remotely on the SET TEMP screen. The SET TEMP screen displays a thermostat feature, which allows the Heat and Cool setpoints to be changed on individual or all (global) thermostats, for either Occupied or Unoccupied modes.

1. Click on the SET TEMP Tab.

2. To change temperature setpoints on all thermostats, click on the **Global** radio button *(see Fig. 22)*; or,
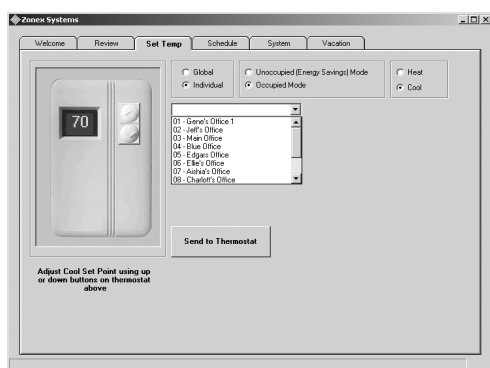

Fig. 22

3. To change an individual thermostat, click on the **Individual** radio button.

   NOTE: When the Individual radio button is selected, a window will appear with a **down arrow** button:

   a. Click on the **down arrow** button to display thermostat address numbers and names, and click on an address.

b. After selecting the desired address, the current Occupied and Unoccupied temperature setpoints for that thermostat will be displayed *(see Fig. 23)*.
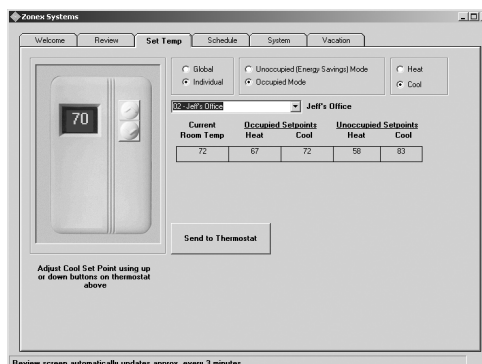

Fig. 23

4. After the Individual or Global radio button has been selected, click on either the **Occupied** or **Unoccupied mode** radio button.

5. Click on either the **Heat** or **Cool** radio button.

6. To change the temperature, click on the **Up** or **Down** buttons on the thermostat until the desired temperature is displayed.

7. Click on the **Send to Thermostat** button to place information into memory.

8. After adjusting setpoints, click on the REVIEW TAB to confirm entries have been saved. If a change did not occur, repeat the sequence above.

Scheduling the System
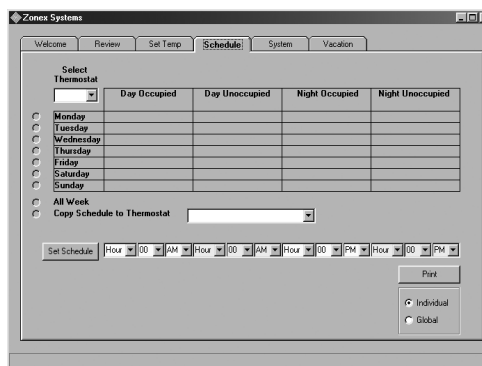
SCHEDULE Screen – *Fig. 24*

Fig. 24

The *ZonexCommander* software provides up to four scheduled events each day, for each thermostat. To assign Occupied and Unoccupied schedules:

1. Click on the SCHEDULE Tab.

2. Under **Select Thermostat** at the top left of the screen, click on the **down arrow** button; and select a thermostat from the drop down menu.

3. Event times can be entered separately for each day or for the entire week. Click on the **All Week** radio button. This allows a complete schedule to be assigned to one thermostat for every day of the week. (If, after the week's schedule has been set, you would like to change one day, see No. 6 below for instructions.)

4. To enter the time schedules on the selected thermostat or **RLYCOM** address, use the **down arrow** buttons in each **Hour, Minute** and **AM** or **PM** field to make your selections.

   You must make an entry into each time event. If there is no difference in time between the Occupied and Unoccupied modes, select **NC** ("No Change") in the appropriate fields.

   EXAMPLE: Thermostat 01 will be in the Occupied mode from 6:30 AM until 5:00 PM –

   a. Under **Day Occupied** select **6** in the hour field, **30** in the minute field, and then **AM.**

   b. Under **Day Unoccupied** select **NC** in the hour field (this denotes "No Change").

   c. Under **Night Occupied** select **NC** in the hour field (this denotes "No Change").

   d. Under **Night Unoccupied** select **5** in the hour field, **00** in the minute field, and then **PM**.

   e. Click on **Set Schedule** to program the schedule into memory.

   f. Repeat this process for each thermostat and **RLYCOM** address.

5. To copy the same schedule to another thermostat or **RLYCOM**:

   a. Click on the **Copy Schedule to Thermostat** radio button, and select the destination thermostat address.

   b. Click on **Set Schedule** to copy the schedule to the destination thermostat.

6. Thermostats and **RLYCOMs** can have individual schedules for every day of the week. To assign a schedule for one day:

   a. Select the thermostat or **RLYCOM** address from the pull down menu under **Select Thermostat**.

   b. Click on the radio button next to the day of the week to be scheduled. Schedule each day individually. After each day's schedule is entered, click on the **Set Schedule** button.

7. The schedules can be printed from the SCHEDULE screen:

   a. Click on either the **Individual** or **Global** radio button below the **Print** button. The Global selection will print the schedules for all thermostats and **RLYCOMs**, and the Individual selection will print a copy of the SCHEDULE screen displayed.

   b. Click on **Print**. It is recommended that this information be printed following the start-up of the system.

8. The Individual schedules can also be viewed on the REVIEW screen:

   a. Click on the REVIEW Tab.

   b. Click on the thermostat name *(see Fig. 19)*.

Vacation Scheduling

VACATION Screen – *Fig. 25*

Fig. 25

The vacation schedule provides 20 separate Unoccupied events for up to 30 days. This feature is designed to maximize your energy savings by placing the thermostat(s) into a 24-hr Unoccupied mode for 1 to 30 days.

To set an event:

1. Click on the VACATION Tab at the top of the screen, and verify all thermostat and **RLYCOM** addresses are listed under the column, **Thermostats below on Vacation Schedule** *(see Fig. 26)*.

2. To enter an **Unoccupied** day event, click on the **down arrow** button in the field showing the event numbers ["Select 1-20"]. Begin by selecting **1** for the first event.

Fig. 26

3. Select the **Month, Day,** and **Duration** of the event by using the **down arrow** buttons in the appropriate fields.

4. Click on **Set Vacation Schedule**.

5. Verify that the event **Month, Day** and **Duration** appear in the list on the left side of the screen.

6. Repeat steps 1 – 4 to set each vacation date, using the next available event number.

To clear an event:

1. Click on the **down arrow** button in the event number ["Select 1-20"] field, and select the event number.

2. Click on the **down arrow** button in the **Month** field.

3. Click on **Clear**.

4. Click on **Set Vacation Schedule**.

To override an event, if you have signage or other units that will operate during a vacation period:

1. In the **Thermostats below on Vacation Schedule** column, click on each thermostat address that you wish to override. Notice that, when you click on an address, it moves to the **Override Vacation Schedule** column *(see Fig. 27)*.
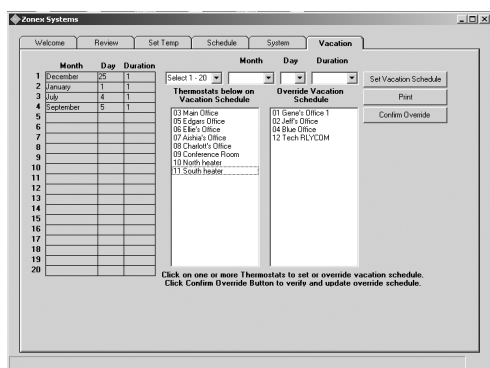

Fig. 27

2. Click on **Confirm Override**.

To print the Vacation event schedule:

1. Click on the **Print** button.

Allocating Thermostats to Specific Units for use with ZonexCommander (Plus) only
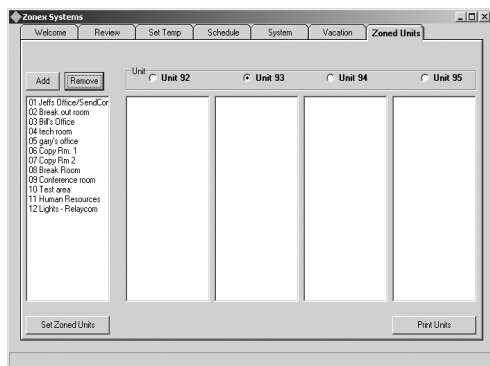
ZONED UNITS Screen – *Fig. 28*

Fig. 28

The ZONED UNITS screen is only applicable to *ZonexCommander (Plus)* software. It is used to configure, allocate and display thermostats assigned to their specific **RMOD** controllers. Each Command Center can support up to four **RMODs**. The **RMODs** are designated as Units #92 – #95.

1. Click on the ZONED UNITS Tab.

2. Verify that all thermostat/device address numbers appear in the Add/Remove left column *(see Fig. 28)*.

3. Select the **RMOD** #92 radio button, and highlight the thermostat address numbers to be assigned to that **RMOD** (one or more addresses may be highlighted).
   NOTE: When **DIGICOM**, **DIGIHP** thermostats or **RLYCOM** devices are part of the installation, they must be addressed above #05 (5).

4. Click on Add.

5. It is important to confirm that the correct thermostats are assigned to that **RMOD** *(see Fig. 29)*.
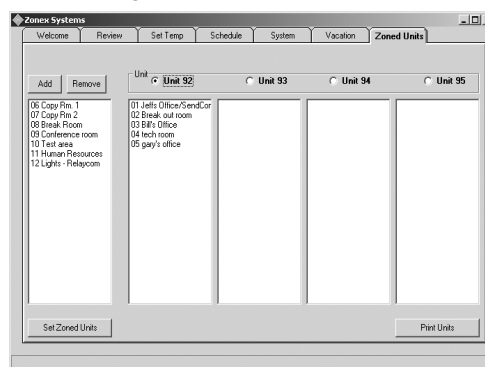

Fig. 29

6. Repeat steps 1-5 to allocate thermostats to each RMOD.

7. If an address has been assigned in error, simply highlight the address number and click on the Remove button. This returns the thermostat to the Add/Remove column. Reassign the address to the appropriate unit.

8. After all addresses have been assigned to the corresponding RMOD, click on the Set Zoned Units button on the lower left of the screen.

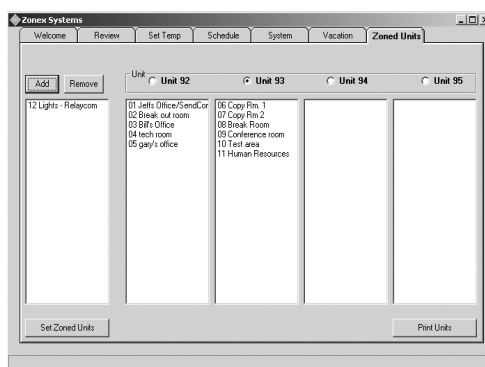9. Repeat these procedures for each RMOD #93, #94 and #95 when applicable *(see Fig. 30)*.

Fig. 30

10. When the hourglass returns to the arrow cursor on the ZONED UNITS screen, close the *ZonexCommander (Plus)* program on the computer; and recycle power on the Command Center and **RMOD(s)**.

11. Bring up the *ZonexCommander (Plus)* program again, and direct-connect to the system.

12. Go the the REVIEW screen, and verify all termostats are indicating temperatures.

13. Double left click on the **Current Room Temperature** of thermostat #1, to bring up RMOD 92 Supply and Return temperatures. This confirms communication with the RMOD.

14. Double left click on the **Current Room Temperature** on thermostat #2 for RMOD 93, #3 for RMOD 94 and #4 for RMOD 95.

15. Click on the ZONED UNITS screen, and verify any **DIGICOM**, **DIGIHP** and **RLYCOM** addresses remaining in the **Add/Remove** column.

16. To print the **ModStat** to **RMOD** listings for future reference, click on the **Print Units** button.

17. **RMOD** configuration is complete

System Requirements: Windows 7,8, XP or Vista are required to trend log. Not compatible with Windows 95 or 98.

Activating Trend Logging Data

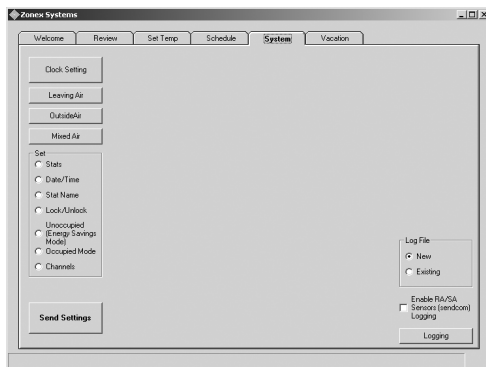**SYSTEMS Screen –** *Fig. 31*

Fig. 31

Trending Thermostat Data

Historical data must be developed in order to trend thermostat information.

1. Click on the SYSTEM Tab.

2. Underneath **Use Log File**, in the lower right corner of the SYSTEM screen, click on the **New** radio button to open a new trend log.

3. Click on the **Logging** button.

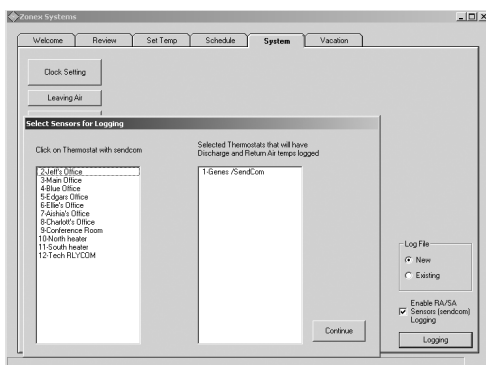4. If you have **SENDCOM** Sensors in your system:

Fig. 32

a. Click on the box labeled **Enable RA/SA Sensors (SENDCOM) Logging**. This will open another box, which lists all thermostats in your system *(see Fig. 32)*.

b. Click on thermostats with **SENDCOM** Sensors to move them to the right column for inclusion in the trending data.

5. The program must be named and then saved onto your C drive *(see Fig. 33)*. For example, we saved a file named **Log Zones** in **C:\Program Files\ Zonex Systems.**
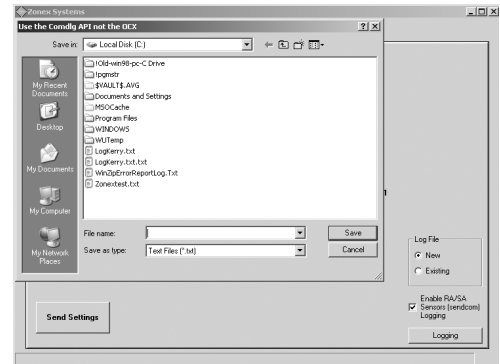

Fig. 33

6. After the logging commences, you may minimize the Zonex program in order to use other computer functions; but **do not turn off the computer or trending program during data collection.** This will cause the logging function to cease. Typically, 2-3 days of logging information polled at 20-minute intervals provides you with sufficient data to establish a trend.

Displaying Trending Data

Trending data is displayed in a separate Zonex program called **Zonex Trends** *(see Fig. 34)*. This program was initially loaded with the Zonex Software. A **Zonex Trends** icon should reside on your Desktop.
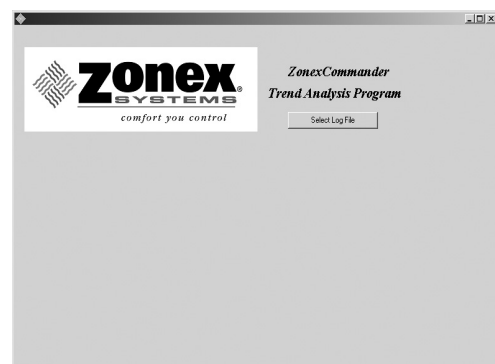

Fig. 34

1. Click on the **Zonex Trends** icon.

2. Click on the **Select Log** file, and retrieve the saved data file. (Using our example above, we would select C:\Program Files\Zonex Systems; then click on Log Zones).

3. When the file is retrieved, use the **drop down box** to select your installation name, thermostat number, and date and time range; then click the **Continue** button *(see Fig. 35)*. Multiple buildings can be accessed via the trending program, and files can be saved under various names.
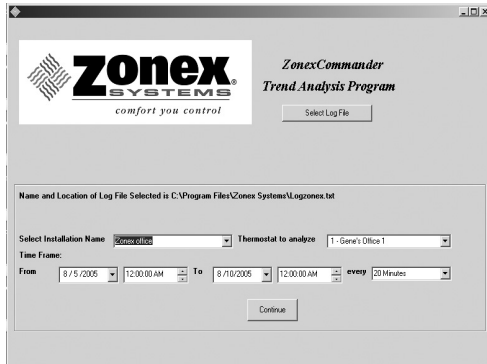

Fig. 35

4. The data logging program logs data on every thermostat in your system every 20 minutes. Use the **pull down box** to select the thermostat you want to analyze.

5. A calendar resides in the trending software package *(see Fig. 36)*. Enter the From/To date and time range you want to review.
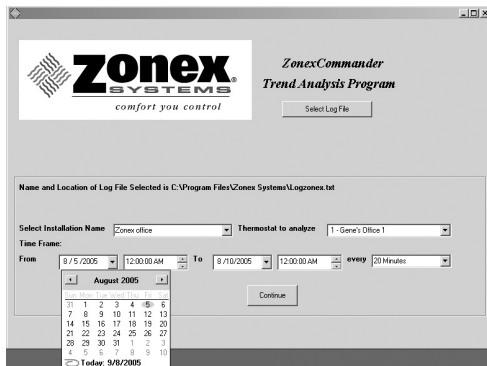

Fig. 36

6. You also have the option of viewing the saved data every 20 minutes or hourly; select one option.

7. Click on the **Continue** button. The trending program will provide you with a Trend Analysis Chart reflecting the temperatures of the desired thermostat vs. the heating and cooling setpoints during the trending period.

8. The chart displays temperatures from 40-100º in 2º increments on the Y axis, and dates and times are displayed on the X axis *(see Fig. 37)*.
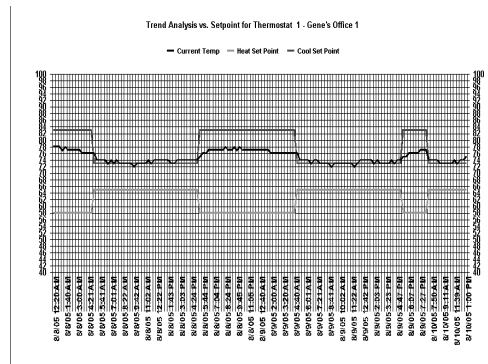

Fig. 37

9. Different presentations may be prepared by selecting options listed in the **Chart Type** drop down box. The initial chart is displayed as a 2d line.

10. A correlation exists between the number of data points and the rows of data displayed. Reducing the number of rows allows you to zoom in on the data.

11. To print the Trending Chart, click on the **Print** button; or save it in your computer as a bitmap (.bmp), which can be e-mailed easily.

12. To generate additional data for other thermostats in the system, click on the **X** button located at the top of the page to return to Page 1 of the Trending program. Then select another thermostat you wish to analyze by using the **drop down** arrow, and the data will be retrieved quickly.

13. After the data is collected, if you would like to trend Return and Supply air from each unit:

    a. If you are using **SENDCOM** sensors in your system, click on the **Discharge/Return Air Temps** button on the graphing page associated with that thermostat.

    b. If you are using a *ModCom* System, the system's RA/SA will be shown as the last entry in the pull down thermostat box. To display, click on the **Discharge/Return Air Temps** button on the graphing page. If you are using **SENDCOM** sensors with stand-alone equipment, that information will follow its thermostat number.

14. Temperature points on the trend lines can be highlighted by double clicking on any of the lines (additional data points will appear). By clicking inside each small box, the temperature at that data point will be displayed at the bottom of the graph with its value at that point. Data points will be displayed for any **SENDCOM** assigned to that specific thermostat number.

ZonexCommander Will Not Connect

Direct Connect
1. **System will not connect; error message, "*Error on operation. Please try again.*"**
   A. Verify **ZonexCommander** Command Center is energized.
   B. Verify that the USB cable is installed between the **ZonexCommander** Controller and the computer.
   C. Verify the correct COM port is assigned to the computer
   D. Close all running programs except the **Zonex-Commander**. Uninstall USB Driver; reinstall following USB Installation procedures on Page 39 of Installation and Applications Manual.
2. **System will not connect; error message, "*Invalid port number. Please try again.*"**
   A. Verify the correct COM port is assigned on the computer.
   B. Change COM port assignment in Computer Device Manager to port 1-4.

Network Connection
1. **System won't connect on the network, "*System Timed Out.*"**
   A. Verify the network cable is installed to the Network ISERVER Device.
   B. Check cable from the ISERVER to the **Zonex-Commander** Controller.
   C. Verify the ISERVER Network device is powered and energized.
   D. Check the IP Address being used to connect.
   E. Check the configuration of the ISERVER and verify the baud rate of 4800.

Communicating Devices Not Responding

ModStat, DIGICOM and DIGIHP
1. When trying to read the thermostats, the REVIEW screen shows "0" for temperature.
   A. Verify device is powered up.
   B. Verify device has the correct address.
   C. Verify communication wire is in correct polarity on terminals RX & TX.
   D. Verify communication wire is properly connected from **ModStat/DIGICOM/DIGIHP** thermostats to Command Center with no disconnected or broken connections. Wire nuts are not to be used.
   E. Check polarity of R & C to the thermostats (Common Ground Phasing).

SENDCOM
1. **SENDCOM** reporting "0" on **Read Sensors** window.
   A. Verify device is powered up.
   B. Verify device has the correct address. For corresponding thermostat address, add 70.
   C. Verify communication wire is in correct polarity on terminals RX & TX.
   D. Verify communication wire is properly connected from the **SENDCOM(s)** to the communication link with no disconnected or broken connections. Wire nuts are not to be used.
   E. Verify C/F jumper position.
   F. Verify the R & C polarity (Common Ground Phasing).

RLYCOM
1. **RLYCOM** indicates all black zeroes ("0") on REVIEW screen and does not switch from computer schedule.
   A. Verify device is powered up.
   B. Verify device has the correct address (01 to 20).
   C. Verify communication wire is in correct polarity on terminals RX & TX.
   D. Verify communication wire is properly connected from the **RLYCOM(s)** to the communication link, with no disconnected or broken connections. Wire nuts are not to be used.
   E. Check polarity of R & C (Common Ground Phasing).

Programming and System Setup Problems

1. Thermostat names disappear after entering.
   A. When entering thermostat names or ID, do not exceed 20 characters, including spaces.
   B. After entering each name or ID, click on **Send Settings** button.
2. Cannot manually change address or set points on the thermostats.
   A. Thermostat is electronically locked.
   B. Thermostat can only be unlocked from the computer on the SYSTEM screen.
3. Thermostat display is blank.
   A. Verify thermostat 24 volt power, verify 24-28vac measured from "R" to "C" on circuit board.
4. System goes into Unoccupied during the day.
   A. Go to the SYSTEM screen and verify that the Day, Date and Time are correct.
   B. Verify Occupied and Unoccupied times are correct from the SCHEDULE screen.
   C. Verify Vacation schedule entries.

OPERATING SCHEDULE

For additional questions on programming and technical support, please call Zonex Systems at (800) 228-2966, M-F 6:30 AM-5:00 PM PST.

DAY	ADR	NAME	DAY OCC		DAY UNOCC		NIGHT OCC		NIGHT UNOCC	
			H	C	H	C	H	C	H	C
MON										
TUES										
WED										
THUR										
FRI										
SAT										
SUN										
MON										
TUES										
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