MultiFlex RTU

Installation and Operation User Manual

COPELAND

READ ALL INSTRUCTIONS CAREFULLY

If the equipment is not used in the manner specified by the manufacturer, the protection provided by the equipment may be impaired.

SAVE THIS INSTRUCTION MANUAL

This instruction manual contains important operating instructions for the MultiFlex RTU rooftop control board.

1   Overview of the MultiFlex RTU

Figure 1-1 - MultiFlex RTU

LEGEND			
1	INPUT POWER (24VAC)	9	RS485 I/O TERMINATION JUMPERS
2	RS485 I/O NETWORK	10	HAND-HELD TERMINAL JACK
3	RTU INPUTS 1-8	11	RELAY OUTPUT CONNECTORS
4	RTU INPUTS 9-16 (NOT ACTIVE FOR RTU)	12	RELAY OUTPUT FUSES (2A rated, 250V slow-blow)
5	NETWORK ID DIP SWITCHES (S3, S4)	13	RELAY STATUS LEDs
6	INPUT TYPE DIP SWITCHES (S1,S2)	14	OUTPUT FAIL-SAFE SWITCHES
7	BOARD STATUS LEDs (Code A, Code B, General Status)	15	ANALOG OUTPUTS (#1and #2 active for RTU, #3 and #4 inactive)
8	DC POWER OUTPUTS (3 at +5VDC, 1 at +12VCDC)	16	NETWORK STATUS LEDs

The MultiFlex Rooftop Unit Board (RTU) (*P/N 810-3062*) is a "smart" combination input/output board designed to control package rooftop HVAC units. The MultiFlex RTU is capable of controlling heat and cool stages, fans, humidification and dehumidification devices, economizers using on-board I/O and control algorithms, as well as monitor and interact with other building control systems and peripherals (such as smoke alarms and CO_2 sensors).

1.1   Differences Between the MultiFlex RTU and ARTC

The MultiFlex RTU is a hardware replacement for Copeland's ARTC rooftop unit control boards, which are now discontinued. The RTU firmware is in every way identical to the ARTCs, and is compatible with both E2 BX and the REFLECS BCU controllers. The only difference between the RTU and ARTC is the RTU uses the MultiFlex hardware platform, which is smaller and more robust.

1.2   The RTU's I/O Points

The compact size of the RTU allows technicians to easily field-mount the RTU in a rooftop unit or enclosure close to it, allowing for easy local connection of sensors and transducers. The board has eight analog inputs, pre-configured for quick connection to space temperature sensors, supply and return air temperature sensors, and fan and compressor proofs. Its eight relay outputs, rated 2.0 amps max, are used for activating and deactivating fans, heat and cool stages, economizers, and other systems or devices.

1.3   Independent System Control

The RTU can control a rooftop unit independently without the need of a central controller (such as Copeland E2 BX Refrigeration Controller). However, the RTU is designed to interface with an E2 BX or BCU to allow it to work with other RTUs together to control large zones. Networking the RTU to a central controller also allows you to view status on E2 and UltraSite32 status screens, report alarms, and control dehumidification.

The RTU's configuration can be programmed either with a Hand-Held Terminal (HHT) or through the E2 front panel.

2   Mounting and Powering

The MultiFlex boards are usually mounted by the refrigeration equipment manufacturer. Therefore, the installer need only make the necessary connections between the boards and the site controller(s).

In some instances, an installer may be required to mount an I/O board. There are no restrictions on the location of these boards; however, for ease of network configuration, it is recommended that the boards be located adjacent to the E2. I/O boards may be mounted without an enclosure, but they should be mounted in a location that is not easily accessible to avoid tampering or damage.

2.1   Snap-Track Installation

MultiFlex boards not supplied in a custom panel or other enclosure are supplied with a snap-track for easy installation. The insulation sheet and I/O board must be removed from the track before the track is mounted. The snap-track is mounted using the 0.1875" mounting slots. **Figure 2-1** shows this installation procedure.
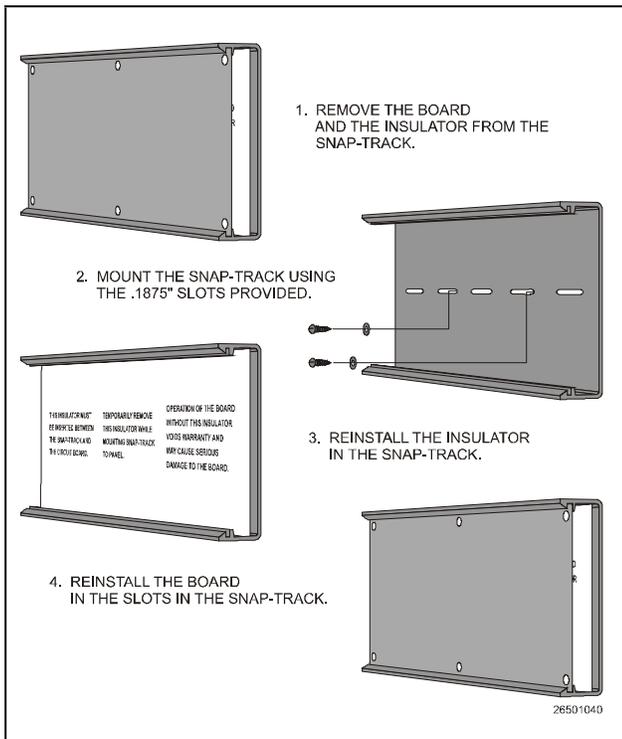
Figure 2-1 - MultiFlex Snap-Track Mounting

Figure 2-2 provides mounting dimensions for the MultiFlex board.
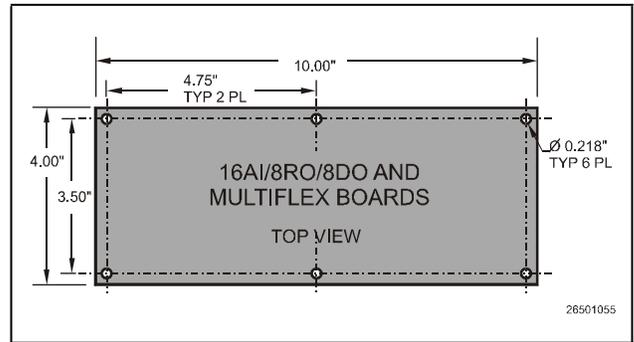
Figure 2-2 - MultiFlex Board Dimensions

2.2   The Plug-In Output Board
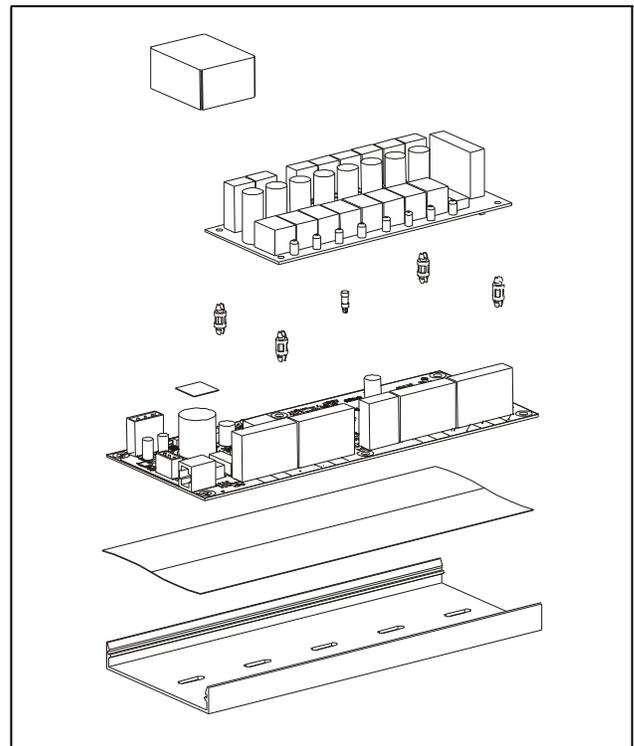
Figure 2-3 - Exploded View — MultiFlex RTU

The MultiFlex RTU has an output sub-board that plugs to the top of the base board. Typically, these boards are shipped with the output board pre-installed on the board using stand-offs, so no additional hardware setup should be necessary.

The additional board makes the MultiFlex RTU boards considerably taller than the MultiFlex 16 and other Copeland I/O boards. If you will be mounting these boards in an enclosure, the board will need at least 2.5" of clearance between the base board and the panel door.

2.3   Powering the MultiFlex RTU Board

⚠ **WARNING**	All models of MultiFlex require a 24VAC Class 2 input power source. The MultiFlex RTU requires the power source to be non-center-tapped.

Copeland supplies a wide variety of 24VAC transformers with varying sizes and either with or without center taps.
Table 2-1 shows the transformer sizes and whether they are center-tapped or non-center-tapped.

Table 2-1 - Transformers Compatible with MultiFlex

Xformer P/N	VA Rating	Primary Voltage	Center Tap?
640-0041	50 VA	110 VAC	No
640-0042	50 VA	220 VAC	No
640-0056	56 VA	Multi-tap (120/208/240 VAC)	Yes
640-0050	75 VA	110 VAC	No
640-0045	75 VA	220 VAC	No
640-0080	80 VA	Multi-tap (120/208/240 VAC)	Yes

2.3.1   Choosing Transformer Sizes

In most site installations, a single transformer will power multiple devices. Choose a transformer with a VA rating large enough to power all devices that will be attached to it. **Table 2-2** gives the VA ratings of the MultiFlex RTU in conjunction with other MultiFlex boards. Refer to your site controller's manual for VA ratings of the other I/O boards that may be powered by one of these transformers.

Table 2-2 - Device Power Requirements

Unit	VA	VAC	Center tapped?
MultiFlex 16	6	24	Yes
MultiFlex 88, 88AO, 168, 168AO, and 168DO	15	24	NO
MultiFlex RTU and RTU	15	24	NO

2.3.2 MultiFlex RTU Power Wiring

The MultiFlex RTU boards do not use a center tap. Instead, the 0V terminal of the board should be connected to a separate Earth ground.

Important! The rules that must be followed when connecting a MultiFlex RTU board to a transformer are different depending on whether you have a "new style" MultiFlex board with an isolated power supply (all MultiFlex boards shipped after November 1, 2002) or an "old style" MultiFlex board (all MultiFlex boards shipped before November 1, 2002)

A new-style MultiFlex Combination I/O board has a green power LED located next to the 24VAC connection terminal in the upper right corner of the circuit board (see **Figure 2**-**4** for reference).
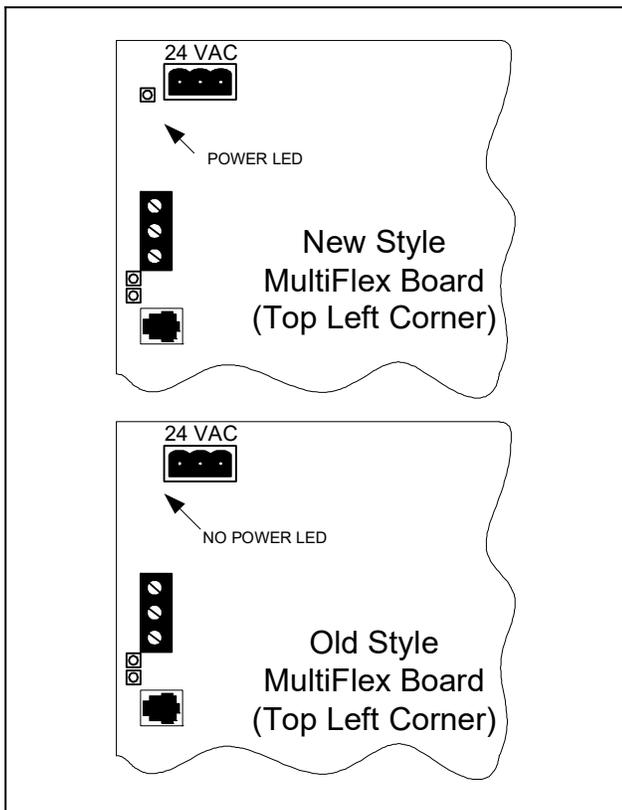
Figure 2-4 - New-Style vs. Old-Style MultiFlex Board

If there is a power LED next to the connector, your MultiFlex is a **new**-**style MultiFlex** -- refer to **Section 2.3.2.1, New**-**Style MultiFlex RTU Boards** (**with Isolated Power Supply**) for power wiring instructions.

If there is no power LED next to the connector, your MultiFlex is an **old**-**style MultiFlex** -- refer to **Section 2.3.2.2, Old**-**Style MultiFlex RTU Boards** (**No Isolated Power Supply**) for power wiring instructions.

2.3.2.1 New-Style MultiFlex RTU Boards (with Isolated Power Supply)

The new-style MultiFlex board can be connected to any of the center-tapped transformers mentioned in **Table 2**-**2**, provided the 0V terminal of the board is connected to an Earth ground.

A center-tapped transformer may power both center-tapped and non-center-tapped boards at the same time, as long as **none of the non-center-tapped MultiFlex boards are old-style MultiFlex boards.** If an old-style MultiFlex shares the same center-tapped transformer as a device that uses the center tap, boards on the network will be damaged. **Figure 2**-**6** shows how to wire a non-center tapped device to a center-tapped transformer.
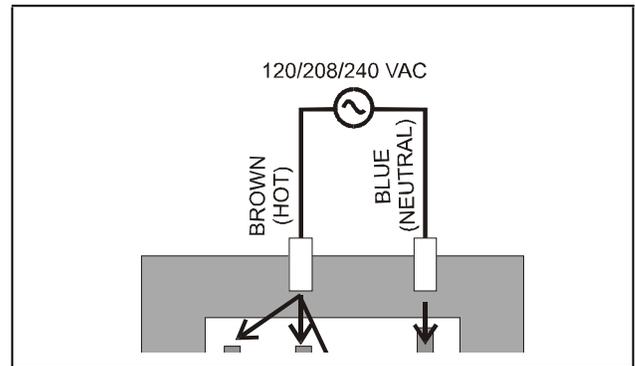
Figure 2-5 - Wiring Non-Center Tapped MultiFlex Boards to Transformers With a Center Tap

In addition, the MultiFlex combination boards can be powered by one of the 50VA or 75VA non-center-tapped transformers listed in **Table 2**-**1**. **Figure 2**-**6** shows how to wire the transformers to the MultiFlex boards.

You may also tie one side of the secondary (but not BOTH sides) or the center tap to an earth ground, provided none of the boards powered by the same transformer are old-style MultiFlex boards (see **Section 2.3.2.2, Old-Style MultiFlex RTU Boards** (**No Isolated Power Supply**)).
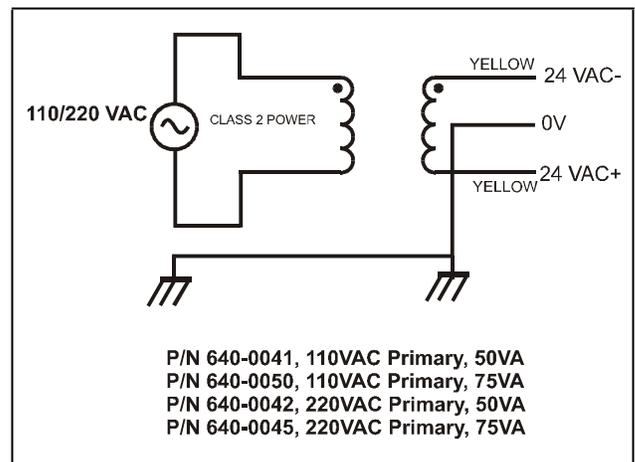
Figure 2-6 - Non-Center-Tapped Transformer Wiring

2.3.2.2 Old-Style MultiFlex RTU Boards (No Isolated Power Supply)

Like the new-style MultiFlex board, the old-style MultiFlex Combination I/O board can be connected to any of the center-tapped transformers mentioned in **Table 2-2**, provided you follow the following three rules:

Rule 1: Ground the 0V terminal on the old-style MultiFlex board to an Earth ground.

Do not connect the center tap of the transformer to the 0V terminal.

Rule 2: Do not power an old-style MultiFlex non-center-tapped board with a transformer that is also powering a center-tapped device.

This means you cannot connect an old-style MultiFlex non-center tapped board to a transformer that is powering a MultiFlex 16, 16AI, 8RO, 4AO, 8DO, a Gateway board, or any previous generation Copeland board that uses center-tapped power. Doing so will destroy the MultiFlex board.

Rule 3: The secondary of the transformer must not be grounded on any side.

Verify that neither side of the transformer secondary is connected to earth ground before powering the old-style MultiFlex board. A grounded secondary will damage the MultiFlex board.

In addition, the old-style MultiFlex combination boards can be powered by one of the 50VA or 75VA non-center-tapped transformers listed in **Table 2-1**. **Figure 2-7** shows how to wire the transformers to the MultiFlex boards.

2.3.3 Wire Types and Maximum Distances

For powering I/O boards, use only the listed wire types from **Table 2-3**. Three-conductor non-shielded cables are the recommended wire for connecting between the center-tapped transformer and the I/O boards. Shielded cable should not be used for power wiring. The center tap should be wired with the third conductor to earth ground at the transformer.

Table 2-3 - Power Wiring Types

Power Wiring Types	
14 AWG	Belden 9495
18 AWG	Belden 9493

The wire length from the transformer and the number of boards connected to the same wire determines the type wire gauge used. In most cases, the distance between the I/O boards and the transformer that supplies power to them is not enough to be concerned with. But it is very important not exceed this maximum wire length or the boards will malfunction.

Use these formulas to determine if the wire gauge you are using fits within specification:

Table 2-4 - Power Wire Lengths

14 AWG:
Feet = 1920/VA

18 AWG:
Feet = 739/VA
(VA is the total VA rating of the I/O boards)
For example, if you had an 80 VA load:
14 AWG: 24 ft.
18 AWG: 9 ft. (rounded down)

Sensors requiring 24VAC can be powered from the same transformer powering the input board as long as the resulting total load of both the input board(s) and the sensor(s) connected to the transformer does not exceed the transformer's VA rating.

2.4   The MultiFlex RTU Battery and Battery Enable Jumper

The RTU uses battery-backed memory to store setpoints and the current time and date. The battery for the MultiFlex RTU is located either underneath the output plug-in board (for old-style MultiFlex boards) or on the rear side of the input board layer facing the snap-track (**Figure 2**-**7**).
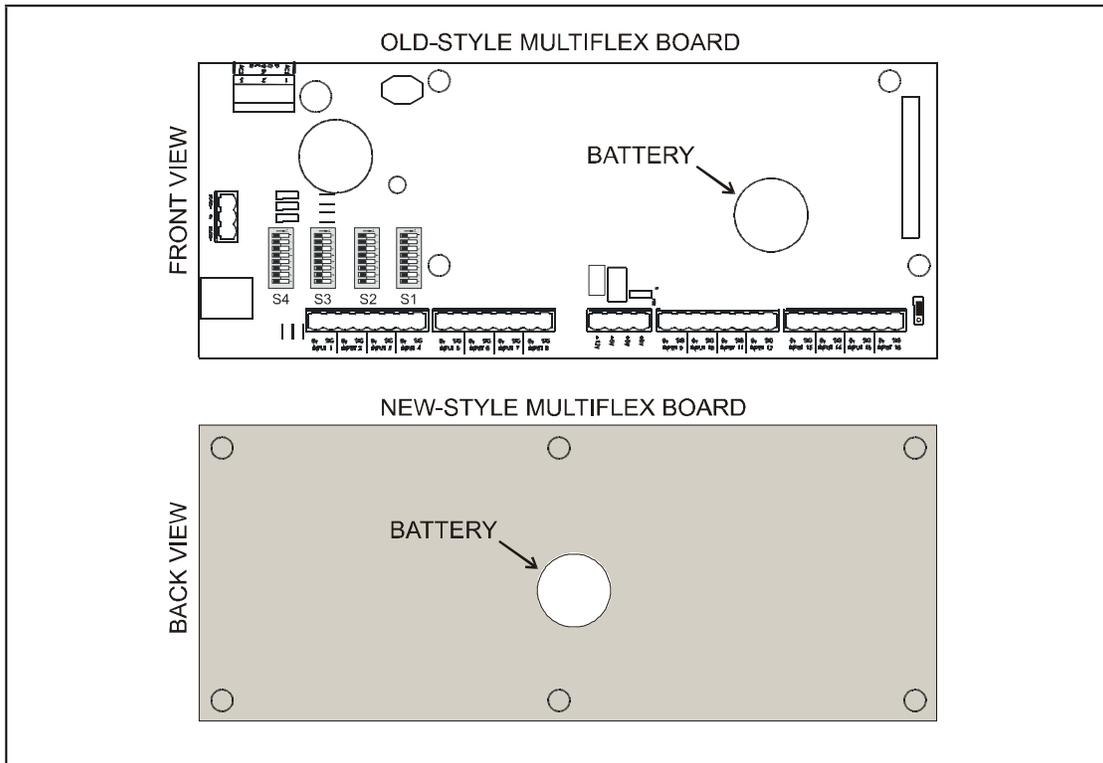
Figure 2-7 - MultiFlex Battery Location

Battery-backed memory is enabled by the ENABLE BATTERY jumper (JP5) located at the bottom right corner of the input board layer (**Figure 2**-**8**). This jumper is shipped from Copeland in the DISABLE position. The jumper should be set to the ENABLE position (UP) before installation. To preserve battery life, when storing the MultiFlex RTU, the jumper should be set to the DISABLE position.
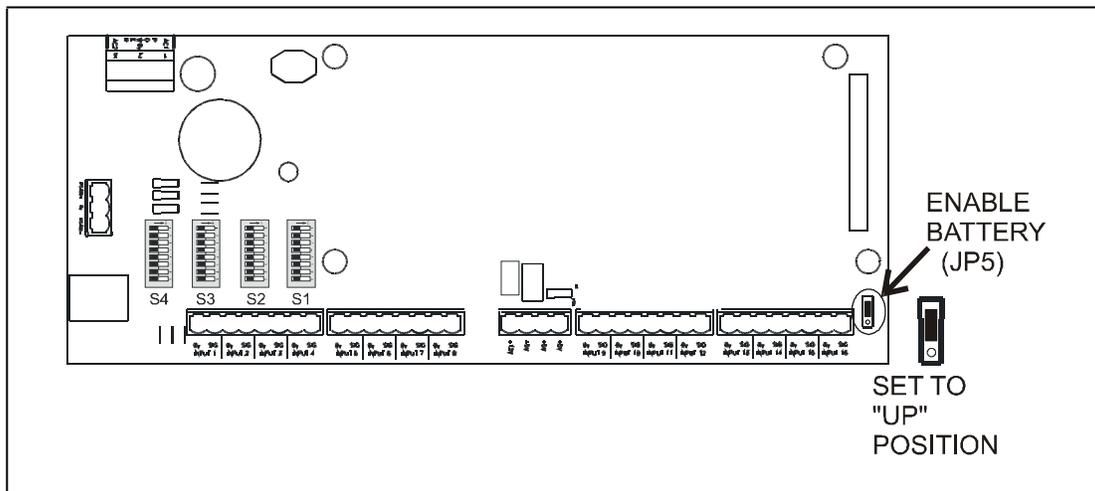
Figure 2-8 - Enable Battery Jumper on MultiFlex Board

3 The I/O Network

Although the MultiFlex RTU can operate as a stand-alone controller, it relies on an E2 unit for advanced features such as remote dial-in/dial-out, logging, and alarm control. All MultiFlex boards and controllers use an RS485 network connection to communicate with E2 site controllers. Technicians who are familiar with Copeland's previous generation 16AI, 8IO, and ARTC boards will find the network setup procedure for the MultiFlex RTU boards to be very much the same.

3.1 Wiring Types

Copeland specs Belden #8641 shielded twisted pair cables for use as I/O network wiring (or Belden #82641 and Belden #88641 for plenum installations).

If the recommended cable is not available in your area, be sure the wiring meets or exceeds the following specs:

Table 3-1 - RS485 I/O Network Wiring Specifications

Shielded?	Yes
Conductor Type	Twisted Pair
Gauge	18 - 24 AWG
Capacitance between signal wires	31 pF/ft or less
Capacitance between signal and shield	59 pF/ft or less
Nominal Impedance	$120\Omega\pm50\Omega$

3.1.1 Daisy Chains

The RS485 Input/Output (I/O) network connects all input and output communication boards together in a single open communications loop. This loop, or "daisy chain," connects the E2 to multiple input and output communication boards, and terminates at the last input or output board on the network. A diagram of this network arrangement is shown in **Figure 3-1**.
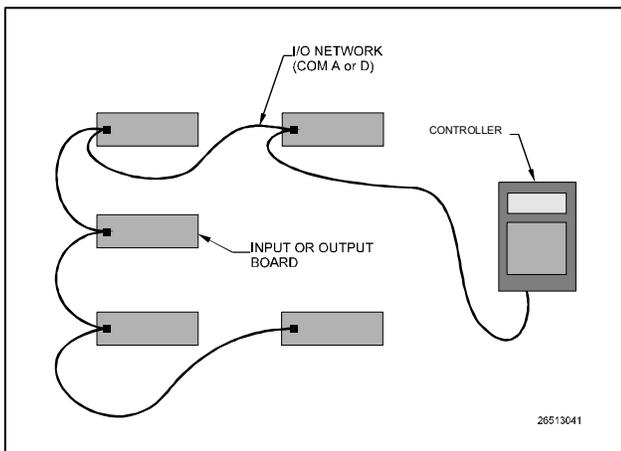
Figure 3-1 - I/O Network Configurations

3.1.2 Network ID Numbers

Each device on an RS485 segment has a network dip switch that must be used to assign the board a unique **network ID number**.

The network ID number makes a board unique from other boards on the network of the same type. This allows the site controller to find it and communicate with it easily.

Boards of the same type should be numbered in sequence, starting with one and continuing with two, three, and so forth.

3.1.2.1 Numbering the MultiFlex RTU

The MultiFlex RTU is a unique board type on the RS485 Network by the Copeland controllers. Each RTU that will be associated with an E2 must have a unique number from 1 to 31, which is configured by setting the first five switches on dip switch bank S3.
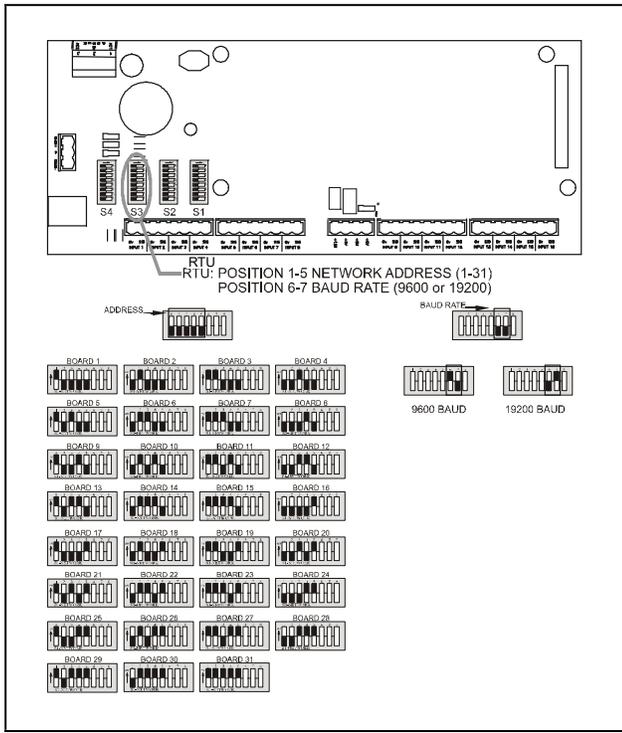
Figure 3-2 - RTU Baud Rate Switches

Numbering RTUs On The Same Network as ARTCs

Both the E2 BX and the BCU treat ARTCs and RTUs as "ARTCs" for purposes of networking. An RTU and an ARTC should not be assigned the same number. In other words, if a network has two ARTCs and two RTUs, do not number the ARTCs #1 and #2 and the RTUs #1 and #2.

3.1.3   Setting the Baud Rate

All I/O boards have dip switches that determine the baud rate at which they communicate. Currently, the baud rate dip switch in network components may be set at either 9600 or 19200 baud. Either may be used — refer to your site controller's user manual for the baud rate recommendation (currently 9600 baud for both REFLECS and E2 controllers).

On all MultiFlex boards, switches 6 and 7 on S3 are used to set the baud rate. To communicate at 9600 baud, set switch #6 UP and #7 DOWN. For 19200 baud, set switch #6 DOWN and #7 UP. Refer to **Figure 3-2** for a visual look at how the switches must be set.

3.1.4   Setting the Terminating Resistance Jumpers

All MultiFlex boards and other RS485 devices have a set of terminating resistance jumpers (one jumper for each wire lead). These jumpers are labeled JP2, JP3, and JP4 on the MultiFlex board.

The purpose of the jumpers is to indicate the two ends, or termination points, of the segment. On a daisy chain, one device at the beginning and one device on the end must be terminated by placing all three termination jumpers in the OUT (toward the left edge of the board) position. All other devices on the daisy chain must be set to the IN (toward the center of the board) position. **Figure 3-3** shows the proper terminating resistance jumper settings for the E2 and for all I/O boards.
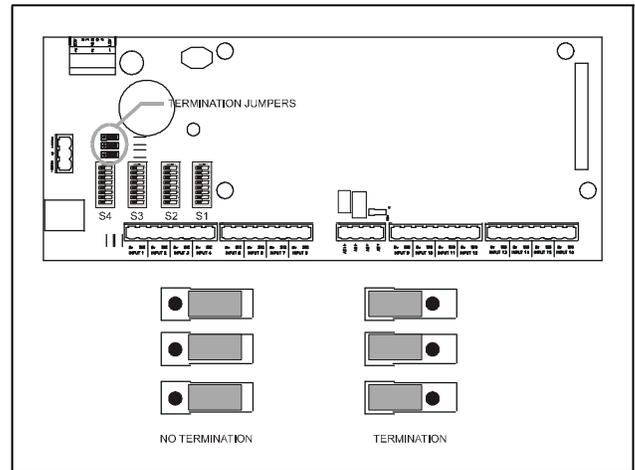
Figure 3-3 - I/O Network Termination Jumper Settings

4 RTU Input and Output Setup

4.1 The Inputs

4.1.1 MultiFlex RTU Fixed Input Locations
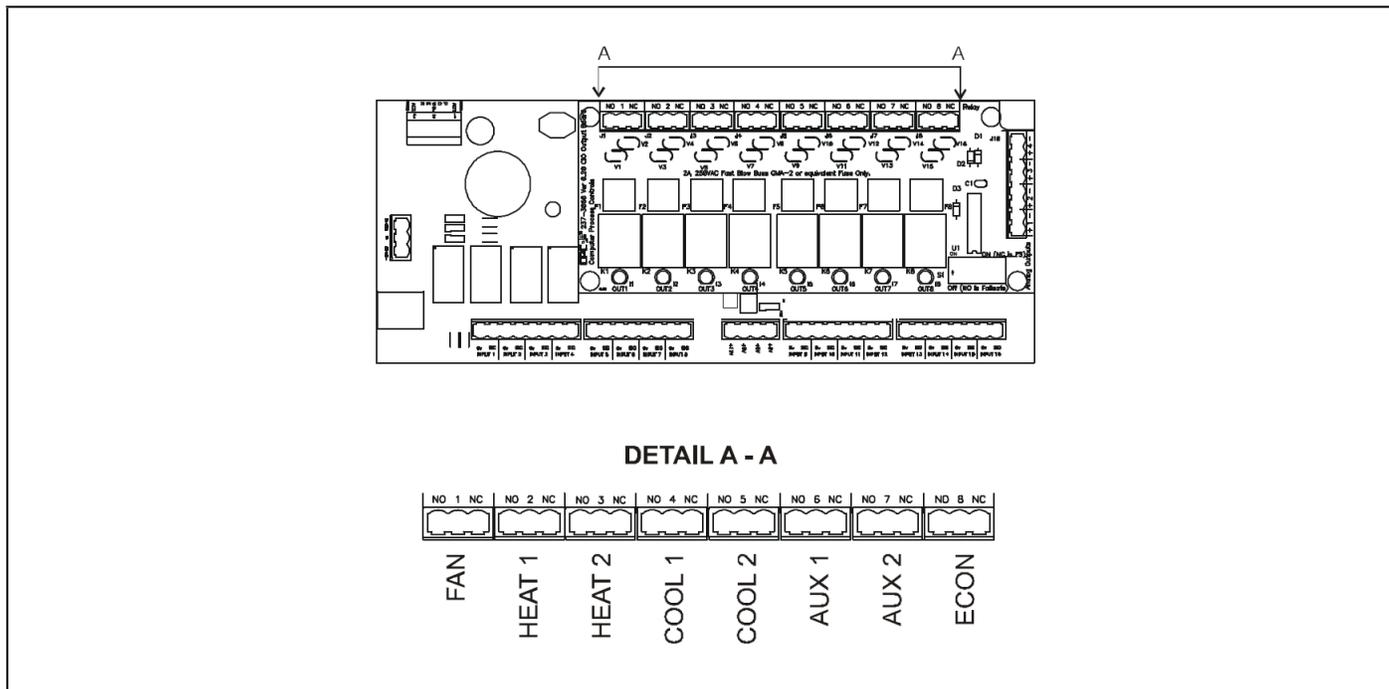
Figure 4-1 - MultiFlex RTU Output Locations

The MultiFlex RTU has pre-defined locations for connection to all sensors that are typically present for a rooftop unit. **Figure 4-1** shows the locations and functions of each input, and **Table 4-1** describes the function of each point. The default locations cannot be changed in the RTU system software, although inputs Auxiliary 1 and Auxiliary 2 (points 7 and 8) may be configured to accept several different types of inputs.

Table 4-1 - RTU Default Input

RTU Input Point Number	Label	Sensor to Connect To This Point
INPUT 1	SPACE TEMP	Indoor air temperature sensor in the floor area
2	SUPPLY AIR	Temperature probe mounted in the supply air flow
3	RETURN AIR	Temperature probe mounted in the return air flow
4	COMP 1 PROOF	Proof checker for compressor on cool stage #1
5	COMP 2 PROOF	Proof checker for compressor on cool stage #2
6	AIR FLOW	Sail switch to verify fan is running
7	AUX 1	Configurable in RTU software (see **Section 4.1.2, Auxiliary Input Types**)
8	AUX 2	Configurable in RTU software (see **Section 4.1.2, Auxiliary Input Types**)

4.1.2   Auxiliary Input Types

Input points #7 and #8 on the RTU board are configurable in the RTU software. **Table 4-2** lists all of the possible input types that can be chosen for these inputs.

Table 4-2 - Analog Input Types

Code #	Auxiliary Input Type	Description
1	MIXED AIR	Temperature sensor measuring the temperature of air from the economizer mixed with the return air.
2	OUTSIDE AIR	Outdoor air temperature sensor.
3	SPACE 2	A second space temperature sensor. This sensor's value will be combined in some way with the value of the SPACE TEMP input to determine the control temperature.
4	COMP #3 PROOF	If an auxiliary output is configured to be COOL STAGE #3, COMP #3 PROOF is the proof checking device for the compressor on stage #3.
5	COMP #4 PROOF	If an auxiliary output is configured to be COOL STAGE #4, COMP #4 PROOF is the proof checking device for the compressor on stage #4.
6	OUTSIDE HUMIDITY (4-20 mA)	An analog outdoor relative humidity sensor with a 4-20 mA output.
7	INDOOR HUMIDITY (4-20 mA)	An analog indoor relative humidity sensor with a 4-20 mA output.
8	OUTSIDE HUMIDITY (0-5V)	An analog outdoor relative humidity sensor with a 0-5V output.
9	INDOOR HUMIDITY (0-5 V)	An analog indoor relative humidity sensor with a 0-5V output.
10	HUMIDISTAT	A digital humidity switch.
11	ENTHALPY SWITCH	A digital enthalpy switch used for economization checking.
12	LIGHT SENSOR	A light level sensor.
13	LIGHT SWITCH	A digital light level switch.
14	FREEZE STAT	A digital temperature sensor mounted near the cool stage evaporator, used to detect coil freezes.
15	SMOKE STAT	A smoke alarm.
16	DIRTY FILTER	A digital device that detects blocked filter conditions.
17	TEMP	General temperature sensor.
18	OVERRIDE SWITCH	An override switch.
19	CO_2 SENSOR	Carbon dioxide sensor.

4.1.3   Wiring Sensors to the MultiFlex RTU

Wiring an input to the input points on a MultiFlex board requires three steps:

1. Connect the sensor's signal wires to the two terminals of an input point.
2. Set the input type dip switch that corresponds to the point being connected.
3. If necessary, connect the sensor to one of the 5V or 12V power terminals.

4.1.3.1 Wiring

An input point on a MultiFlex board consists of two terminals, as shown in **Figure 4-2**. One of these terminals, labeled "**SIG**," reads the signal from the sensor, while the other, labeled "**0v**" is where the sensor's ground and/or cable shield wire is connected.

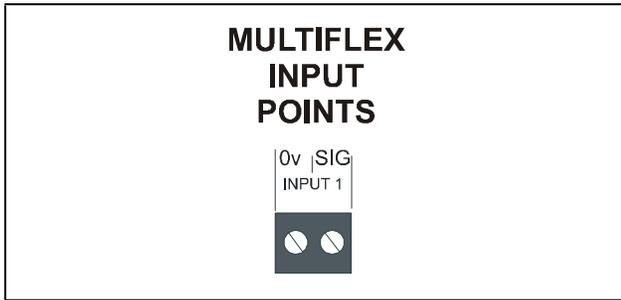*Figure 4-2 - Input Board Points*

4.1.3.2 Sensor Wiring Types

Specific wiring types are required for each type of sensor used with E2 or RMCC.

All Analog Temperature Sensors and Air Flow Sensors

Temperature and air flow sensors are to be wired with shielded, 2 conductor, at least 22 GA wire (Belden # 8761 or equivalent).

All Pressure Transducers, Humidity Sensors, and Refrigeration Transducers

Pressure and refrigeration transducers and humidity sensors are to be wired with shielded, 3 conductor, at least 22 GA wire (Belden #8771 or equivalent).

Dew Point and Light Level Sensors

These sensors are to be wired with shielded, 4 conductor at least 22 GA wire (Belden # 8729 or equivalent).

4.1.3.3 Input Type Dip Switches

Each MultiFlex input point has an input type dip switch that must be set. Input type dip switches are located in the switch banks labeled **S1** and **S2**.

The input type dip switch tells the input board whether or not the sensor connected to the point is a resistive type sensor. Generally, if the sensor or transducer supplies its own voltage signal to the point, the dip switch should be set to the **LEFT (OFF) position**. If the sensor uses variable resistance and requires voltage to be supplied to it from the input point, set the dip switch to the **RIGHT (ON) position**. Dip switches for unused points should be set to the **RIGHT (ON) position**.

The exception to this rule is for Copeland's 5VDC pressure transducers -- though they supply their own voltage signal, the dip switch **MUST** be set to the **RIGHT (ON) position**.
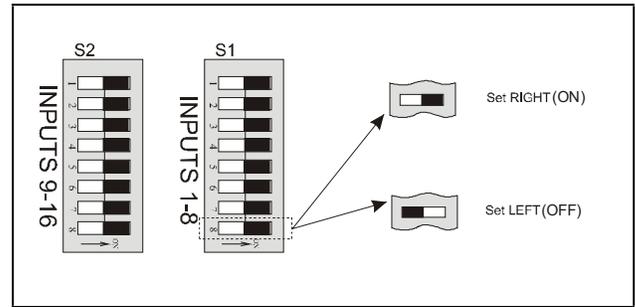
Figure 4-3 - Input Type Dip Switches for 16 Board

4.1.4 Input Connection When Replacing ARTC with RTU

If the RTU you are installing is replacing an existing ARTC, you will not be able to simply unplug the input connectors from the ARTC and plug them into the RTU. Doing so will cause the inputs to be reversed and the polarity to be swapped.

You must either re-wire each input to the proper place on the RTU board, or obtain a Multiflex input adapter cable (P/N 335-2301), as shown in **Figure 4-4**. Plug the connector with the probe wires attached into the female end of the adapter, and plug the male end into the RTU input socket.
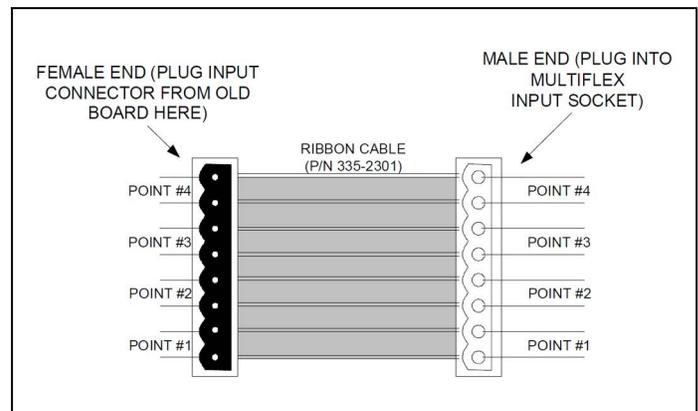
Figure 4-4 - MultiFlex Input Adapter Cable

4.1.5 On-board Power Connection

If power is needed to operate the sensor, four points are provided on the MultiFlex board that supply DC power: one +12VDC point, and three +5VDC points. See **Figure 4-5** for the location of these points.
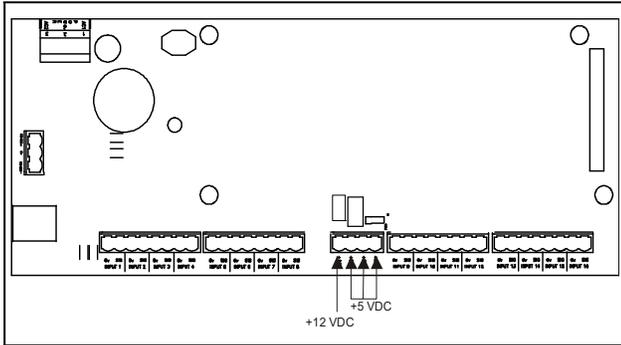
Figure 4-5 - Input Board Power Sources

To connect to one of the DC power sources, simply connect the sensor's power wire to one of the terminals.

4.1.5.1 Current Ratings for On-Board Power Sources

The maximum current that may be drawn from the +12VDC terminal is 100 milliamps. The maximum current that can be drawn from all three +5VDC terminals COMBINED is 50 milliamps.

4.1.5.2 Powering Sensors Requiring 24VAC Off the Power Transformer

Some sensors that requires 24VAC can be powered off the MultiFlex's own 24VAC power connection. To connect to the 24VAC power source, connect the sensor's power wires to terminals AC1 and AC2.

This can only be done with sensors that keep the 24VAC signal isolated from its DC output signal (such as Copeland's Dewpoint Probe). If the output signal is not isolated from the 24VAC input, you must use a separate transformer.

4.2 The Outputs

4.2.1 MultiFlex RTU Fixed Outputs
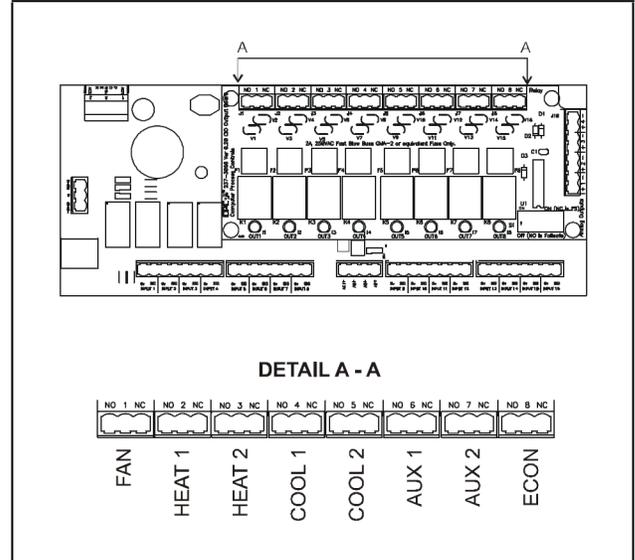
Figure 4-6 - MultiFlex RTU Output Locations

The MultiFlex RTU has pre-defined locations for connection to all outputs that are typically present for a rooftop unit. **Figure 4-6** shows the location of the RTU outputs, and **Table 4-3** describes the location of each point. The default locations cannot be changed in the RTU system software, although outputs Auxiliary 1 and Auxiliary 2 (points 6 and 7) may be configured to control several different types

Table 4-3 - RTU Default Options

RTU Output Point Number	Label	Device to Connect To This Point
1	FAN	The RTU fan.
2	HEAT 1	Heat stage #1.
3	HEAT 2	Heat stage #2.
4	COOL 1	Compressor for Cool stage #1.
5	COOL 2	Compressor for Cool stage #2.
6	AUX1	Configurable in RTU software (see **Section 4.2.2, MultiFlex RTU Auxiliary Output Types**).
7	AUX 2	Configurable in RTU software (see **Section 4.2.2, MultiFlex RTU Auxiliary Output Types**).
8	ECON	Two-position economizer, or contactor for analog economizer.

4.2.2 MultiFlex RTU Auxiliary Output Types

Output points #6 and #7 on the RTU board are configurable in the RTU software. **Table 4-4** lists all of the possible output types that can be chosen for these outputs.

Table 4-4 - Auxiliary Output Types

Auxiliary Output Type	Description
COOL 3	Third stage of cool.
COOL 4	Fourth stage of cool.
HEAT 3	Third stage of heat.
HEAT 4	Fourth stage of heat.
FAN 2	Additional fan or 2nd fan speed.
HEAT PUMP REV VALVE - CLOSED (HEAT)	If a heat pump is being used, this reversing valve output will close when cooling stages are active and open when heating stages are active.
ALARM	This relay will be activated when any RTU alarm is generated, and return to normal when the alarm condition is acknowledged, reset, or cleared from E2 or BCU.
HUMIDITY	An output controlling a humidifier.
HEAT PUMP REV VALVE - CLOSED (COOL)	If a heat pump is being used, this reversing valve output will close when heating stages are active and open when cooling stages are active.
FAIL-SAFE	Output relay will be ON when the RTU is on-line with the E2 or BCU, and OFF when the RTU is off-line.
ECON SHADOW	Operates the same as the ECON output (ON when economization is OK, OFF when economization is not OK).
DEHUM	Output for controlling a dehumidifying device.

4.2.3 Wiring Output to Points

The MultiFlex RTU has Form C relay contacts. **Figure 4-7** shows how to wire the three-terminal Form C contact.

One wire of the two-wire connection should always be connected to the middle terminal. The second wire must either be connected to the N.C. terminal (if you want the path to be closed when the relay is de-energized) or the N.O. terminal (if you want the path to be open during power failure).

The contacts you choose also affect what the board's fail-safe dip switch will need to be set to for proper operation. Refer to **Table 4-5** and **Table 4-6**.
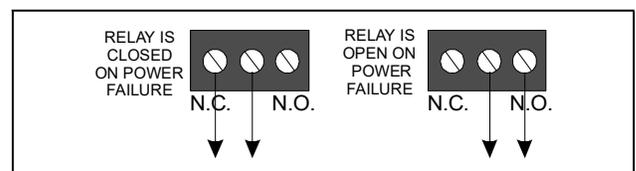
Figure 4-7 - Form C Contact Wiring

4.2.4 Output Fail-Safe Dip Switches

When a controller calls for a MultiFlex relay output to be ON, it sends a command to the MultiFlex to turn the output to the ON state (signified by the output LED being ON). The behavior of the relay when it is ON is determined by the position of the fail-safe switch. The fail-safe switches for the outputs are on a switch bank at the bottom right corner the plug-in output module. Each switch corresponds to an output on the board (switch #1 = output #1, etc.).

Table 4-5 and **Table 4-6** show how the fail-safe switch and Form C contacts should be configured based on how you want the output to perform during both normal operation and during network/power loss.

NOTE	There are not many cases where you would want a relay to be OPEN when called to be ON. For most applications, you will want to set the fail-safe switch to UP so that an ON command from the controller will close the relay.

Table 4-5 - Output Board Fail-Safe and Switch Settings when Contact is Wired Normally Closed (N.C.)

Fail-safe Switch	State of Normally Closed (N.C.) Contacts on MultiFlex Relay Points			
	Light is ON	Light is OFF	Loss of Communication	Loss of Power
Up (ON)	Closed	Open	Closed	Closed
Down (OFF)	Open	Closed	Closed	Closed

Table 4-6 - Output Board Fail-Safe and Switch Settings when Contact is Wired Normally Closed (N.O.)

Fail-safe Switch	State of Normally Open (N.O.) Contacts on MultiFlex Relay Points			
	Light is ON	Light is OFF	Loss of Communication	Loss of Power
Up (ON)	Open	Closed	Open	Open
Down (OFF)	Closed	Open	Open	Open

4.2.5 Relay Output Ratings and Fuse Protection

Each relay output on the MultiFlex Combination I/O boards is rated for up to 240 VAC with a maximum current of 2A.

Each relay is fused with a 2A fast-blow 5mm x 20mm fuse, Bussman GMA-2 or equivalent.

4.3 Analog Outputs

Figure 4-8 - MultiFlex RTU Analog Output Locations

The MultiFlex RTU analog outputs are 0-+10VDC points used for controlling variable-position economizers, mod heat and cool stages, and variable-speed fans. The maximum output current for each point is 10 milliamps. **Figure 4-8** shows the location of the analog outputs.

4.3.1 Wiring the RTU Analog Output Points

The analog outputs have no hardware-based fail-safe settings (fail-safes are set in the board firmware by setting either fan speed on failure or economizer% on failure). All that is required to connect a device to an analog point is to connect the "+" terminal to the positive wire on the device and the "-" terminal to the negative (or ground) wire of the device.
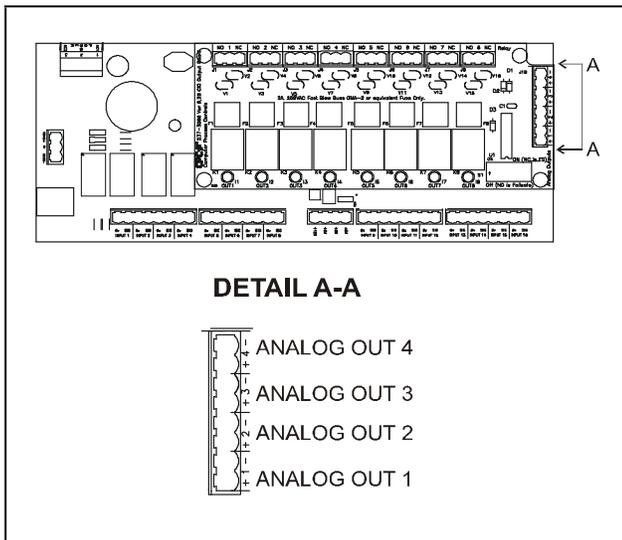
5   *Board Status LEDs*

When a MultiFlex board is powered up, you will be able to determine the operating status of the board by observing its status LEDs. **Figure 5**-**1** shows the location of the MultiFlex's status LEDs.
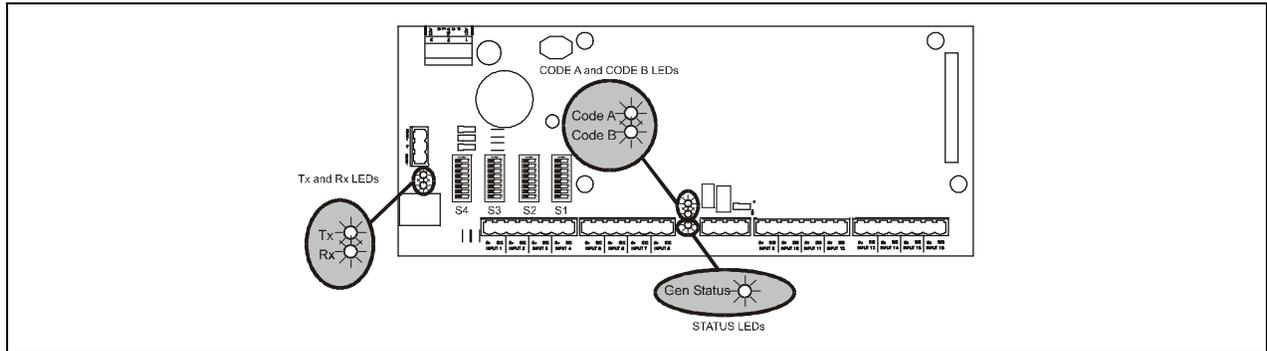
Figure 5-1 - MultiFlex Status LED Locations

5.1   Status LED

The Status LED blinks GREEN once per second to show that the board is powered and operational. If this light is dark, the board has likely lost power.

5.2   Tx and Rx LEDs

The Tx and Rx LEDs indicate when the MultiFlex is sending or receiving messages on the RS485 network.

The Tx LED blinks once every time the MultiFlex sends a response to the E2 or REFLECS. The Rx LED blinks once when the MultiFlex receives a message.

If the MultiFlex is connected to the network and set up to communicate with the controller, you should see these lights blinking regularly. If they do not, there may be a problem with the network.

5.3   The Code A LED

The Code A LED on the MultiFlex RTU indicates activity on the Hand-Held Terminal port. When this LED is not blinking, it means no HHT is plugged into the board. When it is blinking rapidly, it means an HHT is present.

The Code A LED will also glow without blinking for 1/2 second every time a screen update occurs on the HHT.

5.4   The Code B LED

The Code B LED is an indicator of the state of the I/O network. When this LED is flashing once every four seconds, the RTU is communicating properly on the I/O network. When the LED is flashing once every two seconds, the board is not properly communicating on the I/O network.

5.5   Relay Output LEDs

Each relay output point on a MultiFlex has an indicator LED that shows the status of the output. This LED is lit to show the output is ON, and unlit to show the output is OFF.

The definition of ON and OFF in this case is determined by the position of the fail-safe dip switch (see **Table 4**-**5** and **Table 4**-**6**).

6   Software Overview

6.1   Introduction to Zone Control

RTUs are designed to be grouped together in **zones**. Zones are groups of ARTC/RTUs and/or AHU (air handling unit) applications that share the same heating, cooling, and dehumidification setpoints, as well as other control parameters.

The primary purpose of zone control is to maintain a specific temperature and humidity level throughout a wide area using multiple rooftop units.

In general terms, it is best to think of the relationship between an RTU and its parent controller (E2 or BCU) as a master-slave arrangement. Each RTU does most of the work to keep its own environmental conditions within the range specified by its master. The "master" tells each slave what conditions must be met.

Because zone control is already covered in the E2 BX manual (P/N 026-1602) and REFLECS BCU manual (P/N 026-1102), this manual will only cover how the RTU itself performs its control functions. Refer to the controller's user manual for instructions on how to set up zone control

6.2   Temperature Control

In its most basic form, temperature control in an RTU reads the space temperature input value, compares it to the active heating or cooling setpoint, and activates or deactivates heating or cooling stages in an effort to satisfy the setpoint.

The majority of user setup that must be done in Temperature Control involves defining different setpoints in the RTU's parent zone for use in occupied, unoccupied, summer, and winter modes, and setting up the operating characteristics of the heating and cooling stages.

6.2.1   Setpoints

There are two active setpoints in an RTU: a cooling setpoint and a heating setpoint (both of which are supplied by the zone from the E2 or BCU). When the input rises above the cooling setpoint, cooling mode begins, and when the input falls below the heating setpoint, heating mode begins.

RTUs activate stages in sequence, starting with stage #1 and continuing on to the last stage, until the space temperature meets the setpoint. When the setpoint is satisfied, stages are deactivated in reverse order, beginning with the highest numbered active stage, and ending with stage 1.

6.2.1.1 Setpoint Deadbands

Both the currently active heating setpoint and cooling setpoint have deadbands. A deadband is a range of values around the setpoint where the space temperature is considered to be "OK." If the temperature is within this deadband, the RTU will not activate new stages or deactivate any stages that are currently ON.

6.2.1.2 Stage ON and OFF Delays

Heating and cooling stages may be also be set up with on and off delays as well as minimum ON and OFF times.

6.2.1.3 Summer/Winter and Occupied/Unoccupied Setpoints

The RTU may be programmed with different setpoints that are used during occupied and unoccupied building times, and summer and winter seasons.

The RTU has two ways of determining whether to use occupied or unoccupied setpoints. If the RTU is associated with a zone in an E2 or BCU, it will use whatever occupied state the zone says to operate in (i.e., the zone controls the schedule). If the RTU is not connected to a zone, or if the RTU loses communications with its parent controller, the RTU uses a fallback schedule that is saved in its own memory.

6.3 Fan Control

The RTU boards support control of one single-speed fan stage, a low- and a high-speed fan stage (i.e., two-speed fan control), or a variable-speed fan. The fans may be controlled in one of three ways:

- **Continuous** - The fan is always on, even when the AHU Zone application is not in heating, cooling, or dehumidification mode.
- **Auto** - The fan is only on when the AHU Zone application is in heating, cooling, or dehumidification mode.
- **Summer ON, Winter Auto** - This mode allows the fan to operate in Continuous mode during the summer months and in Auto mode during the winter months.

If desired, activation and deactivation delays

may be set up for the AHU Zone application for both heating and cooling mode.

6.4 Dehumidification and Humidification Control

Unlike Temperature Control, Dehumidification Control and Humidification Control is handled entirely by zones. A zone typically has a single humidity sensor, humidistat, or dewpoint probe input connected to the central building controller that measures relative humidity or dewpoint for the entire zone. If the zone determines that dehumidification or humidification is necessary, it notifies all RTUs in the zone to begin dehumidification.

6.4.1 Dehumidification Control

RTUs dehumidify by using cool stages or auxiliary outputs that are configured on the RTU as dehumidification devices. When the command to begin dehumidification is received, the RTUs begin by cycling on the dehumidification output (if available), and then a cool stage. After a programmed delay, if dehumidification is still necessary, a new stage of cool will cycle ON. The RTUs will continue cycling cool stages ON in this manner until 100% of its dehumidifying capacity is active (or until the setpoint is met). Once the setpoint is met, the dehumidifier will switch OFF and stages will cycle OFF.

You may choose the number of cool stages that will be made available for dehumidification.

6.4.2 Humidification Control

RTUs humidify by activating and deactivating a humidifier output. Humidification, like dehumidification, is controlled by the RTU's zone. If a zone is not available, the RTU may control humidity in stand-alone mode if a humidity input is available on one of its auxiliary inputs.

When operating in stand-alone mode, the RTU uses cut-in and cut-out setpoints to control the humidifier.

6.5 Economization

Economizer dampers on rooftop HVAC units are used to bring outside air into the building for use in cooling.

Before economization may occur, the zone must determine when the outside air conditions are favorable for economization. If economization is OK, it sends an ENABLE signal to its AHU Zone applications. For as long as the ENABLE signal lasts, AHU Zone applications treat the economization dampers as if they are preliminary cool stages; if cooling is needed, the dampers will open and economization will begin. If more cooling is needed, the cooling stages would then cycle on as normal.

6.5.1 Analog Economizers

Certain HVAC rooftop units have variable-position economizers which are controlled by analog output points. When

economization is enabled, the RTU varies the position of the analog economizers to maintain a constant mixed air temperature.

6.6 Curtailment

Some power companies offer curtailment programs that allow participating stores to disable user-defined loads during peak power times in return for discounts on utility rates.

If you are participating in a curtailment program, the power company will supply you with a digital curtailment device that closes to signal the beginning of curtailment. This input must be connected to the CURTAILMENT IN input in E2 Global Data, or to an Input Sensor Module set up as a "Curtail" input type for BCU.

To set up curtailment in the RTU, you must designate which specific heating and cooling stages will be subject to curtailment. When the power company sends a curtail command, all stages that are set up to be curtailed will be shut off and locked out.

Fan control is not directly affected by a call for curtailment. The rooftop unit fan will still run at a speed based on the number of active, non- curtailed stages (or, if using modulated outputs, the curtailed modulating percentage). If this causes the fan to slow down or shut off during curtailment, there will be energy savings from the fans.

6.7   Reversing Valve Control

NOTE	If reversing valves are used, the AHU Zone application will not be allowed to bring on stages of heat to compensate for cool stage activation during dehumidification.

The RTU supports the control of a heat reversing valve and a cool reversing valve. These valves may be wired to any auxiliary output on an RTU.

The output is controlled as follows:

1. When no heat or cool stages are active, the coil is de-energized (N.C. contacts closed, N.O. contacts open).

2. When a cool stage comes on, the coil will be energized (N.C. contacts open, N.O. contacts closed).

3. When a heat stage comes on, the coil will be de-energized (N.C. contacts closed, N.O. contacts open).

Therefore, in order for the output to control the valve properly, heat reversing valves must be wired to the Normally Closed (N.C.) contacts, and cool reversing valves must be wired to the Normally Open (N.O.) contacts. This causes the heat valves to activate when heat stages are ON, and cool stages to activate when cool stages are ON.

6.8   Stand-Alone Operation

If for some reason an RTU board loses communications with its parent E2 unit for longer than five minutes, the board will go into Stand-Alone Mode.

In Stand-Alone Mode, the RTU will continue Temperature Control as normal using the space temperature as a control input. Since an RTU has its own stored fallback setpoints and a fallback occupancy schedule, the RTU will continue operating using its occupied or unoccupied heating and cooling setpoints.

Dehumidification and Economization will occur during stand-alone mode only if the board is equipped with the right sensors, as described below.

Dehumidification Stand-Alone Operation
If the RTU board has an auxiliary input defined as a relative humidity sensor, Dehumidification will continue as normal using the RH sensor as a control input.

Economization Stand-Alone Operation
The RTU can economize in stand-alone mode as long as an enthalpy switch is present somewhere on the RTU board.

Other Stand-Alone Operation
The RTU will continue operating the reversing valves (if present) as normal. Other control features that rely on communication with zones or other E2 applications, such as

Demand Shed and Curtailment, Setpoint Reset and Optimum Start/Stop, will not be available.

Supply Air Temperature Failure
If the RTU has an input set up as a supply temperature sensor, differential alarming will be disabled when this sensor fails. A failure alarm will be generated and sent to the Alarm Advisory Log.

Mixed Air Temperature Failure
If the RTU has an input set up as a mixed air temperature sensor, economization defaults to ON or OK when this sensor fails. In other words, if Economization has no mixed air temperature sensor to help verify that economization is OK, it will assume that economization is OK. For variable-position economizers, the position of the dampers will be set to 100%.

Humidity Failure
Under normal conditions, the RTU dehumidifies when the zone application sends a signal to dehumidify. As long as the RTU receives this signal from the zone application, any failure of an on-board humidity sensor will have no effect (since this sensor is not being used as the direct control value).

6.9   Sensor Failures

In many cases, RTUs and AHU Zone applications can compensate for sensor failures by substituting other sensor values. This allows the RTU systems to continue operating as close to normal as possible until the failed sensors can be fixed or replaced.

Space Temp Failure
If a space temperature sensor on an RTU fails, the zone will use its zone temperature value as a replacement value. A failure alarm will be generated and sent to the Alarm Advisory Log.

Outside Air Temp Failure
Failure of the outside air temperature sensor affects Economization only if "Temperature Comparison" is the chosen method of economization enabling. In this case, economization will be disabled for both normal and stand-alone operation. A failure alarm will be generated and sent to the Alarm Advisory Log.

When communications with the zone application are lost, the only way an RTU may dehumidify without help from the zone application is if a humidity sensor is present on the board itself. If no sensor is present, or if the sensor has failed, dehumidification will not take place

7 *The MultiFlex RTU Hand-Held Interface*

The MultiFlex RTU Hand-Held Terminal interface allows you to view status of the rooftop HVAC systems and configure setpoints directly on the board. If you are using RTUs separate from a central E2 or BCU system, the Hand-Held Terminal will be the only programming interface you may use.

IMPORTANT! If the RTU boards are connected to a parent E2 or BCU, do not use the Hand-Held Terminal to make permanent configuration changes. Changes made to an RTU via the Hand-Held Terminal are designed to be temporary for units connected to an E2 or BCU. The parent controller does not recognize any configuration changes made by the HHT, and when the HHT is unplugged from the RTU, E2 will change all parameters changed with the HHT back to their original values.

7.1   RTU Hand-Held Terminal Status Screens

When an HHT is plugged into an RTU, users may access a series of screens that display input and output status information. Certain control parameters, such as offsets, setpoints, and deadbands, may also be changed in these screens. The HHT may also be used to initiate cooling, heating, fan, auxiliary, and economizer overrides.

The UP and DOWN keys on the HHT keypad are used to scroll through the screens. The DOWN key scrolls forward through the screens, and the UP key scrolls backward.

Some screens will have fields that may be changed using the HHT. To change the value in a field, press the RIGHT arrow key. A cursor will appear in the screen next to the first

changeable field in the display. Use the UP and DOWN arrow keys to move the cursor to the desired field, and enter the desired value using the numeric keypad or select an option using the dash "-" key. When finished, use the UP and DOWN arrow keys to move the cursor off the screen.

At any screen, the F1 key may be used to call up a brief description of the screen's function. To exit the help screen, press any key on the keypad. The following sections show the HHT screens for all RTU types currently available.

7.2   RTU Main Menu

Road Map from RTU Main Menu	Menu	Description
	RTC MAIN MENU 1 - STATUS 2 - CONTROL USE F1 FOR HELP	1- **Status:** Brings up the status menu. 2- **Control:** Brings up the control menu.

7.3 Status Menu

Road Map from RTU Main Menu		Description
| ⌈C⌉ 1 | ```
   STATUS  MENU
1-STATUS   3-RUNTM
2-OUTPTS   4-MISC
``` | **1- Inputs:** The status of RTU inputs may be viewed at these screens.<br>**2- Outputs:** The status of RTU outputs may be viewed at these screens.<br>**3- Runtimes:** The runtimes of RTU fans, cooling and heating stages, and auxiliary outputs may be viewed at these screens.<br>**4- Misc:** Miscellaneous RTU information may be viewed at these screens |
| ⌈C⌉ 1 – ⌈C⌉ 1 | ```
↓ TEMP OPWN WINT
SP OPEN   RT OPEN
SpaceTmp2 OPEN
SpaceTmp2 OPEN
``` | **Temp:** The current space temperature reading.<br>**Wint/Summ:** Whether the RTU is operating in Summer or Winter mode.<br>**Sp:** The current supply air temperature reading.<br>**Rt:** The current return air temperature reading.<br>The last two lines of the display show the current status of auxiliary inputs 1 and 2. |
| 1 – 1 – ↓ | ```
↑Outside .....
Crtl Temp OPEN
CL1:..      CL2:..
AIR FLOW:..
``` | **Outside:** The current outside temperature reading.<br>**Ctrl Temp:** The current control temperature value.<br>**CL1/CL2:** The status of cooling stage proofs 1 and 2.<br>**Air Flow:** The status of the air flow switch. |
| 1 – 2 | ```
↓FAN H1 H2 C1 C2
   ..  ..  ..  ..
 OCC AX1 AX2 ECO
  ON  ..  ..  ..
``` | **Fan:** Status of the fan output.<br>**H1/H2:** Status of heating stages 1 and 2.<br>**C1/C2:** Status of cooling stages 1 and 2.<br>**Occ:** Shows whether the outputs are operating in occupied or unoccupied mode.<br>**AX1/AX2:** Status of auxiliary outputs 1 and 2.<br>**ECO:** Status of the digital economizer output. |
| 1 – 2 – ↓ | ```
↑PC(30)  OS(15)
↓   DEHUM ..
ANALOG OUT1 000%
ANALOG OUT2 000%
``` | **PC:** The number of minutes the RTU has determined to be necessary for an Optimum Start Duration. Refer to your controller's user manual for more information on Optimum Start/Stop.<br>**OS:** The number of minutes in the RTU's Optimum Stop Duration. This value will remain fixed at 15 minutes. Refer to your controller's user manual for more information on Optimum Start/Stop.<br>**Dehum:** The number to the left of "DEHUM" shows the number of cools being used for dehumidification purposes. The indicator to the right of "DEHUM" shows the current state of dehumidification (ON to indicate dehum is active, ".." to indicate not active).<br>**Analog Out 1/2:** Output percentages of analog outputs 1 and 2. |
| 1 – 2 – ↓₂ | ```
↑Make-Up Air
   INACTIVE
Timer 000 (10)
Dampr Offset 000
``` | **Make-Up Air:** Whether the make-up air strategy is active or inactive.<br>**Timer:** Number of minutes left on the Make-Up Air timer. The number in parenthesis is the defined Make-Up Air setpoint.<br>**Dampr Offset:** Percentage of damper offset during makeup mode. |
| 1 – 3 | ```
↓COMP1 00000hrs
 000% of time
 COMP2 00000hrs
 000% of time
``` | **Comp1 and Comp2:** Number of hours cooling stages 1 and 2 have been active. The percentages show the percentage of operation since the last time runtimes were cleared. |

Road Map from RTU Main Menu		Description

`1`-`3`-`↓`	↑HEAT1 00000hrs
	   000% of time
	  HEAT2 00000hrs
	↓ 000% of time
		Heat 1 and Heat 2: Number of hours heating stages 1 and 2 have been active. The percentages show the percentage of operation since the last time runtimes were cleared.

`1`-`3`-`↓`₂	↑AX1 00000hrs
	   000% of time
	  AX2 00000hrs
	   000% of time
		Fan: Number of hours the fan has been active. The percentage shows the percentage of operation since the last time runtimes were cleared.

`1`-`3`-`↓`₃	↑ FAN 00000hrs ↓ 000% of time	**Auxiliary 1 and 2:** Number of hours auxiliary outputs 1 and 2 have been active. The percentages show the percentage of operation since the last time runtimes were cleared.2[

`1`-`4`	RTU 1.00F01
	ONLINE BAUD: 03
	   NET CTR:105
	   LAST MSG: 11
		Screens within the Misc. Status menu are used by service technicians to troubleshoot RTUs.

7.4   Control Menu

Road Map from RTU Main Menu	Menu	Description
`2`	CONTROL MENU 1-SETPTS 3-SETUP 2-CONTROL 4-OVRRD	**1- Setpts:** RTU setpoints may be changed using these screens. **2- Scheds:** RTU schedules may be changed and schedule overrides may be ordered using these screens. **3- Setup:** RTU setup information may be entered using these screens. **4- Override:** Inputs and outputs may be overridden and run times may be reset using these screens.
`2`-`1`	↓ SUMMER WINTER OC UN OC UN HT: 70 64 72 66 CL: 74 78 76 80	Occupied and unoccupied summer and winter setpoints may be viewed and changed at this screen.
`2`-`1`-`↓`	↑ DEAD DELAYS ↓ BAND ON OFF HT: 02 03 00 CL: 02 03 01	Deadbands, on delays, and off delays for heating and cooling setpoints may be viewed and changed at this screen.

Road Map from RTU Main Menu	Menu	Description
2	```SEASONAL LOCKOUT SUM(60) HEAT: NO WIN(50) COOL: NO ↑↓```	If temperature is being used as the summer/winter switch-over control value, the summer and winter setpoints may be entered at this screen. Seasonal lockouts for heat and cool may be enabled or disabled by choosing YES or NO in the HEAT and COOL fields.
2 – 1 – ↓ 3	```ALM SPTS LO HI OCC SPAC 055 085 UNO SPAC 000 075 ↑↓ SUPPLY 040 095```	Alarm setpoints for occupied and unoccupied space temperatures and supply air temperatures may be set at this screen.
2 – 1 – ↓ 4	```↑ OCC UNO DEHUM 55% 65% HUMIDIFY 30% 00% DB: 04 MIN: 70F```	Dehumidification and humidification setpoints, deadbands for these setpoints, and minimum building temperatures may be viewed and changed at this screen.
2 – 2	```↓ TUE OCPD UNOC 0000 0000 TEMP OCPD UNOC 0000 0000```	The standard week schedule may be set using this screen. Days of the week are chosen in the field at the top left, and times are entered in 24 hour format in the OCPD and UNOC fields. If temperature is being used as a schedule control value, the temperature setpoint may be entered in the TEMP field. If desired, the BCU's Optimum Start/Stop feature may be used on any of the OCPD and UNOC times. To activate OSS, move the cursor to the field directly to the left of the OCPD or UNOC field and press the dash "—" key. An asterisk should appear in this field, signifying that OSS is active.
2 – 2 – ↓	```↑ OCPD OVERRIDE Timer - Default 060 MIN Timer 000 MIN```	Overrides of the occupied/unoccupied status of an RTU may be configured and ordered using this screen. The Timer-Default field shows the default length of an occupied/unoccupied override. If desired, an override can be ordered for a set number of minutes by entering a time in the Timer field.
2 – 3	```↓ INPUT SETUP SPC SP RT P12 AF 1 1 1 0 0 0 AUX1 00 AUX2 00```	**SPC, SP, RT, P12, AF:** Shows whether the space temp, supply air, return air, compressor 1 proof, compressor 2 proof, and air flow inputs are present (1) or absent (0). These values may be changed by moving the cursor to the field and pressing the dash "—" key. **AUX1/AUX2:** The auxiliary input types may be chosen by entering a two-digit code in this field. Refer to **Table 4-2**, and enter the code number corresponding to the desired input type.
2 – 3 – ↓	```↑↓ OUTPUT SETUP FN H1-2 C1-2 ECO 0 1 1 1 1 0 AUX1 00 AUX2 00```	**FN, H1, H2, C1, C2, ECO:** Shows whether the fan, heat stage 1, heat stage 2, cool stage 1, cool stage 2, and economizer outputs are present (1) or absent (0). These values may be changed by moving the cursor to the field and pressing the dash "—" key. **AUX1/AUX2:** The auxiliary output types may be chosen by entering a two-digit code in this field. Refer to **Table 4-4**, and enter the code number corresponding to the desired output type.

Road Map from RTU Main Menu	Menu	Description
2 – 3 – ↓2	↕ ANLG OUTPUTS TYP MIN% MODE A01 00 00 00 A02 00 00 00	**TYP:** Shows whether the analog outputs (A01 and A02) are absent, (00), controlling analog economizers (01), or controlling variable speed fans (02). To change the value, enter 00, 01, or 02 in this field. **MIN%:** The minimum percentage the analog output will be allowed to be. **MODE:** The mode setting determines at what times the economizer damper is allowed to modulate to the minimum percentage, either Always Open (00) or During Occupied (01). Enter the desired setting in this field.
2 – 3 – ↓3	↕ ANLG OUTPUTS MINV MAXV A01 00.0 10.0 A02 00.0 10.0	RTU analog outputs modulate economizer dampers and fans by sending appropriate voltages to the analog economizers. By default, the outputs will modulate from 0-10VDC. To specify a different voltage range, enter values in the MINV and MAXV fields.
2 – 3 – ↓4	↕ MISC SETUP FANMODE OCC: AUTO FANMODE UNO: AUTO DEHUM COOLS: 01	**Fanmode OCC/UNO:** The occupied and unoccupied fan modes. Set to "AUTO" to have the fans be on only when stages are active, "ON" to have the fans always on, or "SOWA" to be AUTO during summer and always ON during winter. **Dehum Cools:** Number of cool stages available for dehumidification This field can be changed to any number from 0 to the number of cool stages available on the RTU.
2 – 3 – ↓5	↑ SYSTEM TIME: 0339 DATE: 00/00/00 ↓ DAY: MON	**Time:** The current time, in 24-hour format. **Date:** The current date, in month/day/year format. **Day:** The current day of the week.
2 – 3 – ↓6	↑ DAYLT SAVINGS DISABLED SPRING: 04/02/95 ↓ FALL: 10/29/95	**Daylight Savings:** Whether automatic daylight savings time set back is disabled or following a month/week schedule. **Spring/Fall:** If the RTU is set up to change the times on specific days of the year, enter the dates in the Spring and Fall fields.
2 – 3 – ↓7	↑ Use TEMP To Define Season SUMMER: 05/01 60 WINTER: 10/01 50	**Use to Define Season:** Whether the DATE or the outside temperature (TEMP) is being used as the summer/winter switch-over control value. **Summer/Winter:** If the date is being used as the summer/winter switch-over control value, the month and the day of the switch-overs must be entered in the Summer/Winter fields. If temperature is being used as the control value, enter the temperature setpoints in the rightmost Summer/Winter fields.
2 – 4	↓ FAN HT1 HT2 CL1 NOR NOR NOR NOR CL2 AX1 AX2 ECO NOR NOR NOR NOR	All RTU outputs shown in this screen may be bypassed ON, OFF, or returned to normal by moving the cursor to the field and selecting "ON", "OFF", or "NOR" by pressing the dash "—" key.

Road Map from RTU Main Menu	Menu	Description
`2`-`4`-`↓`	⬆⬇ ANLG OVERRIDE % A01 000 A02 000	Analog outputs A01 and A02 may be bypassed ON, OFF, or returned to normal by moving the cursor to the field and selecting "ON", "OFF", or "NOR" by pressing the dash "—" key. When ordering an "ON" override, specify the ON percentage of the output in the Override% field.
`2`-`4`-`↓`₂	⬆⬇RUNTIME RESET FAN H1 H2 C1 C2 AX1 AX2	Runtime statistics for the fan, heating, cooling, and auxiliary outputs may be cleared using this screen. To clear a runtime, move the cursor to a field underneath the output name and press the dash "—" key. The letters "CL" will appear. To confirm the runtime reset, press ENTER; to cancel the runtime reset, press the period "." key.
`2`-`4`-`↓`₃	⬆ RESET ALARMS RESET SETPTS	**Reset Alarms:** To reset all alarms for this RTU, move the cursor to the field next to the Reset Alarms message and press the dash key. The letters "CL" will appear. To confirm the alarm reset, press ENTER; to cancel the runtime reset, press the period "." key. *Reset Setpts:* If desired, all RTU setpoints may be cleared and returned to normal default values by moving the cursor to the field next to the Reset Setpts message and pressing the dash key. The letters "CL" will appear. To confirm the alarm reset, press ENTER; to cancel the runtime reset, press the period "." key.

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