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UltraSite User's Guide
BCU Supplement

COMPUTER PROCESS CONTROLS

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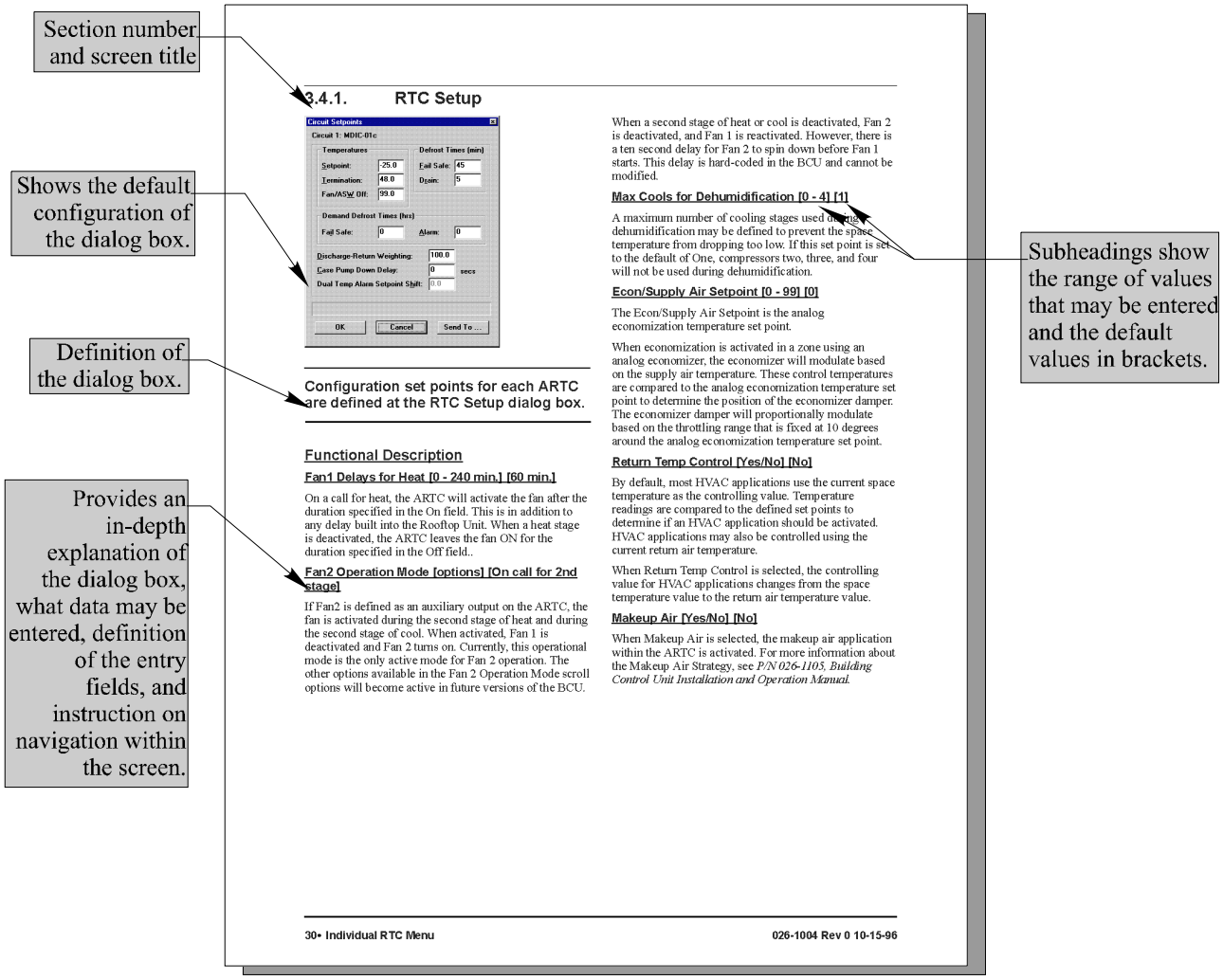
BCU System Navigation

The following section is the Building Control Unit supplement for the *UltraSite User's Guide* (PN 026-1002). This section provides a complete, detailed description of each dialog box associated with the BCU and accessible through UltraSite. In-depth hardware and software information associated with the BCU may be found in the *Building Control Unit Installation and Operation Manual* (PN 026-1105). To obtain supplements for other CPC REFLECS controllers or to obtain other product manuals, contact Computer Process Controls, Inc. at 770-425-2724.

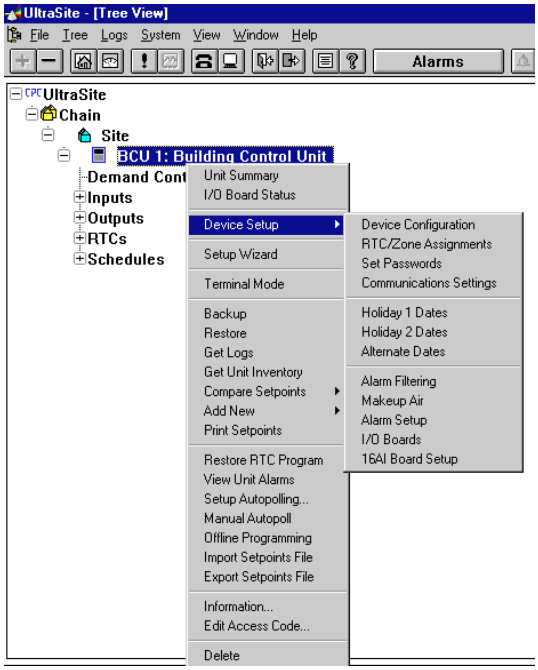
The dialog boxes described in this supplement are presented in the order that they appear within specified pull-down and action menus. The following sheets provide information necessary to access any available screen, or dialog box, what data entry is required, a brief functional description of the data, and how that data is entered. The example below describes the layout and use of the system navigation pages.



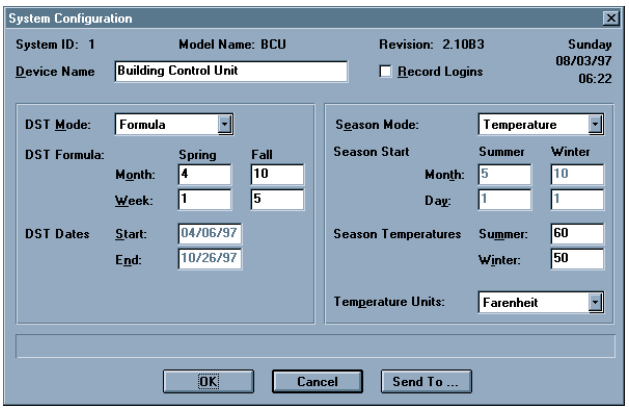
1 Device Setup Menu

Information pertaining to operation and configuration of the BCU, including passwords, remote communication settings, and logging and alarm setup, may be entered using the Device Setup menu options.

Screen Map



1.1. System Configuration



General information such as device names, record logins, and summer and winter start dates is defined at the System Configuration dialog box.

Device Name [25 character max]

The device name is a user-defined identifier that is used to identify a specific BCU on modification and status screens within UltraSite. The unit name makes it easy for the user to identify a specific controller in UltraSite.

Record Logins [Yes/No] [Yes]

Record Logins activates a user log-in record. This log is a record of users logging into the controller. The BCU will log the user's name and location to the BCU Alarm Log.

Daylight Savings Time (DST) Mode [Formula/Fixed] [Fixed]

The BCU contains a real-time clock that is used when logging information to the various logging screens. When the current time changes to standard time or to daylight savings time, the BCU's clock should be modified by one hour. Time changes occur twice a year in most areas. Methods for defining how the system will change its settings for daylight savings time include:

- *Formula* - the system clock will change on the Sunday within a specific month and week.
- *Fixed* - the system clock will change on a specific date.

Daylight Savings Time (DST) Formula Month [1 - 12] [Spring=4, Fall=10]

If the Formula method is chosen in the DST Mode field, the BCU will modify the system time during the specified Spring and Fall months. Enter the desired months in the Spring and Fall Month fields. By default, the spring change-over time is in April and the fall change-over time is in October.

Daylight Savings Time (DST) Formula Week [1 - 5] [Spring=1, Fall=5]

Within the month specified in the DST Month fields, the BCU will change the system time on the Sunday morning within the week specified in the DST Formula Week fields at approximately 2:00 a.m. Enter the number of the week in which the change will occur. By default, daylight savings time will begin in Week 1 of April and end in Week 5 of October.

Daylight Savings Time (DST) Dates [01/01/00 - 12/31/99] [Start=04/07/96, End=10/27/96]

If the Fixed method is chosen in the DST Mode field, the BCU will modify the system time on the specified dates. BCU system settings will be changed to daylight savings time starting on the date defined in the Start field, and will return to standard time on the date defined in the End field.

The Fixed method is primarily used in areas where daylight savings time does not occur every year. Because the defined dates are specific for each year, the Date fields must be updated each year by the user.

Season Mode [Date/Temperature] [Temperature]

Most control set points within the BCU are defined separately for Winter and for Summer. Methods for activating Summer and Winter settings include the following:

- *Date* - the settings are changed to the appropriate settings on a specific date.
- *Temperature* - the settings change when the outside temperature drops below or exceeds the defined temperature set points.

Season Start Month [1 - 12] [Summer=5, Winter=10]

If the Date method is chosen in the Season Mode field, the Season Start Month fields are the numbers of the months in which the seasonal changes occur. By default, summer is May through September (5-9), and winter is October through April (10-4).

Season Start Day [1 - 31] [Summer=1, Winter=1]

If the Date method is chosen in the Season Mode field, the Season Start Day fields are the days within the months specified in the Season Start Month fields in which the change-overs will take place. By default, the seasonal change-overs take place on the first of May and the first of October.

Season Temperatures [0 - 99°] [Summer=60°, Winter=50°]

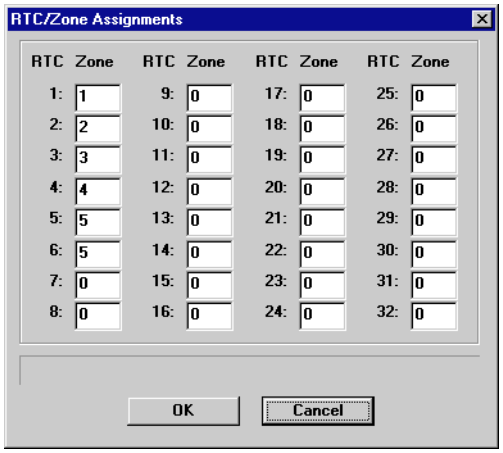
If the Temperature method is chosen in the Season Mode field, the BCU will change to the Summer settings when the outside temperature exceeds the Summer start temperature set point, and will change to the Winter settings when the outside temperature falls below the Winter start temperature set point.

Temperature Units [Fahrenheit/Celsius] [Fahrenheit]

The BCU can display temperature readings in either degrees Fahrenheit or degrees Centigrade. To select a unit for display, move the cursor to the temperature unit field and select the appropriate unit using the pulldown menu.

If the system is changed to display temperatures in Centigrade, all defaults will be displayed in Centigrade.

1.2. RTC/Zone Assignments

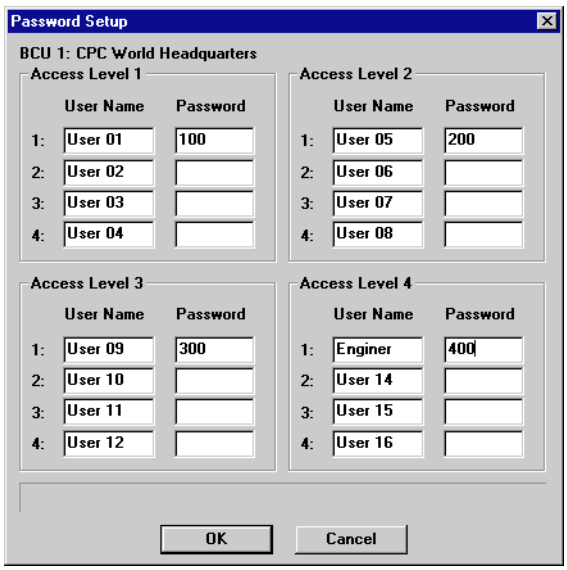


ARTC boards are assigned to specified zones at the RTC/Zone Assignment dialog box.

Each ARTC board connected to a BCU has a corresponding user-defined board number that is used for identification purposes within the network. The board number for each ARTC is determined by the network rotary switch settings defined during installation.

For more information about ARTC board numbers and zone management, refer to the *P/N 026-1105, CPC Building Control Unit Installation and Operation Manual*.

1.3. Password Setup



User passwords for all access levels are defined at the Password Setup dialog box.

The BCU system requires a user name and password for users to enter into and modify the system. Four user names may be assigned within each access level. Each user name may be no more than seven characters and the defined name will appear in the BCU Alarm Log if the Record Logins option is chosen in the System Configuration dialog box

There are four levels of access to the BCU.

Level 1

Level one users may only view system settings and reset alarms. 100 is the default password for the level one password. This password may be changed at any time to any six character string.

Level 2

Level two users may view the system settings, reset alarms in the BCU, change set points, and make software designations for 16AI configuration in addition to Level 1 actions. 200 is the default password for the level two password. This password may be changed at any time to any six character string.

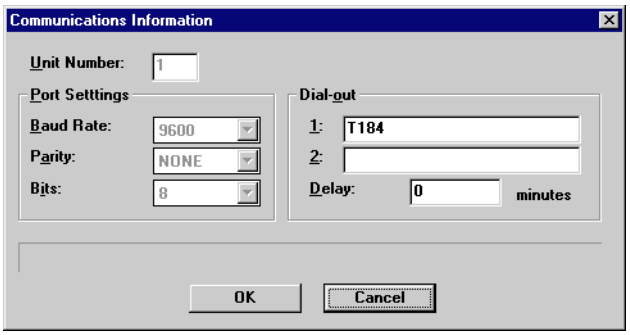
Level 3

Level three users have access to system setup, setup changes, and access to the I/O, Host, and Remote network. Level three users may also view system settings, reset BCU alarms, change set points, and make software designations for 16AI configuration in addition to Level 2 actions. This password may be changed at any time to any six character string.

Level 4

Level four users have full access to all BCU functions. 400 is the default password for the level four access. This value may be changed at any time to any six character string.

1.4. Communications Information



Remote communication network settings are defined at the Communications Information dialog box.

Unit Number [1 - 38] [1]

The unit ID number for each BCU is the number that UltraSite uses to determine which BCU information is coming from if more than one BCU is being used to control the building. No two BCUs may have the same ID number. These numbers are defined at the Add Unit dialog box (see **Section 1.4.3, *Add Unit***).

Baud Rate [1200 - 9600 bps] [9600 bps]

The baud rate is the actual carrier frequency being used to transmit data to and from an attached modem. The baud rate should be set according to the type network modem used with the remote network.

Parity/Bits [options] [NONE/8]

The BCU automatically calculates the Parity and Data Bits settings required for the remote network to communicate properly according to the specified Baud Rate settings. This setting should not have to be changed.

Modem Setup String [34 characters max]

The initialization string for the specified modem is displayed in the Modem Setup String field. The BCU will automatically define the necessary string needed to initialize the modem entered in the Modem field if the modem is known to the BCU. If there is no predefined string displayed in the Setup field, enter the initialization string found in the modem user's manual.

Reset Modem at Midnight [Yes/No] [Yes]

To ensure the modem is properly set up to perform the BCU's remote communication functions, users can send a string to reset the modem on a regular basis. To automatically send the string every night at midnight, enter YES in the Reset Modem at Midnight field.

Dialout

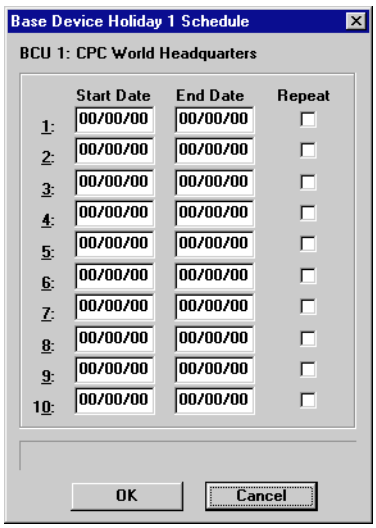
The dialout is the phone number to be called when a dialout sequence is activated. When using UltraSite to receive alarms, this number should be the phone number to the UltraSite modem.

When an alarm is generated, and after the dialout delay, the dialout sequence begins. If the remote line is busy or there is no answer, the system will dial the first number six times, waiting five minutes before each attempt, until a connection is made. If no connection is made, the system will dial the second dialout phone number six times, waiting five minutes before each attempt. If there is still no connection, the system will generate an additional alarm in the BCU Alarm Log (Dial Out Unsuccessful).

Delay [0 - 255 min.] [0 min.]

The dial out time delay is the amount of time in minutes the unit must wait before activating the call-out sequence. The delay allows an on-site user to acknowledge the alarm before it is called out.

1.5. Base Device Holiday 1 Schedule



Holiday 1 schedules are activated by date at the Base Device Holiday 1 Schedule dialog box.

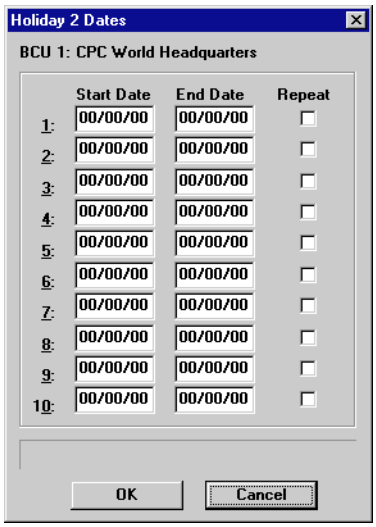
Start Date/End Date [01/01/00 - 12/31/99] [00/00/00]

The Holiday 1 schedule is activated according to the specified dates in the Start Date and End Date fields. If no ending date is entered, the schedule will end at midnight the next day. If the current date is entered as a start date, the schedule is activated immediately.

Repeat [Yes/No] [No]

Holiday 1 schedules that are the same from year to year are repeated if the repeat box is selected for the specified schedule.

1.6. Holiday 2 Dates



Holiday 2 schedules are activated by date at the Holiday 2 Dates dialog box.

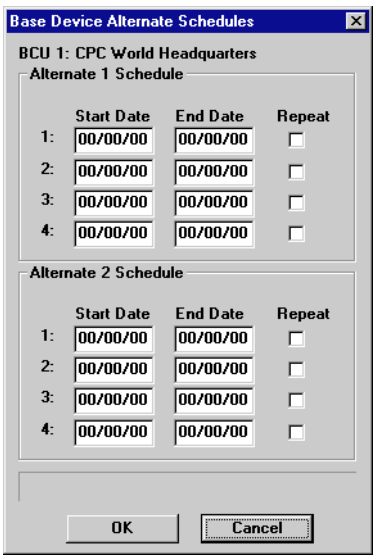
Start Date/End Date [01/01/00 - 12/31/99] [00/00/00]

The Holiday 2 schedule is activated according to the specified dates in the Start Date and End Date fields. If no ending date is entered, the schedule will end at midnight the next day. If the current date is entered as a start date, the schedule is activated immediately.

Repeat [Yes/No] [No]

Holiday 2 schedules that are the same from year to year are repeated if the repeat box is selected for the specified schedule.

1.7. Base Device Alternate Schedules



Alternate schedules are activated by date at the Base Device Alternate Schedules dialog box.

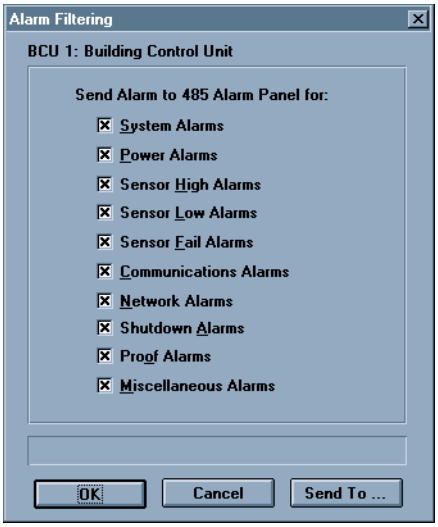
Start Date/End Date [01/01/00 - 12/31/99] [00/00/00]

Alternate schedules are activated according to the specified dates in the Start Date and End Date fields. If no ending date is entered, the schedule will end at midnight the next day. If the current date is entered as a start date, the schedule is activated immediately.

Repeat [Yes/No] [No]

Alternate schedules that are the same from year to year are repeated if the repeat box is selected for the specified schedule.

1.8. Alarm Filtering



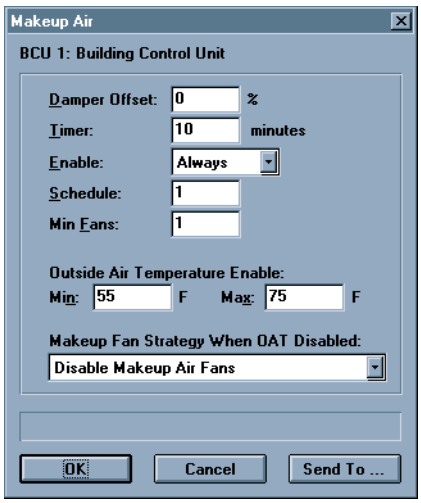
In the Alarm Filtering dialog box, users may choose the alarm groups that will go to the 485 Alarm Panel.

Alarms and notices are defined by filter group in **Table 1**. The Send to 485 Alarm Panel screen allows for definition of which alarms and notices will be sent to the 485 Alarm Panel. All alarms default as YES and are sent to the 485 panel unless they are set so that the controller does not send an alarm group.

Alarm Filtering Group	Alarm/Notice Messages	Alarm Filtering Group	Alarm/Notice Messages
SYSTEM ALMS	Setpts Corrupt Emergency Off Restore Error RTC Code FAIL RTC Run Fail Invalid Alarm	PROOF ALMS	Cmp1 Proof FAIL Cmp2 Proof FAIL Cmp3 Proof FAIL Cmp4 Proof FAIL Air Flow FAIL Proof Failure
POWER ALMS	Curtailment On Curtailment Off Demand High	COMM ALMS	Dialout Failed
SENS HI ALMS	Occp Space HIGH UnOc Space HIGH High Supply Air HIGH	SHUTDOWN ALMS	Freeze ShutDown Smoke ShutDown
SENS LO ALMS	Occp Space LOW UnOc Space Low Low Supply Air LOW	NETWORK ALMS	Missed Token No Response Bad Message Bad Checksum
SENS FAIL ALMS	Short, Open Space Temp OPEN, SHRT Supply Air OPEN, SHRT Return Air OPEN, SHRT Aux 1 Input OPEN, SHRT Aux 2 Input OPEN, SHRT	MISC ALMS	All Lights On Open Closed FreezeStat Smoke Detected Filter Dirty

***Table 1**-Alarms/Notices by Group*

1.9. Makeup Air



The makeup air strategy for a specified BCU is defined at the Makeup Air dialog box.

The use of RTU economizers and fans to provide enough outside air to maintain positive pressure within a building, or to overcome the negative pressure effects of building exhaust fans, has a wide degree of variability. For this reason, the BCU makeup air strategy is configured completely with user-defined set points, and makes no predictions or assumptions about when or how makeup air should be enabled. For more information about the makeup air strategy, see CPC's *Building Control Unit Installation and Operational Manual* (PN 026-1105).

Damper Offset [0 - 100%] [0%]

To provide the required amount of makeup air, ARTCs are commanded to increase the position of their outside air dampers by an additional calculated amount. This calculation is based on the offset percentage and the number of in-

active RTUs within the zone. RTU air dampers will modulate the number of inactive ARTCs times the defined offset percentage. For example, if the damper offset is 1% and five ARTC fans are not running, the remaining ARTCs will increase their damper positions by 5% (five units X 1%).

Timer [5 - 60 min.] [10 min.]

An ARTC will be placed in makeup mode when all fans participating in a stage of heat or cool are running and the required amount of makeup air has not been achieved or the minimum number of fans are not running. These ARTCs will remain in makeup mode until there is positive pressure in the controlled space and the minimum requirements of fans is met. However, the duration an ARTC may be placed in makeup mode is limited by defining the MUA-Timer.

When there is a call for an ARTC to run in makeup mode, the ARTC will run only for the amount of time defined in the Timer field. The BCU will then sequentially rotate to the next available controller. This rotation distributed the fan times fairly among the participating controllers.

Enable [options] [Always]

The makeup air application may be enabled by the following BCU features:

- *Schedule* - the BCU will only allow makeup air based on the ON and OFF times defined by the schedule designated at the Schedule field.
- *Digital Input* - the BCU will only allow makeup air when the BCU receives a contact closure from a digital input defined as a makeup air input in I/O Control.
- *Always* - the makeup air application is active at all times.

Schedule [1 - 56] [1]

When enabling the makeup air application using a schedule, the BCU will only allow makeup air based on the ON and OFF times defined by the designated schedule. Users may choose from all 56 available schedules.

Min Fans [1 - 32] [1]

During occupancy, a defined minimum number of fans will run at all times to provide the appropriate makeup air. Up to 32 fans may run at one time according to how many ARTCs are attached to the BCU. Entering "0" in this field disables the application.

Outside Air Temperature Enable [0 - 99°] [Min=55°, Max=75°]

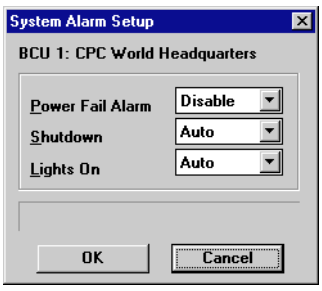
Regardless of the option selected in the Enable field, makeup air will not begin unless the outside air temperature falls within the range specified at the Outside Air Temperature Enable fields.

Makeup Fan Strategy When OAT Disabled [options] [Disable Makeup Air Fans]

When Makeup Air is disabled because the outside air temperature (OAT) is not within the range defined in the Outside Air Temperature Enable fields, the BCU will follow the strategy defined in the Makeup Fan Strategy field. Three options are available:

1. *Disable Makeup Air* -Makeup air is disabled.
2. *MUA Fans On* - Fans will come on for makeup air, but the damper offset is set to zero.
3. *MUA Fans On When Occupied* -Strategy 2 is active only when the building is occupied.When unoccupied, disable makeup air.

1.10. System Alarm Setup



Alarm set points for features such as Shutdown and Lights On are defined at the System Alarm Setup dialog box.

Alarm control within the BCU includes generating alarms or notices when specific sensor readings exceed HI and LO alarm set points or when there is a power failure to the system. The BCU will also activate all lights and turn off all HVAC functions if these specified alarms are selected.

Power Fail Alarm [options] [Disable]

The BCU will generate an alarm when there is a power failure within the system. Users may choose from two alarm types:

- *Notice* - A notice is a low-level warning that alerts users of abnormal facility or control system conditions. A notice creates an entry in the BCU Alarm Log.
- *Alarm* - An alarm is a high-level warning that also alerts users of abnormal facility or control system conditions. An alarm will appear in the BCU Alarm

Log and may be accompanied by a contact closure for on-site operation of a bell, light, horn, etc. An alarm may also initiate an alarm dialout sequence and/or the activation of the 485 Alarm Annunciator Panel.

If Disable is chosen as an alarm type, the power fail alarm feature is deactivated and no alarm will be generated if there is a power failure within the system.

Shutdown [Auto/Lock] [Auto]

The BCU will deactivate all HVAC functions within the system when certain alarms are generated. To activate Shutdown, an input module must be defined as Shut Down, and an Occupied Alarm or Notice must be set to Closed within I/O Control. When an alarm associated with this input module is generated, the BCU will automatically deactivate all HVAC functions.

There are two methods for resetting all HVAC functions to normal operation after shutdown:

- *Auto* - functions are automatically reset when the alarm condition no longer exists.
- *Lock* - functions must be reset manually.

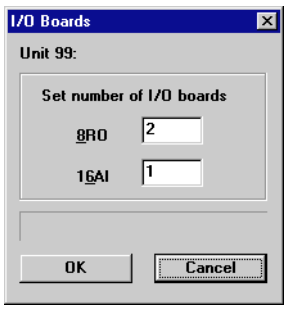
Lights On [Auto/Lock] [Auto]

The BCU will activate all output modules defined as lights when certain alarms are generated. To activate Lights On, an input module must be defined as Lights On, and an Occupied Alarm or Notice must be set to Closed within I/O Control. When an alarm associated with this input module is generated, the BCU will activate all output modules defined as lights.

There are two methods for resetting all lights to normal operation after Lights On:

- *Auto* - functions are automatically reset when the alarm condition no longer exists.
- *Lock* - functions must be reset manually.

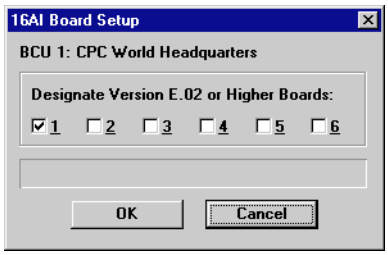
1.11. I/O Boards



The number of Input/Output boards connected to the BCU is defined at the I/O Boards dialog box.

Each Building Control Unit supports up to twelve 8RO Boards and up to six 16AI Boards.

1.12. 16AI Board Setup



16AI version numbers are designated in the 16AI Board Setup dialog box.

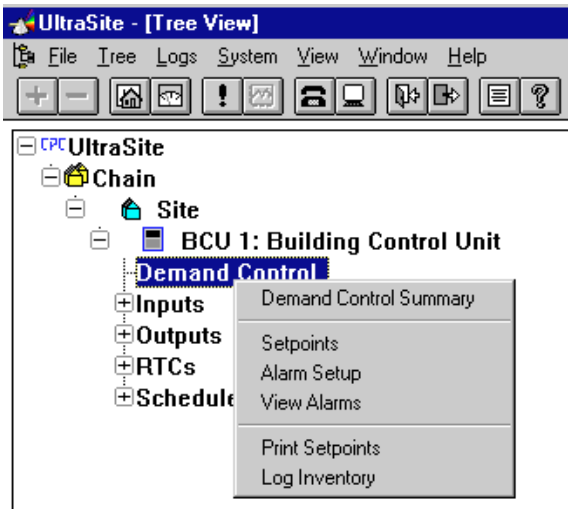
All versions of a 16AI Board may be used with BCU 2.0. However, BCU 2.0 contains a new feature that only E.02 or higher 16AI boards will accept. Therefore, to interact properly with the connected 16AI boards, the versions must be designated.

If a 16AI board is version E.02 or higher, click the box next to the board number. If the board is not E.02 or higher, leave the box blank.

2 Demand Control Menu

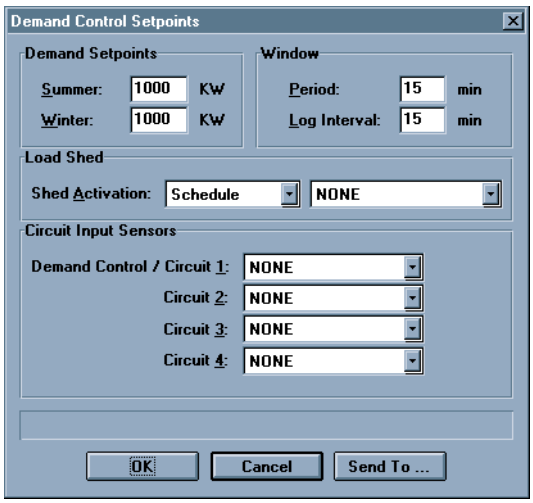
Demand control status screens and setup dialog boxes may be accessed using the Demand Control Menu options.

Screen Map



Option	Reference	Page
Demand Control Summary	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.10, Status and Summary Screens***.	63
Setpoints	**Section 2.1.,** *Demand Control Setpoints.*	12
Alarm Setup	**Section 2.2.,** *Demand Control Alarms.*	13
View Alarms	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.6.1, Print Setpoints***.	47
Log Inventory	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.5.2, Log Inventory***.	40

2.1. Demand Control Setpoints



Demand settings used by the BCU to initiate and perform demand control are defined at the Demand Control Setpoints dialog box.

Demand Setpoints [0 - 9999 kW] [Summer, Winter=1000 kW]

The demand limit set point is a predefined level of energy consumption at which a power company greatly increases its rates. Separate set points for summer and for winter may be defined.

Window

Period [3 - 60 min.] [15 min.]

To determine if the demand limit set point is being exceeded, power companies monitor energy consumption for a fixed period of time. This duration is called the Demand Window. The duration of the Demand Window is entered in the Period field.

Log Interval [0 - 60 min.] [15 min.]

The log interval defines how often data is recorded to specified logs. The log interval for the demand window is the interval the BCU will use to send kW readings to the demand status log.

Load Shed

Shed Activation [options] [Schedule]

When defined, demand control takes place constantly within the BCU. However, whether load shedding actually occurs as a result of demand monitoring is determined by a load shed activation command. The BCU may be instructed to perform load shedding using any of the following five commands:

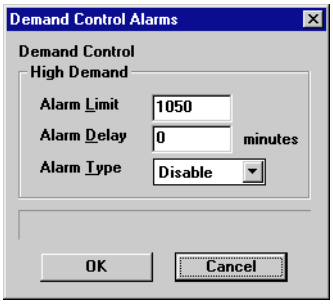
- *Sensor Input Command* - A digital value issued by the Sensor Input Module as a final result of the interaction between the Hardware Interface, Combiner, Cut In/ Cut Out, and Override cells.
- *Sensor Input Alarm* - A digital value issued by the Sensor Input Module as a final result of the Process Alarm cell. This value is generated based on a digital or analog signal generated by the Combiner cell.
- *Digital Output Command* - A digital value issued by the Digital Output Module as a final result of the interaction between the Demand Interface, Schedule Interface, timer, Combiner, and Bypass cells.
- *Proof Fail Command* - A digital value issued by the Digital Output Module as a final result of the comparison of an actual proof value and a commanded output action.
- *Schedule* - An application independent of the Sensor Input and Digital Output Modules which is used to establish on and off times. Schedules are defined using Schedule Control in the BCU.

The source number associated with each command type is the Input or Output Module number specified in I/O Control.

Demand Control [Input#] [NONE]

To perform demand monitoring and control, the circuits must receive kW values from either kW or watt-hour transducers. For each circuit being used, choose the input module to which the transducer is connected from the pull-down menu.

2.2. Demand Control Alarms



High demand alarms and notices are defined at the Demand Control Alarms dialog box.

A demand alarm or notice is a warning that signifies an abnormal kW reading within the BCU. When the current kW reading exceeds the user-defined High Demand Alarm set point, an alarm or notice will be generated.

Alarm Limit [0 - 9999 kW] [1050 kW]

The alarm limit is the set point in kW at which an alarm or notice will be generated.

Alarm Delay [0 - 240 min.] [0 min.]

Alarm Delay is the specified time duration the BCU must wait before generating an alarm or notice.

Alarm Type [Alarm/Notice/Disable] [Disable]

There are two types of alarms within the BCU. Users may choose from the following alarms according to which type should be activated when the current kW reading exceeds the high demand alarm limit:

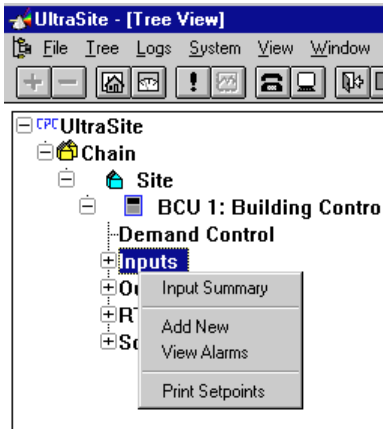
- *Alarm* - appears in an alarm log and may be accompanied by a contact closure for on-site operation of a bell, light, horn, etc. and may also be accompanied by an alarm dialout sequence and/or activation of the 485 Alarm Annunciator Panel.
- *Notice* - creates an entry in an alarm log and initiates no other signal.

A disabled option is available if no alarms or notices are to be generated.

3 Inputs Main Menu

From the Inputs Main Menu, input summary screens and alarms may be viewed, new modules may be added, and set points may be printed.

Screen Map



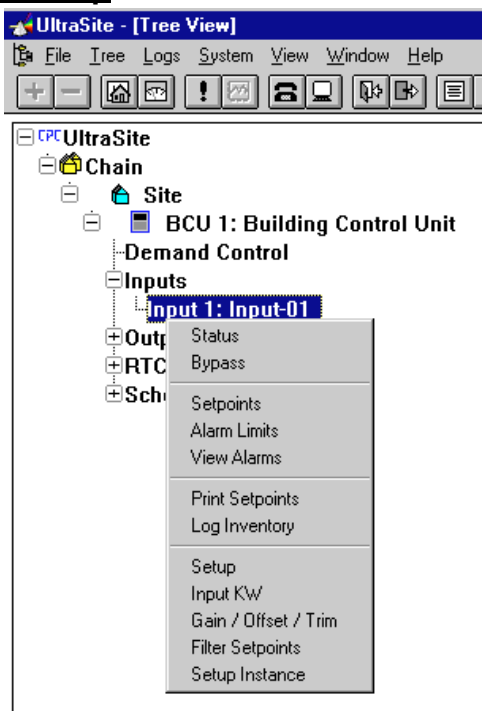
Options	Reference	Page
Input Summary	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens***.	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.5.7, Add New (Enhanced REFLECS only)***.	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints***.	47

3.1. Input Modules

From the Individual Input Modules Menu, input modules may be configured, bypassed, overridden, and given load shed parameters.

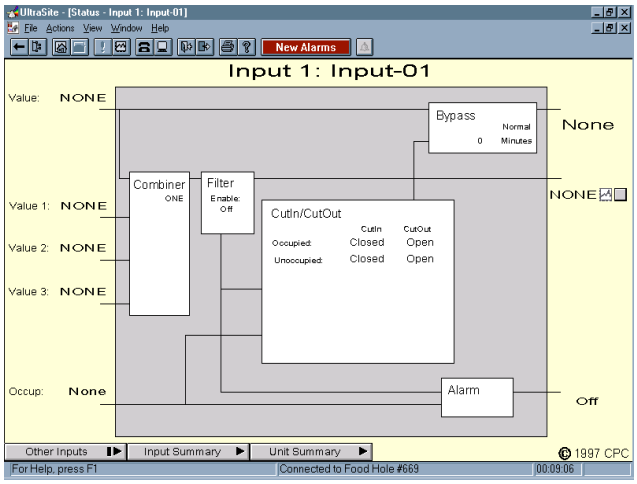
I/O Control provides a way of customizing the BCU by interconnecting control objects to create modules that provide custom applications to control special building functions. I/O control objects include analog and digital sensor inputs, and outputs connected to the 16AI, 8RO, and auxiliary inputs on the ARTC. Sensor inputs are setup, monitored, and controlled at the Input Modules dialog boxes. For a complete overview of I/O Control, refer to CPC's *Building Control Unit Installation and Operational Manual* (PN 026-1105).

Screen Map



Options	Reference	Page
Status	**Section 3.1.1.,** *Input Status*.	16
Bypass	**Section 3.1.2.,** *Input Bypass*.	16
Setpoints	**Section 3.1.3.,** *Input Setpoints*.	17
Alarm Limits	**Section 3.1.4.,** *Input Sensor Alarms*.	17
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints***.	47
Log Inventory	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.5.2, Log Inventory***.	40
Setup	**Section 3.1.5.,** *Input Setup*.	18
Override Setup	**Section 3.1.6.,** *Input Override*.	21
Input KW	**Section 3.1.7.,** *Input kW*.	21
Gain/Offset/Trim	**Section 3.1.8.,** *Gain/Offset/Trim*.	22
Filter Setpoints	**Section 3.1.9.,** *Filter Setpoints*	22
Setup Instance	**Section 3.1.10.,** *Setup Instance*.	23

3.1.1. Input Status

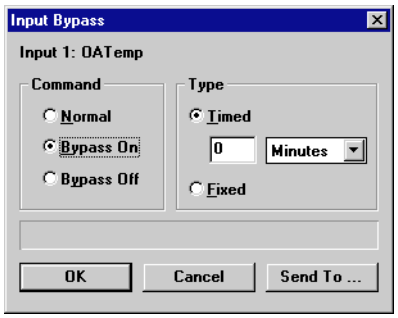


The Input Status screen displays the current status of the selected input.

The Input Status screen displays real time information about the selected unit, or controller. Icon buttons and pull-down menus provide the necessary options to select graphing data, graph the selected data, view other input status screens, view the Input Summary screen, and view the Unit Summary screen.

Icon buttons and pull-down menus found on summary and status screens are described in *P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens***.

3.1.2. Input Bypass



Normal input set points are bypassed at the Input Bypass dialog box.

Command [options] [Normal]

Users may choose from the following three status commands:

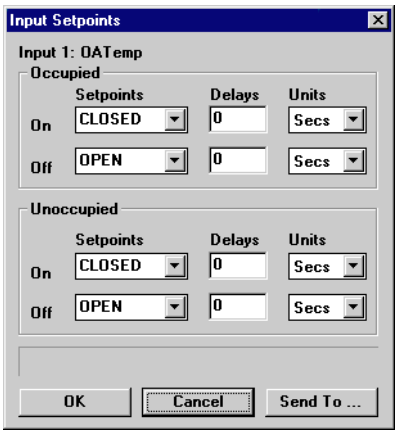
- *Normal* - The normal status is the normal operation mode for the selected input. The input will operate according to normal system settings.
- *Bypass On* - The bypass on status initiates an override and replaces the normal system settings with an ON command. The specified input will then read ON.
- *Bypass Off* - The bypass off status initiates an override and replaces the normal system settings with an OFF command. The specified input will then read OFF.

Type [Timed/Fixed] [Timed, 0 min]

Users may choose from the following bypass types when Bypass On or Off is selected from the command options:

- *Timed* - A timed bypass overrides the input for a specified period of time.
- *Fixed* - A fixed bypass overrides the input until the user returns to this dialog box and disables the bypass. Bypasses are disabled when the status in the Command options box is returned to Normal.

3.1.3. Input Setpoints



Input set points, or control parameters, are defined at the Input Setpoints dialog box.

Occupied/Unoccupied

Setpoints [-999 - 999, OPEN, or CLOSED] [On=CLOSED, Off=OPEN]

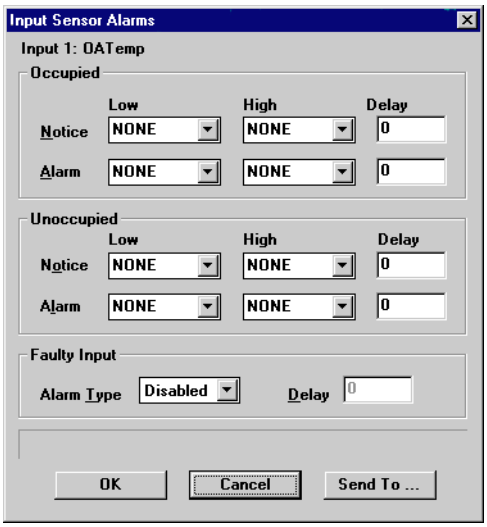
Input sensor set points are the cut-in and cut-out values that are used when a facility is in an occupied or unoccupied mode. Input sensor set points may be defined as specific values for analog inputs, or simply as contact closed or contact open for digital input sensors.

- *Open* - contact open for digital input sensors.
- *Closed* - contact closed for digital input sensors.
- *None* - a limit is not applied.

Delays [0 - 240 secs/mins/hrs] [0 sec.]

The delay is the specified time the BCU must wait before activating the defined set points. Separate delays may be defined for cut-in and cut-out values for occupied and unoccupied modes.

3.1.4. Input Sensor Alarms



Alarm control settings for input sensors are defined at the Input Sensor Alarms dialog box.

Alarm Control within the BCU includes the generation of alarms or notices when specific control values exceed HI and LO alarm set points. When the current input sensor reading exceeds the user-defined HI and LO alarm set points, an alarm or notice will be generated.

When control values are received by the BCU from the specified input sensors, they are compared to user-defined input set points to determine if the BCU should send an ON signal to the appropriate output. This signal is also compared to the user-defined HI and LO alarm set points to determine if the BCU should generate an alarm or notice.

Occupied/Unoccupied

Notice/Alarm [options] [None]

- *Notice* - low-level warning that creates an entry in the BCU Alarm Log.
- *Alarm* - high-level warning that will appear in the BCU Alarm Log and may be accompanied by a contact closure for on-site operation of a bell, light, horn, etc. An alarm may also initiate an alarm dialout sequence and/or the activation of the 485 Alarm Annunciator Panel.

Low/High

Alarm set points may be defined as specific values for analog inputs, or simply as contact closed or contact open for digital input sensors.

- *Open* - contact open for digital input sensors.
- *Closed* - contact closed for digital input sensors.
- *None* - a limit is not applied.

Delay [0 - 240 min.] [0 min.]

When the BCU generates an alarm or notice, it must wait the specified time delay before activating the alarm sequence.

Faulty Input

Faulty sensor alarms or notices are generated when the BCU detects a short or an open circuit in an input connection. When this feature is activated, the BCU automatically looks for faulty readings.

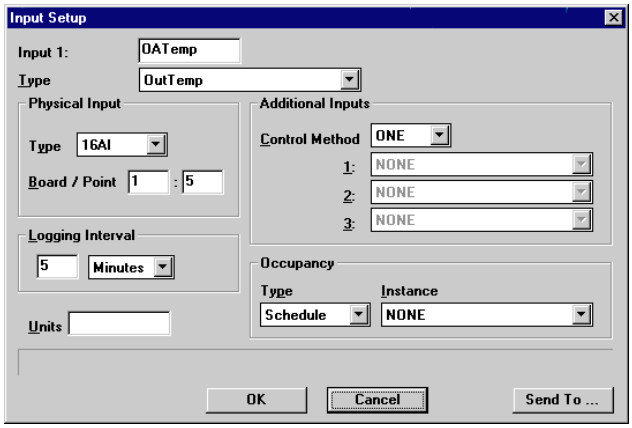
Alarm Type [options] [Disabled]

If the BCU detects an abnormal sensor reading, it will generate either an alarm or a notice. The faulty input alarm feature is active when Alarm or Notice is selected as an Alarm Type. The disable alarm type deactivates the faulty input alarm feature.

Delay [0 - 240 min.] [0 min.]

When the BCU generates an alarm or notice, it must wait a specified period of time, or time delay, before activating the alarm sequence.

3.1.5. Input Setup



The selected Sensor Input Module is defined within I/O Control at the Input Setup dialog box.

Input

The sensor input module name is a user-defined name that corresponds to the sensor input module number defined at the Add New Input dialog box (see *P/N 026-1002, Ultra-Site User's Guide,* ***Section 1.5.7, Add New (Enhanced RE-FLECS only)***). While the BCU uses various set points to determine the type and location of a particular sensor, the module name provides a convenient, easily recognized description of the sensor for the user. The sensor input module name may not be longer than 15 characters.

Type [options] [Temp]

The sensor type is the specific type of sensor to be read by the Sensor Input Module. There are 39 sensor types available. The sensor type should be defined according to the physical input connected to the ARTC or 16AI board. Users may choose from the sensor types displayed in the following table.

Input Type	Description
Temp	Temperature input.
OutTemp*	Global outside temperature input.
In-Temp	Inside temperature input.
RtcSpace	Space temperature input.
Counter	Used for counting changes of state.
RH-5V	Relative humidity sensor input (RH%, 5 volts variable).
OutRH-5V*	Global outside relative humidity sensor input (RH%, 5 volts variable).
InRH-5V	Inside relative humidity sensor input (RH%, 5 volts variable).
EcnlRH5V*	Global economization relative humidity sensor input (RH%, 5 volts variable).
DhmlRH5V*	Global dehumidification relative humidity sensor input (RH%, 5 volts variable).
RH-4MA	Relative humidity sensor input (RH%, 4-20mA).
OutRH4MA*	Global outside relative humidity sensor input (RH%, 4-20mA).
InRH4MA	Inside relative humidity sensor input (RH%, 4-20mA).

Table 2 *- Available Input Types (*Global Inputs **Virtual Inputs) (Sheet 1 of 2)*

EcnlRH4MA*	Global economization relative humidity sensor input (RH%, 4-20mA).
DhmlRH4MA*	Global dehumidification relative humidity sensor input (RH%, 4-20mA).
Dewpt-In	Inside dewpoint temperature sensor input.
DewptOut*	Global outside dewpoint temperature sensor input.
RefrLeak	CPC refrigerant leak detector.
KwAnalog	KW analog sensor input (continuous reading).
KwDigitl	KW digital sensor input (reads pulses).
Lite-Lev	Analog light level input (reads foot-candles).
Linear	Linear input (reads voltage 0-5VDC).
CPC-SW	CPC temperature sensor with occupancy override button.
Digital	Non-voltage contact closure.
Proof	Input sensor that reads closure to determine if equipment is running.
Momentary	Reads momentary change of state (open to close or close to open).
MonOnOrv	Reads momentary change of state to determine fixed or timed override.
Orvd-On	Reads a change of state to determine fixed or timed override.
ShutDown	Reads a closure and shuts down all loads (all heating & cooling stages).
Lites-On*	Global input that relays ON to all outputs defined as “Lights” on closure.
Curtail	Non-voltage contact closure to activate curtailment.
AirMakUp	Non-voltage contact closure to activate MakeUp Air.
Enth-SW	Non-voltage contact closure from a enthalpy switch.
HumiStat	Non-voltage contact closure from a humidity stat.
lite-Dig	Non-voltage contact closure from a light level sensor.
Demand**	Virtual input that uses an internal demand value to control an output.
Alarm**	Virtual input that uses an internal alarm value to control an output.
Occupancy**	Virtual input that uses an internal schedule value to control an output.
Hr-Chime**	Virtual input that uses an internal time value to control an output.

***Table 2** - Available Input Types (*Global Inputs **Virtual Inputs) (Sheet 2 of 2)*

Alarm sequences are available for all input types defined in I/O Control. However, some input types require an alarm sequence in order to function properly. These input types are ShutDown, Lites-On, and Curtail. If any of these input types are used in I/O Control, an associated alarm sequence must be defined at the Input Sensor Alarms dialog box (see **Section 3.1.4.,** *Input Sensor Alarms*).

When a contact closure is detected within an input defined as ShutDown, Lites-On, or Curtail, the BCU activates these override functions regardless of any other control settings. ShutDown input contact closure will deactivate all HVAC loads. Lites-On input contact closure will activate all outputs defined as Lights (see **Section 4.1.3.,** *Output Setup*). Curtail input contact closure will activate all HVAC loads setup for curtailment for fifteen minutes (see **Section 5.1.5.,** *RTC Demand Setup*).

Most sensors connected to an input communication board provide data to a specific Sensor Input Module. Only the specified module uses the data received from the connected sensor. Global sensor readings are applicable to all areas controlled by the BCU. Global input sensors are used to monitor BCU functions such as lights and outside air and are also used when the BCU cannot find the appropriate sensors for a specified area.

In addition to global input types, virtual input types are also available within I/O Control. Virtual inputs use stored values within the BCU that control the activity of a specified output. Virtual inputs are defined as sensor inputs connected to the BCU; however, virtual inputs are not physically connected to any input board.

Physical Input

Type [options] [None]

Type defines the board type where the sensor to be read by the sensor input module is located. Users may choose from the following board types:

- BCU
- RTC

- 16AI
- None

If the input type is a virtual input, the board type should be BCU.

Board/Point

The network address of an input communication board is defined by either the network dip switch on the 16AI board or rotary dials on the ARTC. The number entered in the Board field is used in conjunction with the Type above to locate the sensor to be used by the Sensor Input Module. If the Type is a virtual input, no board number is required.

Each input sensor is connected to a specific point on an input communication board. On the 16AI board, the point numbers are printed on the board above the input connections. On the ARTC, AUX1 is point 1 and AUX2 is point 2. Because virtual inputs are not physically connected to any input communication board, no point number is required.

If a pulse input type is connected to a 16AI board with software older than version E.02, it must be connected to point one (1). In addition, the network dip switch rocker number eight on the 16AI board must be configured ON or in the up position.

Logging Interval [0 - 255 secs/mins/hrs] [5 min.]

The BCU periodically records the values received from the defined input sensors and stores the information in the Input Log. The Logging Interval defines when the data received from the sensor inputs are recorded.

Units

The BCU reads a signal from a sensor and compares the signal to the sensor type to determine the correct analog value. Therefore, units of measure are not important to the BCU. As a convenience to the user, a Units field is provided so that analog values displayed on the BCU screen are easily interpreted.

Additional Inputs

Control Method [options] [One]

The control method determines how to combine the values from multiple sensor input modules. This combined or control value is then compared to defined set points and commands to determine the operational status of an output. Users may choose from the following six control methods:

For Analog Sensors:

- *ONE* - The primary sensor value is the control value.
- *AVG* - The BCU calculates the control value using the average temperature of one or more sensors.
- *MAX* - The BCU calculates the control value using the maximum temperature value of one or more sensors.
- *MIN* - The BCU calculates the control value using the minimum temperature value of one or more sensors.

For Digital Sensor:

- *AND* - If the input sensor reads open and if all of the defined combiner inputs read open, an input command value of ON will be generated. Otherwise, an input command value of OFF will be generated.
- *OR* - If the input sensor reads open and if one or more of the combiner inputs read open, an input command value of ON will be generated. Otherwise, an input command value of OFF will be generated.

Up to three sensor input modules may be combined with the current input module.

Occupancy

Type [options] [Schedule]

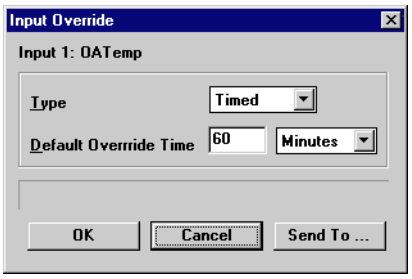
The occupancy type is the command type of an input or output module, or a schedule that will be used to establish the occupied mode for the selected sensor input module. The following command types are available:

- *Sensor Input Command* - A digital value issued by the Sensor Input Module as a final result of the interaction between the Hardware Interface, Combiner, Cut In/Cut Out, and Override cells.
- *Sensor Input Alarm* - A digital value issued by the Sensor Input Module as a final result of the Process Alarm cell. This value is generated based on a digital or analog signal generated by the Combiner cell.
- *Digital Output Command* - A digital value issued by the Digital Output Module as a final result of the interaction between the Demand Interface, Schedule Interface, Timer, Combiner, and Bypass cells.
- *Proof Fail Command* - A digital value issued by the Digital Output Module as a final result of the comparison of an actual proof value and a commanded output action.
- *Schedule* - An application independent of the Sensor Input and Digital Output Modules which is used to establish on and off times. Schedules are defined using Schedule Control in the BCU.

Instance [options] [None]

The instance is the source of the command type.

3.1.6. Input Override



Inputs defined as overrides are configured at the Input Override dialog box. If the input is not defined as an override see Section 3.1.5., *Input Set-up*, the Input Override menu option will not appear.

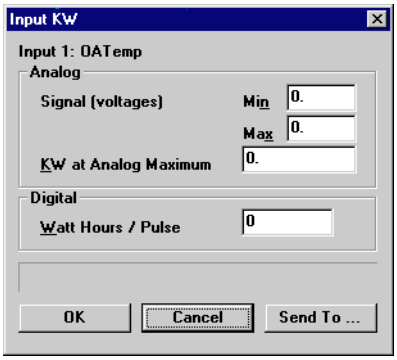
Type [Timed/Fixed] [Timed]

- *Timed* - A timed bypass overrides the input for a specified period of time.
- *Fixed* - A fixed bypass overrides the input until the user returns to this dialog box and disables the bypass. Bypasses are disabled when the status in the Command options box is returned to Normal.

Default Override Time [0 - 240 secs/mins/hrs] [60 min.]

The default override time is the specified period of time a timed bypass will be activated.

3.1.7. Input kW



KW settings required for demand monitoring are defined at the Input kW dialog box.

The BCU may use either a kW transducer or a watt-hour transducer to monitor demand. Set points for kW should be defined according to the transducer used.

Analog

Signal [0 - 6V] [0V]

kW transducers read the actual kW and send a voltage range defined by a minimum and maximum voltage.

kW of Analog Maximum [0 - 3200 kW] [0 kW]

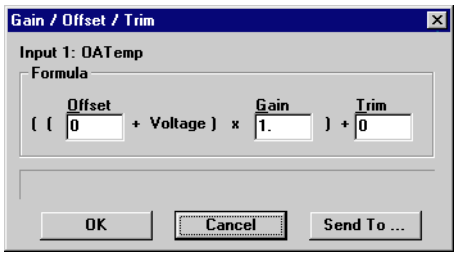
To correctly translate the voltage reading into a kW reading, the BCU requires the kW reading when the maximum voltage is being supplied. The BCU assumes the minimum voltage represents a value of zero.

Digital

Watt Hours/Pulse [0 - 9999 kW] [0 kW]

Watt-hour transducers read a pulse supplied by the power company, which represents a fixed number of watt-hours. The BCU uses the watt-hour information to calculate a kW value for use by the Demand Control algorithm.

3.1.8. Gain/Offset/Trim



The converted value of an input sensor reading is adjusted at the Gain/Offset/Trim dialog box.

Offset [-9999 - 9999] [0]

Offset is used to define the lower boundary of the range of input values that may be read by the sensor input module. Example: if a humidity sensor supplies a 1 to 5 volt signal, which represents a humidity range of 0% to 100%, the Offset value will be 1 (1 volt = 0% humidity).

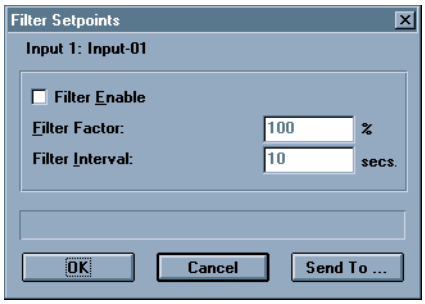
Gain [-999 - 999] [1.0]

Gain is used to define the upper boundary of the range of input values that may be read by the Sensor Input Module. Example: if a humidity sensor supplies a 1 to 5 volt signal, which represents a humidity range of 0% to 100%, the gain value will be 20 (5 volts * 20 = 100% humidity).

Trim [-99 - 99] [0]

At times, a sensor may provide a reading that—when offset and gain values are applied—reads lower or higher than the known condition being monitored. A trim value may be entered to calibrate the sensor to actual conditions.

3.1.9. Filter Setpoints



The rate of change of the combined value leaving the Combiner cell may be altered using the Filter Setpoints dialog box.

The Filter cell is used to limit the rate of change of the value leaving the Combiner cell. The Filter cell should only be used by persons having prior experience setting up such cells.

Enable [YES/NO][NO]

If this box is checked, the Filter cell will be enabled. If unchecked, the cell will not be active.

Factor [0 – 100%] [100%]

The Factor percentage determines how much the filter's input will be changed when compared with the desired filter output. Every time that an input changes, the filter will compare the previous output with the current input. After the comparison, the filter will then only allow the new output to be changed a percentage of what the input says it should change.

Interval [2 – 240 sec.] [10 sec.]

The Interval field determines how often the Filter will check what the input is. The Filter can be set to check the input anywhere between 2 and 240 seconds. By default, the Filter will check this value every 10 seconds if enabled.

3.1.10. Setup Instance

Setup Instance allows users to access all input-related dialog boxes in succession.

When Setup Instance is chosen, all dialog boxes related to input setup appear in sequence. This allows users to change a number of settings without having to select each dialog box individually from the system tree menu. When an input is created in UltraSite, the Setup Instance sequence is initiated automatically.

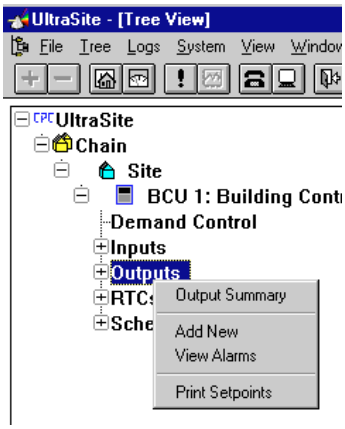
Setup Instance cycles through the dialog boxes in the following order:

- *Input Setup* - see **Section 3.1.5.**
- *Input Setpoints* - see **Section 3.1.3.**
- *Input Sensor Alarms* - see **Section 3.1.4.**
- *Input KW* - see **Section 3.1.7.**
- *Gain/Offset/Trim* - see **Section 3.1.8.**
- *Input Override* - see **Section 3.1.6.**
- *Filter Setpoints* - see **Section 3.1.9.**

4 Outputs Main Menu

From the Outputs Main Menu, output summary screens and alarms may be viewed, new modules may be added, and set points may be printed.

Screen Map



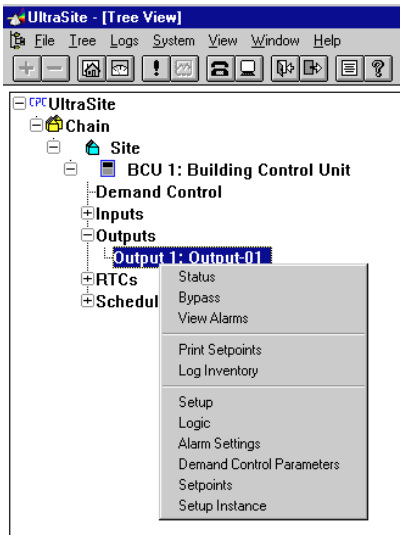
Options	Reference	Page
Output Summary	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens***.	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.5.7, Add New (Enhanced REFLECS only)***.	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints***.	47

4.1. Output Modules

From the Output Modules menu, output logic may be defined, output status screens may be viewed, and alarm and load shed parameters may be specified.

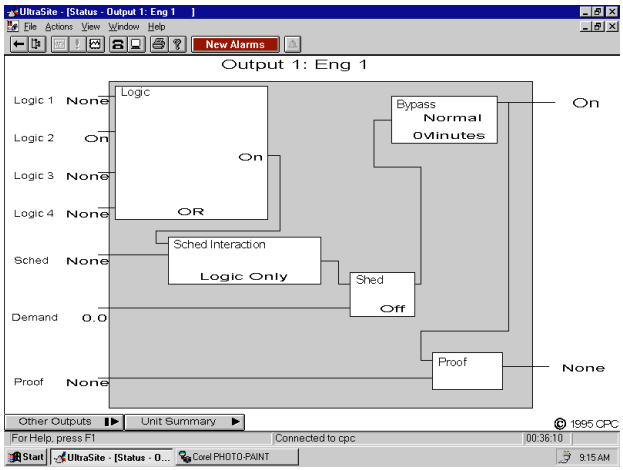
I/O Control provides a way of customizing the BCU by interconnecting input and output modules that control building functions. Digital Output Modules are setup, monitored, and controlled using the Output screens. For a complete overview of I/O Control, refer to *P/N 026-1105, Building Control Unit Installation and Operational Manual*.

Screen Map



Option	Reference	Page
Status	**Section 4.1.1.,** *Output Status*.	26
Bypass	**Section 4.1.2.,** *Output Bypass*.	26
View Alarms	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.6.1, Print Setpoints***.	47
Setup	**Section 4.1.3.,** *Output Setup*.	27
Logic	**Section 4.1.4.,** *Output Logic*.	28
Alarm Settings	**Section 4.1.5.,** *Output Alarms*.	29
Demand Control Parameters	**Section 4.1.6.,** *Output Demand Shed Parameters*.	29
Setup Instance	**Section 4.1.7.,** *Setup Instance*.	30

4.1.1. Output Status

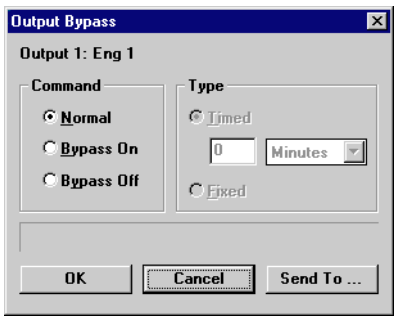


The Output Status screen displays the current status of the selected output module.

The Output Status screen displays real time information about the selected output module. Icon buttons and pull-down menus provide the necessary options to select graphing data, graph the selected data, view status screens of other output modules, and view the unit summary screen.

Icon buttons and pull-down menus found on summary and status screens are described in *P/N 026-1002, UltraSite User's Guide, **Section 1.10, Status and Summary Screens***.

4.1.2. Output Bypass



The normal output command value may be bypassed at any time at the Output Bypass dialog box.

Command [options] [Normal]

Users may choose from the following status commands:

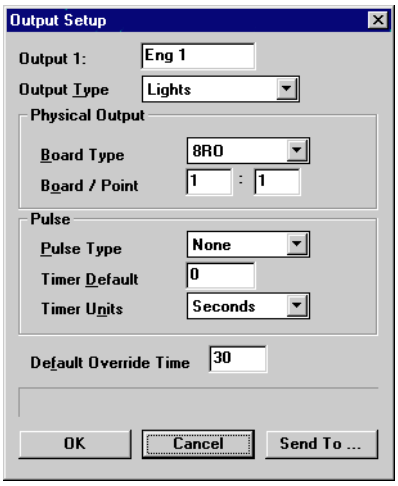
- *Normal* - The normal status is the normal operation mode for the selected output. The output will be activated or deactivated according to the normal Digital Output Command value.
- *Bypass On* - The bypass on status initiates an override and replaces the normal system settings with an ON command. The specified output will be activated.
- *Bypass Off* - The bypass off status initiates an override and replaces the normal system settings with an OFF command. The specified output will be deactivated.

Type [Timed/Fixed] [Timed]

Users may choose from the following bypass types when Bypass On or Off is selected from the command options:

- *Timed* - A timed bypass overrides the normal output command value for a specified period of time.
- *Fixed* - A fixed bypass overrides the normal output command value until the user returns to this dialog box and disables the bypass. Bypasses are disabled when the status in the Command options box is returned to Normal.

4.1.3. Output Setup



Each digital output module within I/O Control is defined at the Output Setup dialog box.

Output Name

The digital output module name is a user-defined name that corresponds to the digital output module number. While the BCU uses various set points to determine the type and location of a particular output, the module name provides a convenient, easily recognized description of the output for the user.

Output Type [Lights/Output] [Output]

The output type is the specific type of output to be controlled by the digital output module. The output type may be either Output or Lights. All outputs defined as Lights will be activated when a contact closure is detected within an input defined as Lites-On from the Input Setup dialog box (see **Section 3.1.5.,** *Input Setup*). These outputs will be activated regardless of any other control settings.

Physical Output

Board Type [options] [NONE]

The location of the output to be controlled by the digital output module is determined by the board type. Users may choose from the following board types:

- 8RO
- RTC
- None

If an 8IO is being used, select 8RO

Board/Point

In conjunction with the board type, the board number and point also determines the location of the output to be controlled by the digital output module.

The network address, or board number, of an output communication board is defined by either the network dip switch on the 8RO board or rotary dials on the ARTC or 8IO board.

Each output is physically connected to a specific point on an output communication board. On the 8RO and 8IO boards, the point numbers are printed on the board adjacent to the output connections. On the ARTC, AUX 1 is point 1 and AUX 2 is point 2.

Pulse

The pulse, or momentary start and stop function within I/O Control will activate an output for a defined period of time based on the transition of the ON/OFF output command value.

Pulse Type [options] [None]

The pulse type is the output timer type and should be defined based on when the timer type should activate the load: at the beginning of the digital ON signal or at the end. Users may choose from the following two pulse types:

- *Pulse On* - activates a specified output when the output command value transitions from an OFF to an ON.
- *Pulse Off* - activates a specified output when the output command value transitions from an ON to an OFF.

To disable the pulse feature, select None.

Timer Default [0 - 240] [0]

The Timer Default is the duration the output will be ON when a value corresponding to the Momentary On or Off selection is received. This duration will be used to determine when an ON pulse should be ended regardless of any other commands received.

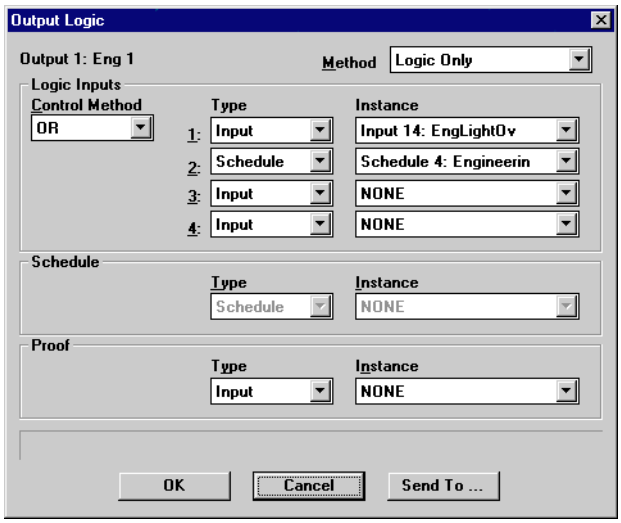
Timer Units [options] [Seconds]

The Timer Units determine if the timer default should be measured in seconds, minutes, or hours.

Default Override Time [0 - 240] [30]

The default override time is the duration the output will remain in bypass mode if the bypass is defined as a timed bypass at the Output Bypass dialog box (see **Section 4.1.2.**).

4.1.4. Output Logic



Command types that will be used to control an output are identified at the Output Logic dialog box. Proof alarm command methods are also defined.

The BCU may control an output using a single command or the combination of several commands. To understand the logic concept in the order that the output control algorithm handles the data provided at the Logic dialog box, the Logic Inputs options box must be described first and the Method, Schedule, and Proof options last.

Logic Input

Type [options] [Input]

The final digital output values of up to four input and/or output modules, or schedules may be logically combined to create a single output control value. The command types may be any of the five types listed below:

- *Sensor Input Command (Input)* - A digital value issued by the Sensor Input Module as a final result of the interaction between the Hardware Interface, Combiner, Cut In/Cut Out, and Override cells.
- *Sensor Input Alarm (Input Alarm)* - A digital value issued by the Sensor Input Module as a final result of the Process Alarm cell. This value is generated based on a digital or analog signal generated by the Combiner cell.
- *Digital Output Command (Output)* - A digital value issued by the Digital Output Module as a final result of the interaction between the Demand Interface, Schedule Interface, Timer, Combiner, and Bypass cells.
- *Proof Fail Command (Output Proof)* - A digital value issued by the Digital Output Module as a final result of the comparison of an actual proof value and a commanded output action.
- *Schedule* - An application independent of the Sensor Input and Digital Output Modules which is used to establish on and off times. Schedules are defined using Schedule Control in the BCU.

Instance [options] [None]

The instances are the modules to be combined using the method chosen in the Control Method field. Users may choose from any Input or Output module, or schedule found in the scroll options.

Control Method [options] [OR]

The control method is the logic type that will determine how the selected module or schedule values will be combined. The control method may be any of the types listed below:

- *OR* - If any of the sensor input commands are ON, the Logic In value will be ON.
- *NOR* - The Logic In value is the opposite of the result of the OR function.
- *AND* - If all of the sensor input commands are ON, the Logic In value will be ON. Otherwise, the Logic In value will be OFF.
- *NAND* - The Logic In value is the opposite of the result of the AND function.
- *XOR* - If the two sensor input command values are the same, the Logic In value is OFF. If the values are different, the Logic In value is ON.
- *VOTE* - If the majority of the sensor input command values are ON, the Logic In value is ON. Otherwise, the Logic In value will be OFF.

Method [options] [Logic Only]

The value created as a result of the logical combination of these input and/or output module, or schedule commands may now be combined with a final input and/or output module, or schedule to create a final output control value.

The method used to combine the Logic and Schedule values may be any of the methods listed below:

- *Logic Only* - The ON or OFF sensor input command received from the Logic output module is used as the normal output command value.
- *Sched Only* - The user-defined occupancy command within the Schedule Interface output module is used as the normal output command value.

- *Both ON/Both OFF* - the result of the logic calculations and the occupancy command must both be ON to activate the output both OFF to deactivate the output.
- *Both ON/Sched OFF* - Both the occupancy command and the result of the logic calculations must be ON to activate the output; however, if the occupancy command is OFF, the output is deactivated.
- *Sched ON/Both OFF* - If the occupancy command is ON, the output is activated, but both the logic calculation and the occupancy command must be OFF to deactivate the output.
- *Both ON/Either OFF* - Both the occupancy command and logic calculation must be ON to activate the output, but either can be OFF to the output.

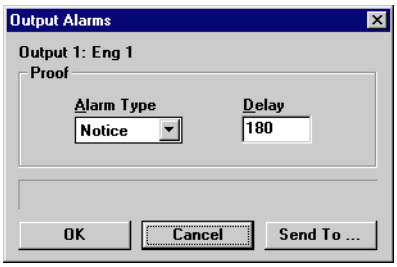
Schedule [options] [None]

The input and/or output module, or schedule to be combined with the logic value created above, may be any of the five command types listed under Logic and found in the Schedule scroll options.

Proof [options] [Input]

The current output command value created within the output module is compared to a proof command. This comparison will determine if a proof fail alarm or notice will be generated when a load controlled by an output module fails to activate. Generally, this command type will be generated by an input module tied to a proof sensor on the load being controlled. The command types may be any of the types listed under Logic and found in the Proof scroll options.

4.1.5. Output Alarms



Proof fail alarms are defined at the Output Alarms dialog box.

Alarm Type [Alarm/Notice/Disable] [Notice]

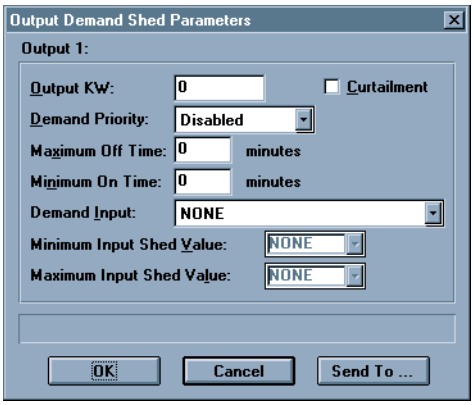
An alarm or a notice will be generated when the BCU detects an abnormal ON/OFF status within a specified output.

The proof alarm feature is activated when an alarm type is chosen. To deactivate the proof alarm function for the specified output, select Disable from the Alarm Type scroll options.

Delay [0 - 240 sec.] [180 sec.]

The proof delay is the specified time in seconds the BCU must wait before activating an alarm or notice when the BCU detects an abnormal ON/OFF reading within an output.

4.1.6. Output Demand Shed Parameters



Demand Control settings for each output are defined at the Output Demand Shed Parameters dialog box.

Output kW [0 - 240 kW] [0 kW]

Each output load controlled by an ARTC has a specific kW rating. This rating is used by the BCU to determine which loads within the priority level must be shed to reduce energy consumption below the Demand Limit Set Point.

Curtailment [Yes/No] [No]

If curtailment is available, it may be assigned to any output load. When a non-voltage contact closure is detected in an input defined as Curtail (see **Section 3.1.5.,** *Input Setup*), curtailment is activated and all HVAC loads setup for

curtailment will be turned off for 15 minutes regardless of any other control settings.

Demand Priority [options] [Disabled]

For each output, a load shed priority is defined. Outputs may be defined to load shed priority levels 1-16. Level 1 is the lowest priority and loads within this level will be shed last. Level 16 is the highest priority level and loads within this level will be shed first. Load shedding is disabled if disabled is selected from the Demand Priority scroll options.

Maximum Off Time [0 - 240 min.] [0 min.]

All digital output modules may be configured to come out of load shed after a specified period of time. This duration is the Maximum Off Time.

Minimum On Time [0 - 240 min.] [0 min.]

A digital output module that has recently been shed may be configured to remain out of shed for a defined period of time before being placed back in shed. This duration is the Minimum On Time.

Demand Input [options] [None]

The value received from the demand input is compared to the demand shed values to determine if load shedding may take place for the specified digital output module.

Demand Shed Values

From [00:00 - 23:59] [NONE]

The value entered in the From field is the minimum shed value. The specified digital output module will compare the value issued by the specified sensor input module and the minimum shed value. If the sensor input value is lower than the minimum shed value, load shed will not occur.

To [00:00 - 23:59] [NONE]

The value entered in the To field is the maximum shed value. The specified digital output module will compare the value issued by the specified sensor input module and the maximum shed value. If the sensor input value is higher than the maximum shed value, load shed will not occur.

4.1.7. Setup Instance

Setup Instance allows users to access all output-related dialog boxes in succession.

When Setup Instance is chosen, all dialog boxes related to output module setup appear in sequence. This allows users to change a number of settings without having to select each dialog box individually from the system tree menu. When an output is created in UltraSite, the Setup Instance sequence is initiated automatically.

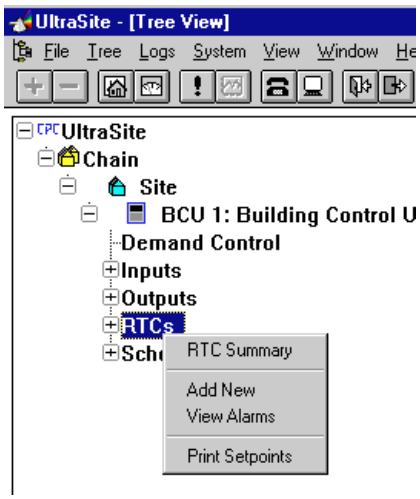
Setup Instance cycles through the dialog boxes in the following order:

- *Output Setup* - see **Section 4.1.3.**
- *Output Logic* - see **Section 4.1.4.**
- *Output Alarms* - see **Section 4.1.5.**
- *Output Demand Shed Parameters* - see **Section 4.1.6.**

5 RTCs Main Menu

From the RTC Main Menu, users may view RTC summary information, add new units, print set points, and view RTC-related alarms.

Screen Map

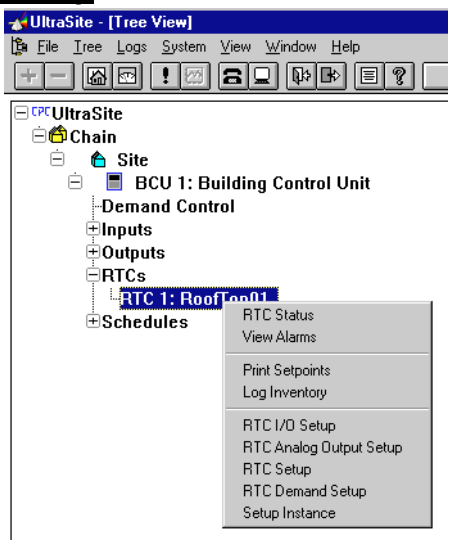


Option	Reference	Page
RTC Summary	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.10, Status and Summary Screens***.	63
Add New	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.5.7, Add New (Enhanced REFLECS only)***.	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide*, ***Section 1.6.1, Print Set-points***.	47

5.1. Individual RTC Menu

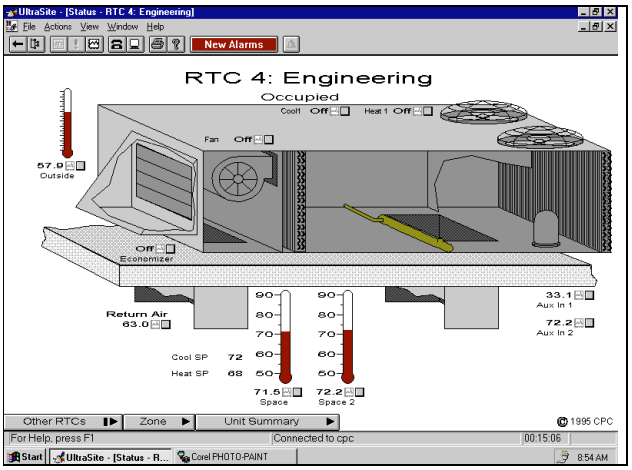
From the Individual RTC Menu, users may view RTC status screens, enter setup and set point data, and define demand control parameters.

Screen Map



Option	Reference	Page
RTC Status	**Section 5.1.1.,** *RTC Status*.	33
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints***.	47
Log Inventory	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.5.2, Log Inventory***.	40
RTC I/O Setup	**Section 5.1.2.,** *RTC I/O Setup*.	33
RTC Analog Output Setup	**Section 5.1.3.,** *RTC Analog Output Setup*.	35
RTC Setup	**Section 5.1.4.,** *RTC Setup*.	35
RTC Demand Setup	**Section 5.1.5.,** *RTC Demand Setup*.	36
Setup Instance	**Section 5.1.6.,** *Setup Instance*.	37

5.1.1. RTC Status

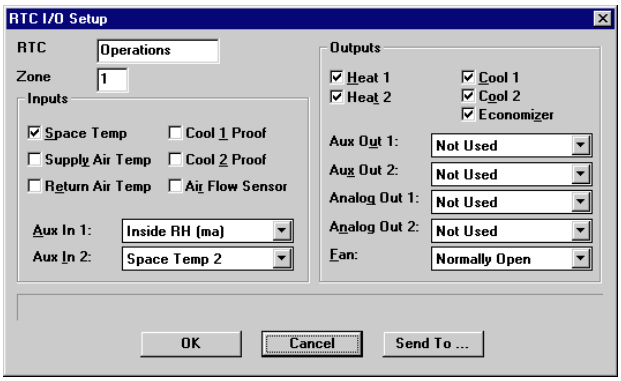


The RTC Status screen displays current information about the selected RTC Application.

The RTC Status screen displays real time information about the selected RTC application. Icon buttons and pull-down menus provide the necessary options to select graphing data, graph the selected data, view status screens of each RTC application, view the RTC Summary screen, and view the unit summary screen.

Icon buttons and pull-down menus found on summary and status screens are described in *P/N 026-1002, UltraSite User's Guide*, ***Section 1.10, Status and Summary Screens***.

5.1.2. RTC I/O Setup



All inputs and outputs connected to an ARTC board are defined at the RTC I/O Setup dialog box.

The name and corresponding zone assignment of the selected ARTC will be displayed in the RTC and Zone fields.

To edit the defined name and zone number, enter the new name and/or number in these fields.

Inputs [Yes/No] [Space Temp=Y, all others=N]

There are eight available input connections on each ARTC board: six predefined, and two auxiliary. Only the types displayed in the Inputs options box should be connected to an ARTC. To activate any of the predefined inputs, check the desired box.

The ARTC is capable of operating a rooftop unit as soon as a single space temperature probe has been defined as an ARTC input connection and power has been supplied to the board.

Aux In 1/Aux In 2 [options] [Not Used]

There are also two auxiliary input connections on an ARTC. There are 18 available auxiliary input types. These inputs are activated when an input type is selected. Users may choose from the auxiliary input types displayed in the table below.

Not Used	Selected to deactivate the auxiliary input.
Mixed Air	Temperature sensor that measures the combined outside and return air temperature.
Outside Temp	Outside air temperature sensor.
Space Temp 2	Secondary space temperature sensor.
Cool 3 Proof	Digital proof input for the defined Cool 3 Output.
Cool 4 Proof	Digital proof input for the defined Cool 4 Output.
Outside RH (ma)	4-20mA analog outside humidity sensor.
Inside RH (ma)	4-20mA analog inside humidity sensor.

Table 3 *- Auxiliary Input Types*

Outside RH (5v)	5 volt analog outside humidity sensor.
Inside Rh (5v)	5 volt analog inside humidity sensor.
Hum-Stat	Digital humidistat that measures the humidity and compares it to the set point defined within the sensor. There is a contact closure when the humidity level falls below the set point.
Enth SW	Digital enthalpy switch that measures the enthalpy and compares it to the set point defined within the sensor. There is a contact closure when the enthalpy level falls below the set point.
Light Level	Analog light sensor that measures light in foot-candles.
Digital Light Sensor	Digital light sensor that measures light and generates contact closure when the light level reaches a defined level.
Freeze Stat	Digital sensor that measures the temperature of the evaporator coil and gives a dry contact closure when the temperature is at or below freezing.
Smoke Det	Digital sensor that gives a dry contact closure when smoke is detected.
Filter Alm	Digital sensor that gives a dry contact closure when a dirty/clogged filter is detected.
Temperature	General temperature sensor input for monitoring only.
Override Switch	Digital toggle switch used to signal an override.

***Table 3** - Auxiliary Input Types*

Outputs [Yes/No] [Heat/Cool=Y, Economizer=N]

The check boxes at the top of the Outputs section of the dialog box are for the first and second stages of heat, the first and second stages of cool, and the economizer. To activate any of these predefined outputs, enter a check in the appropriate box.

If a digital economizer output is not defined (ECO), digital economization within the area controlled by the specified ARTC is disabled. Economization is performed with a digital or analog economizer depending on the type of economizer installed at the Rooftop Unit. Analog economizers are defined as either the AO1 or AO2 analog outputs on the ARTC.

Aux Out 1/Aux Out 2 [options] [Not Used]

There are also two auxiliary output connections on an ARTC. There are 13 available auxiliary output types. These outputs are activated when an output type is selected. Users may choose from the auxiliary output types displayed in the table below.

Not used	Selected to deactivate the auxiliary output.
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.
HP Reverse (Cool)	Heat pump reversing valve - closed (cool): If a heat pump is used, the reversing valve will close for a cooling stage and open for a heating stage.
Alarm	An output relay will be activated when any RTC Alarm is generated. This relay will return to the normal position when the alarm condition is deactivated.
Humidify	An output for a humidifier.
HP Reverse (Heat)	Heat pump reversing valve - closed (heat): If a heat pump is used, the reversing valve will close for a heating stage and open for a cooling stage.
Failsafe	An output relay ON will be activated when the ARTC board is on-line.
Economizer Shadow	Operated the same as an ECO output.

***Table 4** - Auxiliary Output Types*

Analog Out 1/Analog Out 2 [options] [Not Used]

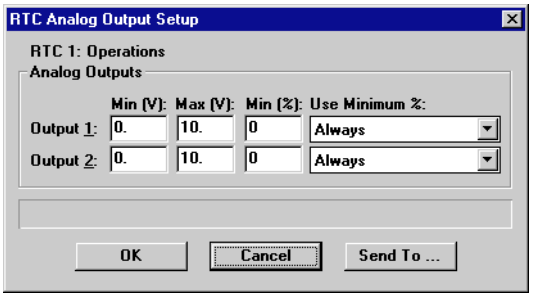
There are two analog output connections on an ARTC. These outputs should be defined when performing economization with an analog economizer. To activate the output, select Analog Economizer from the Analog Out 1 and/or 2 scroll options. Analog economizer con-

trol parameters are defined at the Output Demand Shed Parameters dialog box (see **Section 4.1.6.,** *Output Demand Shed Parameters*) and the RTC Analog Output Setup dialog box (see **Section 5.1.3.,** *RTC Analog Output Setup*).

Fan [Normally Open/Normally Closed] [Normally Open]

The Fan should be defined to either relay normally open or normally closed.

5.1.3. RTC Analog Output Setup



When economization is activated in a zone using an analog economizer, the economizer will modulate based on the analog output set points defined at the RTC Analog Output Setup dialog box.

Min (V) and Max (V) [0 - 10V] [Min=0, Max=10]

The ARTC modulates the damper by sending the appropriate voltage to the analog economizer. By default, the output will modulate at 1-10 VDC. Voltages should be defined based on the controlling motor of the economizer damper. The ARTC will automatically send the appropriate voltage to the economizer according to the desired position of the damper.

The Min (V) is the minimum voltage to be sent to the economizer when the output is OFF. The Max (V) is the maximum voltage to be sent to the economizer when the output is at 100%.

Min% [0 - 100%] [0%]

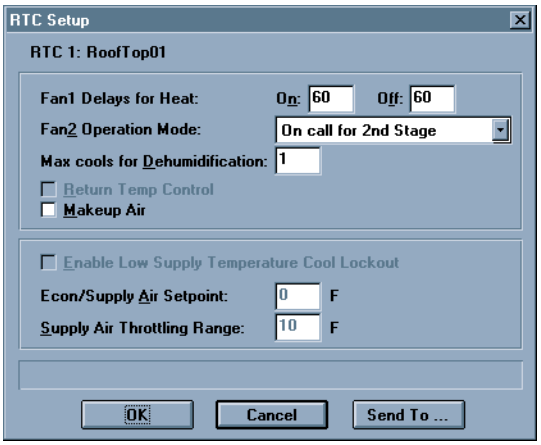
The economizer damper will proportionally modulate based on the throttling range that is fixed at 10° F around the analog economization temperature set point. When the mixed air or supply air temperature falls to the bottom of the throttling range, the economizer damper will modulate closed or the damper will modulate to its minimum position.

The Min% is the minimum percentage position the economizer should stay open on a call to close.

Use Minimum% [Always/Only When Occupied] [Always]

When the “Only when Occupied” option is selected from the Use Minimum% scroll options, the economizer damper will only modulate to the minimum percentage when in an occupied mode. By default, the economizer will modulate based on the minimum percentage at all times.

5.1.4. RTC Setup



Configuration set points for each ARTC are defined at the RTC Setup dialog box.

Fan1 Delays for Heat [0 - 240 min.]

On a call for heat, the ARTC will activate the fan after the duration specified in the On field. This is in addition to any delay built into the Rooftop Unit. When a heat stage is deactivated, the ARTC leaves the fan ON for the duration specified in the Off field.

Fan 2 Operation Mode [options] [On call for 2nd stage]

If Fan2 is defined as an auxiliary output on the ARTC, the fan is activated during the second stage of heat and during the second stage of cool. When activated, Fan1 is deactivat-

ed and Fan2 turns on. Currently, this operational mode is the only active mode for Fan2 operation. The other options available in the Fan2 Operation Mode scroll options will become active in future versions of the BCU.

When a second stage of heat or cool is deactivated, Fan2 is deactivated, and Fan1 is reactivated. However, there is a ten second delay for Fan2 to spin down before Fan1 starts. This delay is fixed in the BCU and cannot be modified.

Max Cools for Dehumidification [0 - 4] [1]

A maximum number of cooling stages used during dehumidification may be defined to prevent the space temperature level from dropping too low. If this set point is set to the default of One, compressors two, three, and four will not be used during dehumidification.

Econ/Supply Air Setpoint [0 - 99° F] [0° F]

The Econ/Supply Air Setpoint is the analog economization temperature set point.

When economization is activated in a zone using an analog economizer, the economizer will modulate based on the mixed air temperature. If a mixed air temperature sensor is not found, the economizer will modulate based on the supply air temperature. These control temperatures are compared to the analog economization temperature set point to determine the position of the economizer damper. The economizer damper will proportionally modulate based on the throttling range that is fixed at 10° F around the analog economization temperature set point.

Return Temp Control [Yes/No] [No]

By default, most HVAC applications use the current space temperature as the controlling value. Temperature readings are compared to the defined set points to determine if an HVAC application should be activated. HVAC applications may also be controlled using the current return air temperature.

When Return Temp Control is selected, the controlling value for HVAC applications changes from the space temperature value to the return air temperature value.

Makeup Air [Yes/No] [No]

When Makeup Air is selected, the makeup air application within the ARTC is activated. For more information about the Makeup Air Strategy, see *CPC's Building Control Unit Installation and Operational Manual* (PN 026-1105).

Enable Low Supply Temp Lockout [Yes/No][No]

To activate Temp Cool Lockout, this box must be checked. Once Lockout Enable is set to Yes, mechanical cooling stages may be prevented from engaging when the supply air temperature is too low.

Lockout Setpt [0°– 99° F][0° F]

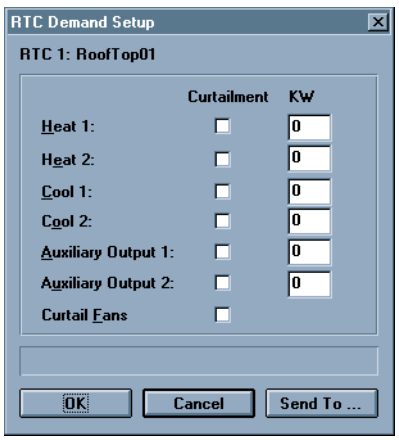
The Lockout set point is the lowest allowable temperature below which the RTC's cooling stages may be locked out.

Lockout Throttling Range [4° – 30° F][10° F]

When the throttling range is set, the BCU will look at the supply air temperature to see if the supply air temperature is below the supply air setpoint. If the supply air temperature is below the supply air set point plus half of the throttling range, no additional compressors will be allowed to stage on because the supply temperature is within the modulating range of the economizer. During this lockout, no compressors that were previously running will be shut off.

After the supply temperature rises above the lockout setpoint plus half of the throttling range, the additional compressors may be allowed to come on if the BCU calls for them.

5.1.5. RTC Demand Setup



The demand shed program and curtailment program is defined at the RTC Demand Setup dialog box.

kW [0 - 240 kW] [0 kW]

Along with the information required in the Define Shed Parameters dialog box (see **Section 4.1.6.,** *Output Demand Shed Parameters*), the BCU must know the kWH rating for any load that will be used in a demand shed program. The kWH rating for any load is available on the unit data plate. The BCU uses this information to shed loads when the maximum kWH limit is approached, thus guaranteeing that the maximum kilowatt rate is not exceeded. Leaving this setting at zero excludes the selected load from demand shed.

Curtailment [Yes/No] [No]

If a particular site is participating in a power company curtailment program, the selected loads for each ARTC will be shut-down for 15 minutes when curtailment is in effect. Curtailment is activated when a non-voltage contact closure is detected in an input defined as Curtail (see **Section 3.1.5.,** *Input Setup*). There is no control over when or if these loads are shut-down other than to include or not include them in the curtailment program.

To set up an output for curtailment, check the Curtailment check box next to the output and enter the kW value of the output's load. Users may select both heating stages, both cooling stages, both auxiliary outputs, and the fan for curtailment.

5.1.6. Setup Instance

Setup Instance allows users to access all RTC-related dialog boxes in succession.

When Setup Instance is chosen, all dialog boxes related to RTC setup appear in sequence. This allows users to change a number of settings without having to select each dialog box individually from the system tree menu. When an RTC is created in UltraSite, the Setup Instance sequence is initiated automatically.

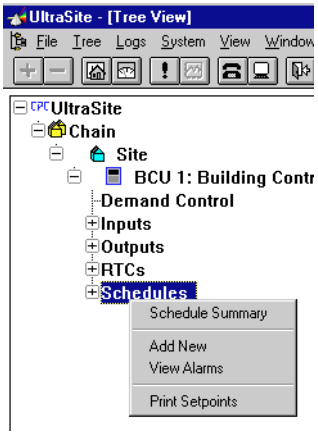
Setup Instance cycles through the dialog boxes in the following order:

- *RTC I/O Setup* - see **Section 5.1.2.**
- *Analog Output Setup* - see **Section 5.1.3.**
- *RTC Setup* - see **Section 5.1.4.**
- *RTC Demand Setup* - see **Section 5.1.5.**

6 Schedules

From the Schedules Main Menu, users may view schedule summaries, add new schedules, view schedule alarms, and print schedule set points.

Screen Map

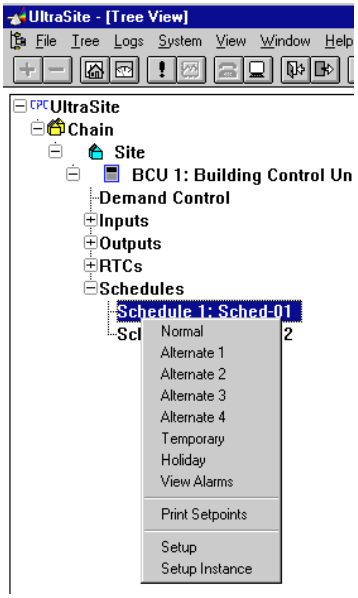


Option	Reference	Page
Schedule Summary	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens***.	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.5.7, Add New (Enhanced REFLECS only)***.	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Set-points***.	47

6.1. Individual Schedule Menu

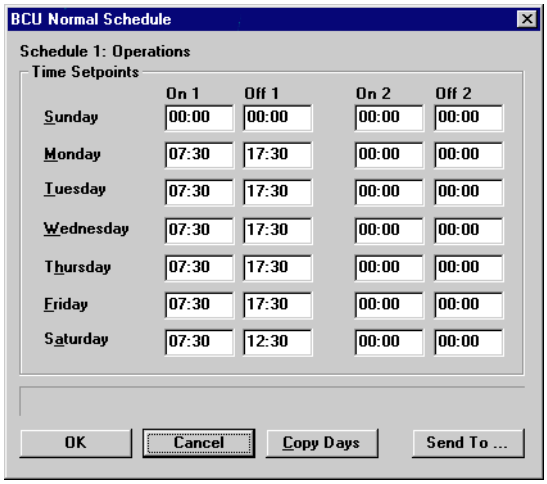
BCU regular, alternate, holiday, and temporary schedules may be set up using the Individual Schedule Menu options.

Screen Map



Option	Reference	Page
Normal	**Section 6.1.1.,** *BCU Normal Schedule*.	40
Alternate 1	**Section 6.1.2.,** *Alternate 1 Schedule*.	41
Alternate 2	**Section 6.1.3.,** *Alternate 2 Schedule*.	41
Temporary	**Section 6.1.6.,** *BCU Temporary Schedule*.	43
Holiday	**Section 6.1.7.,** *BCU Holiday Schedule*.	43
View Alarms	See *P/N 026-1002, UltraSite User's Guide*, **Section 1.11,** *Alarm View*.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide*, **Section 1.6.1,** *Print Setpoints*.	47
Setup	**Section 6.1.8.,** *Schedule Setup*.	43
Setup Instance	**Section 6.1.9.,** *Setup Instance*.	45

6.1.1. BCU Normal Schedule



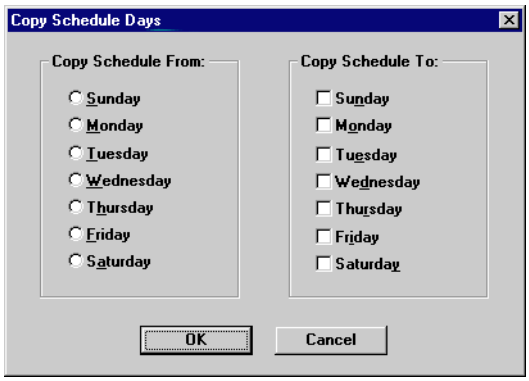
Standard ON and OFF operation times for day to day business hours are defined at the BCU Normal Schedule dialog box.

Standard or Normal week schedules are the basic schedules. All other defined schedules take precedence over the normal week schedule.

Copy Days

See **Section 6.1.1.1.,** *Copy Days.*

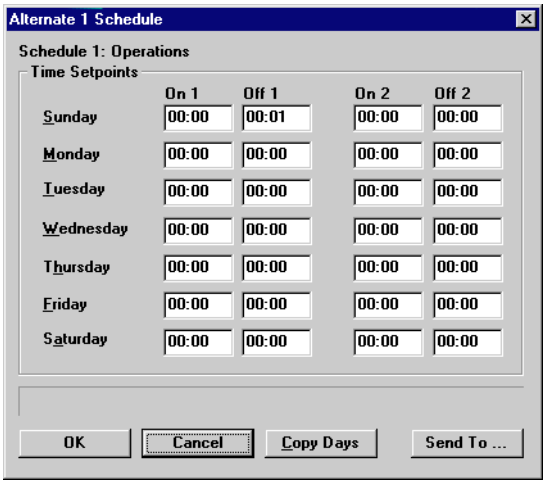
6.1.1.1. Copy Days



ON and OFF operational times of one day of the week may be copied to another day within the specified schedule at the Copy Days dialog box.

Schedule settings defined for one day of the week are copied to another day of the week at the Copy Days dialog box. Select only those days that have identical requirements.

6.1.2. Alternate 1 Schedule



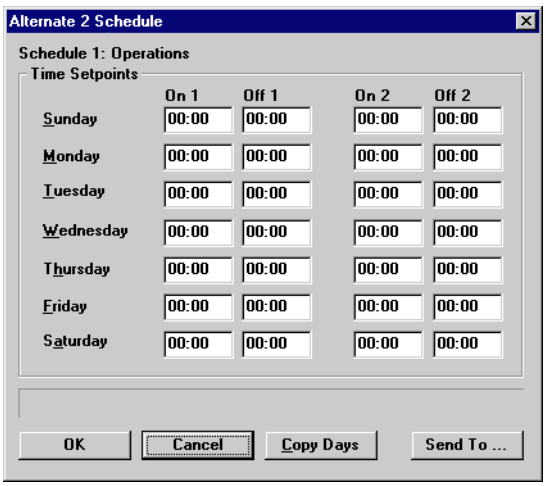
ON and OFF operation times for Alternate Week 1 schedules are defined at the Alternate 1 Schedule dialog box.

Alternate Weeks are used to plan for known hours personnel will be in the store apart from standard business hours. When activated, alternate week schedules take precedence over the standard week schedule.

Copy Days

See **Section 6.1.1.1.,** *Copy Days.*

6.1.3. Alternate 2 Schedule



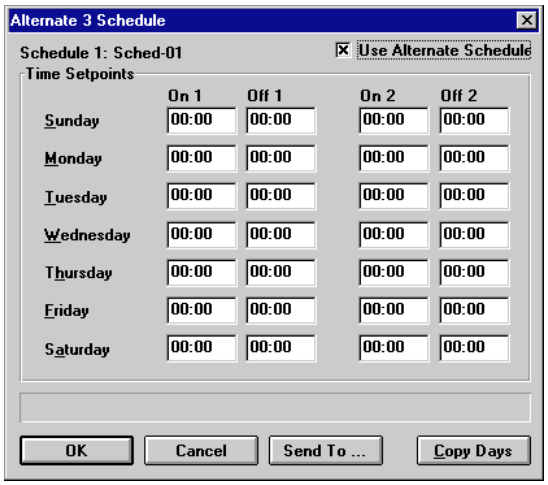
ON and OFF operation times for Alternate Week 2 schedules are defined at the Alternate 2 Schedule dialog box.

Alternate Weeks are used to plan for known hours personnel will be in the store apart from standard business hours. When activated, alternate week schedules take precedence over the standard week schedule.

Copy Days

See **Section 6.1.1.1.,** *Copy Days.*

6.1.4. Alternate 3 Schedule



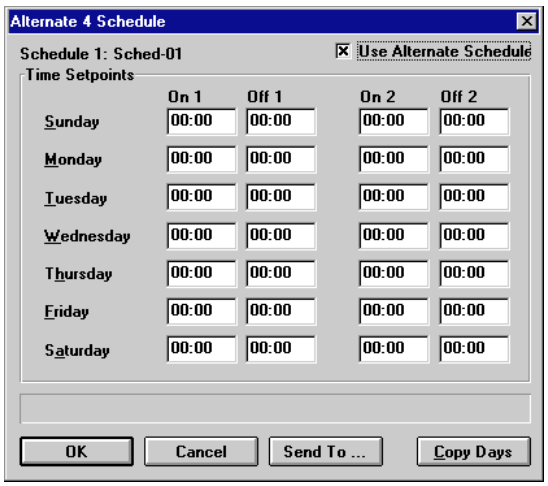
ON and OFF operation times for Alternate Week 3 schedules are defined at the Alternate 3 Schedule dialog box.

Alternate Weeks are used to plan for known hours personnel will be in the store apart from standard business hours. When activated, alternate week schedules take precedence over the standard week schedule.

Copy Days

See **Section 6.1.1.1.,** *Copy Days.*

6.1.5. Alternate 4 Schedule



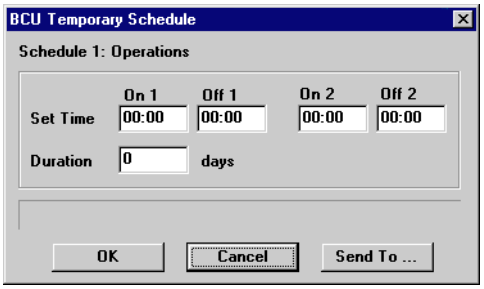
ON and OFF operation times for Alternate Week 4 schedules are defined at the Alternate 4 Schedule dialog box.

Alternate Weeks are used to plan for known hours personnel will be in the store apart from standard business hours. When activated, alternate week schedules take precedence over the standard week schedule.

Copy Days

See **Section 6.1.1.1.,** *Copy Days.*

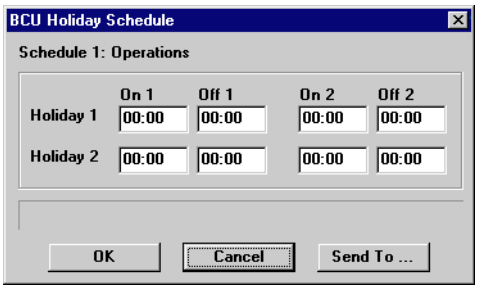
6.1.6. BCU Temporary Schedule



ON and OFF operation times for temporary, or override schedules are defined at the BCU Temporary Schedule dialog box.

Any of the 56 possible schedules may be bypassed using Schedule Overrides. When activated, schedule override settings bypass the normal system schedule for the defined period of time.

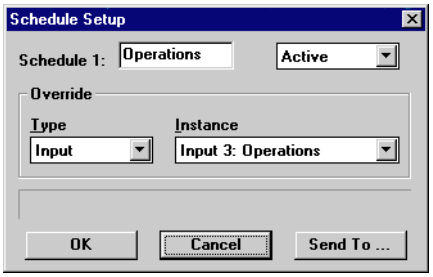
6.1.7. BCU Holiday Schedule



ON and OFF operation times for holiday schedules are defined at the BCU Holiday schedule dialog box.

ON and OFF operation times for long holidays such as Christmas makeup the Holiday 1 and Holiday 2 schedules. When activated, the holiday schedule takes precedence over both the standard week schedule and the alternate week schedules.

6.1.8. Schedule Setup



Schedule overrides are defined at the Schedule Setup dialog box.

When activated by selecting “Active” in the scroll options at the top of the dialog box, schedule overrides will bypass the normal system schedule settings and all zones controlled by the schedule will operate in an occupied mode. To override the normal system schedule, the zone must receive a signal from an override source.

Type [options] [Input]

The override source type is either an input sensor or digital output module defined under I/O Control or it may be a schedule. The following override source types determine if an override should be activated:

- *Sensor Input Command (ICMD)* - A digital value issued by the Sensor Input Module as a final result of the interaction between the Hardware Interface, Combiner, Cut In/Cut Out, and Override cells.
- *Sensor Input Alarm (ALRM)* - A digital value issued by the Sensor Input Module as a final result of the Process Alarm cell. This value is generated based on a digital or analog signal generated by the Combiner cell.
- *Digital Output Command (OCMD)* - A digital value issued by the Digital Output Module as a final result of the interaction between the Demand Interface, Schedule Interface, Timer, Combiner, and Bypass cells.
- *Proof Fail Command (PROF)* - A digital value issued by the Digital Output Module as a final result

of the comparison of an actual proof value and a commanded output action.

- *Schedule (SCHED)* - An application independent of the Sensor Input and Digital Output Modules which is used to establish on and off times. Schedules are defined using Schedule Control in the BCU.

Instance [Input #] [None]

If the source signals OFF, the ARTC will continue to control the zone using normal system settings. If the source signals ON, the ARTC will control the zone according to the occupied mode set points. An instance is the override source defined in I/O Control.

6.1.9. Setup Instance

Setup Instance allows users to access all schedule-related dialog boxes in succession.

When Setup Instance is chosen, all dialog boxes related to schedule setup appear in sequence. This allows users to change a number of settings without having to select each dialog box individually from the system tree menu. When a schedule is created in UltraSite, the Setup Instance sequence is initiated automatically.

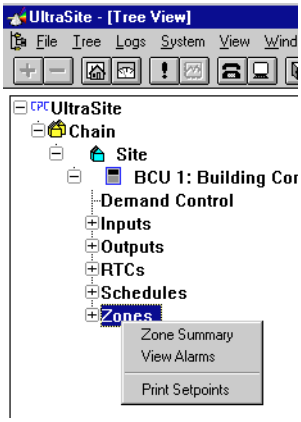
Setup Instance cycles through the dialog boxes in the following order:

- *RTC I/O Setup* - see **Section 5.1.2.**
- *Analog Output Setup* - see **Section 5.1.3.**
- *RTC Setup* - see **Section 5.1.4.**
- *RTC Demand Setup* - see **Section 5.1.5.**

7 Zones Main Menu

From the Zones Main Menu, zone summary and alarm data may be viewed, and set points may be printed.

Screen Map

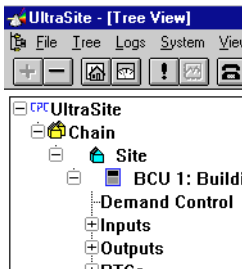


Option	Reference	Page
Zone Summary	*P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens****.*	63
View Alarms	*P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View****.*	66
Print Setpoints	*P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints****.*	47

7.1. Individual Zone Menu

Individual zones may be set up or viewed using the Individual Zone menu options.

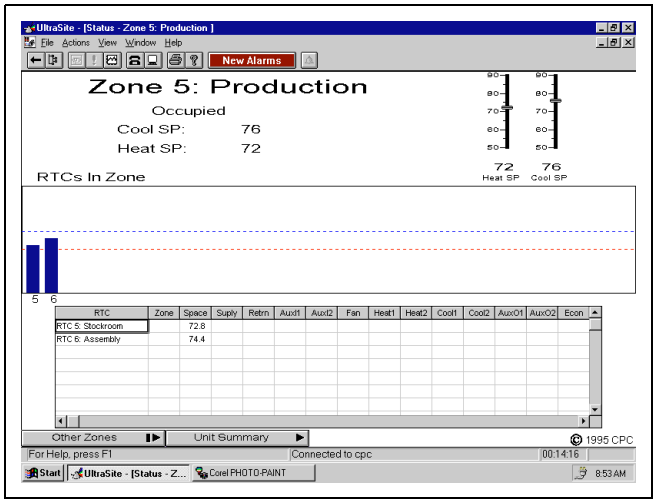
Screen Map



Option	Reference	Page
Zone Status	**Section 7.1.1.,** *Zone Status.*	47
Temperature Setpoints	**Section 7.1.2.,** *Zone Temperature Setpoints.*	47
Humidity Setpoints	**Section 7.1.3.,** *Zone Humidity Setpoints.*	48
Demand Shed Parameters	**Section 7.1.4.,** *Demand Shed Parameters.*	49

Option	Reference	Page
Alarm Limits	**Section 7.1.5.,** *Alarm Limits.*	49
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.11, Alarm View***.	66
Print Setpoints	See *P/N 026-1002, UltraSite User's Guide,* ***Section 1.6.1, Print Setpoints***.	47
Zone Setup	**Section 7.1.6.,** *Zone Setup*.	50
Setup Instance	**Section 7.1.7.,** *Setup Instance*.	52

7.1.1. Zone Status

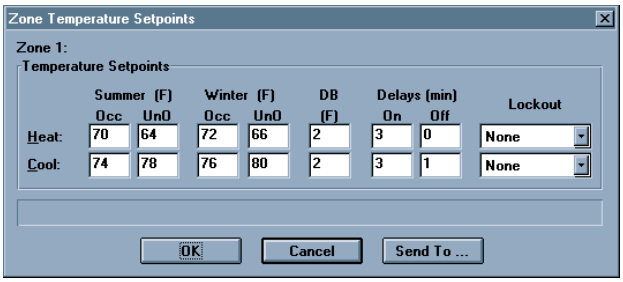


The Zone Status screen displays current information about the selected zone application.

The Zone Status screen displays real time information about the selected zone. Icon buttons and pull-down menus provide the options necessary to select graphing data, graph the selected data, view status screens of each zone, and view the unit summary screen.

Icon buttons and pull-down menus found on summary and status screens are described in the *UltraSite User's Guide* (PN 026-1002) in *P/N 026-1002, UltraSite User's Guide,* ***Section 1.10, Status and Summary Screens***.

7.1.2. Zone Temperature Setpoints



Zone set points are defined at the Zone Temperature Setpoints dialog box.

Summer/Winter [0 - 99°] [as shown above]

The heat and cool occupied and unoccupied set points for summer and winter are used to define the temperature maintained within a specified zone.

Dead Band [0 - 10°] [2°]

The Dead Band is the value equally above and below the temperature set point within which the temperature level is considered to be acceptable. The ARTC will not call for a stage of heat or cool until the dead band is exceeded. Dead Bands may be set up to 10° for heat and for cool.

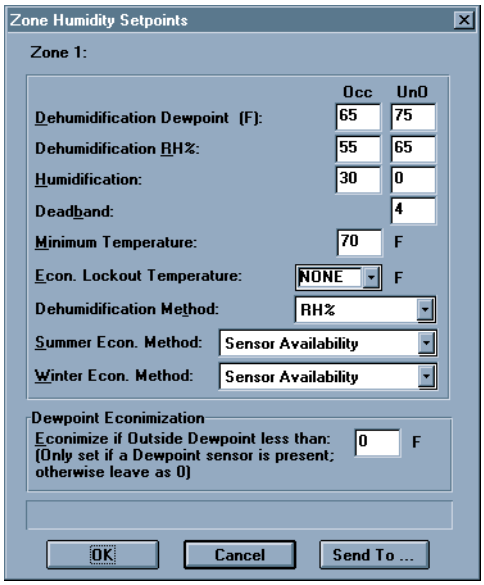
Delays [0 - 99 min.] [On=3 min., Off=0/1 min.]

Time delays are specified measurements of time the ARTC must wait before activating or deactivating a stage of heat or cool. After the ARTC calls for a stage of heat or cool, the ARTC will wait the specified ON delay before initiating the first load. After the ARTC calls for a stage of heat or cool to be deactivated, the ARTC will wait the specified OFF delay before deactivating the appropriate load.

Lockout [None/Summer/Winter] [None]

Lockout values specify the system to keep cools off in the winter mode and heats off in the summer mode regardless of the sensor temperature reading. Lockout values prohibit the system from calling for a stage of cool during dehumidification.

7.1.3. Zone Humidity Setpoints



Humidity set points for each zone are defined at the Zone Humidity Setpoints dialog box.

Dehumidification Dewpoint [0 - 99°] [Occ=65°, UnO=75°]

The dehumidification dewpoint is the zone dehumidification set point defined when monitoring humidity using a dewpoint reading. After the ARTC finds a valid dewpoint sensor reading, the reading is compared to the zone dehumidification set point to determine the dehumidification status.

Dehumifidication RH% [0 - 100%] [Occ=55%, UnO=65%]

The dehumidification RH% is the zone dehumidification set point defined when monitoring humidity using a relative humidity percentage reading. After the ARTC finds a valid relative humidity sensor reading, the reading is compared to the zone dehumidification set point to determine the dehumidification status.

Humidification [0 - 100%] [Occ=30%, UnO=0%]

The Humidification percentages are the percentages set for humidification when controlling humidity with an auxiliary output defined as a humidifier. This humidifier will be activated when the actual humidity level drops below the humidification set points.

Deadband [0 - 10] [4]

The dead band is a value equally above and below the dehumidification set point within which the humidity level is considered to be acceptable. The ARTC will not activate a stage of dehumidification until the dead band is exceeded.

Minimum Temperature [0 - 99° F] [70° F]

To prevent the space temperature within the zone from becoming too cold, the minimum temperature for using cooling stages during dehumidification may be defined. If the zone space temperature reading drops below this set point, dehumidification is disabled.

Econ. Lockout Temperature [-99° — 99° F] [None]

The Econ Lockout Temp is a setting that doesn't allow economization if the outside temperature is higher than the cool lockout setpoint (when the cool lockout setpoint is valid). The Econ Lockout Temp prevents the controller from initiating an economization when conditions are not favorable. If an error occurs in the relative humidity sensor reading and a low reading is received in the controller even though the temperature might be very warm (90° F), the hot air will not be economized if the Econ Lockout Temp setpoint is anywhere below 90° F.

Dehumidification Method [options] [RH%]

Zone sensors measure either the relative humidity or the dewpoint. Zone humidity levels may be measured using a humidity sensor or a humidistat. The zone dewpoint may be measured using a dewpoint probe or a dewpoint control switch. Therefore, the method of monitoring humidity within a zone is dictated by the type sensor connected to an ARTC auxiliary input within the zone.

Summer/Winter Economization Mode [options][Sensor Availability]

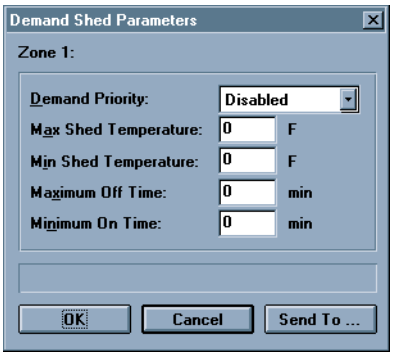
Summer Econ and Winter Econ method describes the type of sensors or calculations used to determine if economization is advantageous. Economization can be controlled by several different devices. Refer to **Section 8.4.7.,** *Miscellaneous Set Points*, for more information about the economization options available.

The Summer Econ method chosen will be active during the BCU's defined "summer" season, while the Winter Econ method will be used in the winter (see **Section 1.1.,** *System Configuration*, for information about setting up seasons).

Dewpoint Economization [0° - 99° F] [0° F]

Economization is the process of allowing outside air into the Rooftop Unit as a stage of cool to conserve energy. When controlling economization using a dewpoint sensor, the Dewpoint Economization set point is the maximum outside dewpoint at which economization is permitted. Economization is disabled when the measured dewpoint exceeds the dewpoint set point by 2°.

7.1.4. Demand Shed Parameters



Demand Control settings for the selected zone are defined at the Demand Shed Parameters dialog box.

Demand Priority [1 - 16 or Disabled] [Disabled]

For each zone, a load shed priority is defined. Zones may be defined to load shed priority levels 1-16. Level one (1) is the lowest priority and loads within this level will be shed last. Level 16 is the highest priority level and loads within this level will be shed first. Load shedding is disabled if "Disabled" is selected from the Demand Priority scroll options.

Max/Min Shed Temperature [0° - 99° F] [0° F]

The values entered in the Max and Min Shed Temperature fields are the minimum and maximum shed values. When the space temperature falls below or exceeds these set points, the call for load shed is disabled. This prevents the space temperature in the zone from becoming too high or too low.

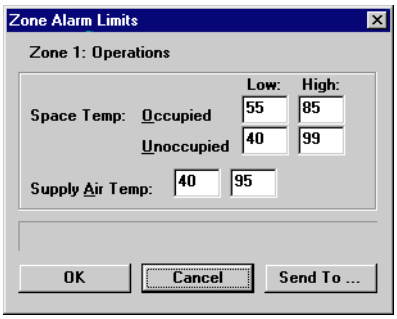
Maximum Off [0 - 240 min.] [0 min.]

The maximum off time limits the duration of load shed within a specified zone. When activated, the call for load shed is disabled after load shedding has been active for the specified time.

Maximum On Time [0 - 240 min.] [0 min.]

To prevent repetitive load shed activation, the maximum on time is set. When the BCU calls for a load to be shed in a zone, the ARTC may not shed that load again until the load has been out of shed for the Maximum On time.

7.1.5. Alarm Limits



Alarm set points for space and supply temperatures in each zone are defined at the Alarm Limits dialog box.

Space Temp

Occupied Low/High [0 - 99°] [Low=55°, High=85°]

When the measured reading from the space temp sensor falls below the low set point or rises above the high set point during occupied hours, an alarm is sent to the Alarm Log and, if installed, the 485 Alarm Panel.

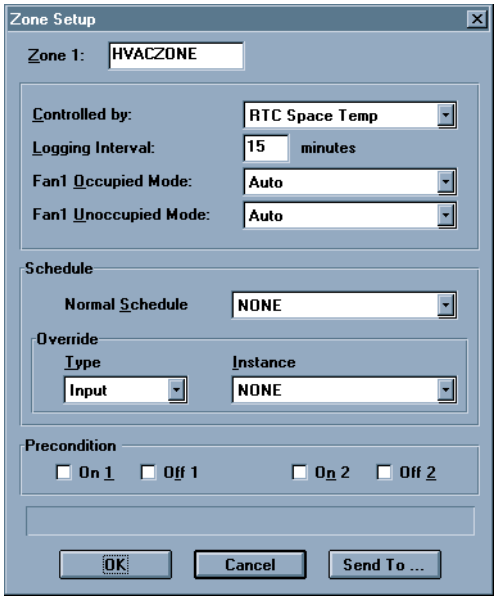
Unoccupied Low/High [0° - 99° F] [Low=40° F, High=99° F]

When the measured reading from the space temp sensor falls below the low set point or rises above the high set point during unoccupied hours, an alarm is sent to the Alarm Log and, if installed, the 485 Alarm Panel.

Supply Air Temp [0° - 99° F] [Low=40° F, High=95° F]

When the measured reading from the space temp sensor falls below the low set point or rises above the high set point during unoccupied hours, an alarm is sent to the Alarm Log and, if installed, the 485 Alarm Panel.

7.1.6. Zone Setup



Controlling methods for each zone are defined at the Zone Setup dialog box.

Controlled by [options] [RTC Space Temp]

The Controlled by field defines the temperature sensor or sensors to be used by the ARTC to control the temperature in the zone. The following options are available:

- *RTC Space Temp*: The RTC Space Temp method uses the measured Space Temperature to control the zone. A space temperature sensor input is connected to each ARTC. This temperature sensor measures the space temperature within the zone.
- R*TC Return Temp*: The RTC Return Temp method uses the measured Return Temperature to control the zone. A return air temperature sensor input is connected to each ARTC. This temperature sensor measures the return air temperature within the zone.

The following three selections assume that either one or both of the auxiliary inputs on an ARTC board have been defined as SpaceTemp2. Therefore, more than one temperature sensor measures the space temperature within the zone.

- *Avg RTC Temps*: The Avg RTC Temps method calculates the average space temperature from all space temperature sensors connected to the specified ARTC. This average value controls the zone.
- *Max RTC Temps*: The Max RTC Temps method determines the highest measurement from the space temperature sensors connected to the specified ARTC. This space temperature is used to control the zone.
- *Min RTC Temps*: The Min RTC Temps method determines the lowest measurement from the space temperature sensors connected to the specified ARTC. This space temperature is used to control the zone.

The following three selections assume that there is more than one ARTC defined within the specified zone. ARTC boards are assigned to zones at the RTC/Zone Board Assignments dialog box (see **Section 1.2.,** *RTC/ Zone Assignments*).

- *Avg Zone Temps*: The Avg Zone Temps method calculates the average space temperature from all ARTC space temperature sensors found in the specified zone. This average value controls the zone.
- *Max Zone Temps*: The Max Zone Temps method determines the highest measurement from the ARTC space temperature sensors found in the specified zone. This space temperature is used to control the zone.
- *Min Zone Temps*: The Min Zone Temps method determines the lowest measurement from the ARTC space temperature sensors found in the specified zone. This space temperature is used to control the zone.

The following three choices search for all ARTC boards in every zone connected to BCU and determines their associated space temperature values.

- *Avg BCU Temps*: The Avg BCU Temps method calculates the average of all space temperature values found. This average value controls the zone.
- *Max BCU Temps*: The Max BCU Temps method determines the highest measurement from the space temperature sensors found. This space temperature is used to control the zone.
- *Min BCU Temps*: The Min BCU Temps method determines the lowest measurement from the space temperature sensors found. This space temperature is used to control the zone.

Logging Interval [0 - 240 min.] [15 min.]

The ARTC periodically records data and stores the information in the ARTC Log. The logging interval defines how often the data within each zone are recorded. There is a limited amount of memory for logging; therefore, the smaller the logging interval, the faster the logs will be overwritten.

Fan1 Occupied/Unoccupied Mode [Auto]

Methods for determining when ARTC fans within a zone should run are entered in the Fan Occupied Mode and the Fan Unoccupied Mode fields. Methods should be chosen based on the desired operation of the fan when the building is occupied or unoccupied. Users may choose from the following methods:

- *AUTO*: run fans when there is a stage of cool or a stage of heat running.
- *ON*: run the fans at all times
- *SUMM-ON/WINT-AUTO*: run the fans at all times in the summer mode and run the fans when there is a stage of cool or a stage of heat in the winter mode.

Normal Schedule [Sch. #] [NONE]

The ON and OFF operation times defined for the schedule selected in the Normal Schedule field will be used to control HVAC functions. During ON operation times, the ARTCs will control the zone using occupied mode set points. During OFF operation times, the ARTCs will control the zone using unoccupied mode set points.

Override Type [options] [Input]

When activated, zone overrides will bypass the normal system schedule and the zone will operate in an occupied mode. To override the normal system schedule, the zone must receive a signal from an override source. The override source type is either an input sensor or digital output module defined under I/O Control or it may be a schedule. The following override source types determine if an override should be activated:

- *Sensor Input Command (ICMD)* - A digital value issued by the Sensor Input Module as a final result of the interaction between the Hardware Interface, Combiner, Cut In/Cut Out, and Override cells.
- *Sensor Input Alarm (ALRM)* - A digital value issued by the Sensor Input Module as a final result of the Process Alarm cell. This value is generated based on a digital or analog signal generated by the Combiner cell.
- *Digital Output Command (OCMD)* - A digital value issued by the Digital Output Module as a final result of the interaction between the Demand Interface, Schedule Interface, Timer, Combiner, and Bypass cells.
- *Proof Fail Command (PROF)* - A digital value issued by the Digital Output Module as a final result of the comparison of an actual proof value and a commanded output action.
- *Schedule (SCHED)* - An application independent of the Sensor Input and Digital Output Modules which is used to establish on and off times. Schedules are defined using Schedule Control in the BCU.

There are two ways to override the specified schedule within a zone, using schedule overrides and using zone schedule overrides. When activated, schedule overrides bypass the normal system schedule within all zones controlled by the schedule. Schedule overrides are defined at the Schedule Setup dialog box (see **Section 6.1.8.,** *Schedule Setup*). However, a zone schedule override will bypass the normal system schedule only within the specified zone.

Override Instance [Input #] [NONE]

If the source signals OFF, the ARTC will continue to control the zone using normal system settings. If the source signals ON, the ARTC will control the zone according to the occupied mode set points. An instance is the override source defined in I/O Control.

Precondition [Yes/No] [No]

The precondition feature is the BCU's optimum Start/Stop function. The precondition feature is designed to activate and deactivate HVAC functions to ensure that zone temperature set points have been reached at the start of the zone occupied or unoccupied mode.

If precondition is selected for the occupied mode, thirty minutes prior to the scheduled occupied time, the ARTC will begin controlling HVAC functions based on current zone set points. If the zone set point is reached within thirty minutes, the next day it will make the switch at twenty-eight minutes. The ARTC will continue to reduce this "Optimum Start" duration until it finds the optimum start time. If the ARTC cannot achieve occupied mode set points within thirty minutes, it adds two minutes to the optimum start time each day.

If precondition is selected for the unoccupied mode, fifteen minutes prior to the scheduled unoccupied time, the ARTC will begin controlling HVAC functions based on the current zone set points. Optimum stop is default 15 minutes and may not be modified.

7.1.7. Setup Instance

Setup Instance allows users to access all zone-related dialog boxes in succession.

When Setup Instance is chosen, all dialog boxes related to zone setup appear in sequence. This allows users to change a number of settings without having to select each dialog box individually from the system tree menu. When a zone is created in UltraSite, the Setup Instance sequence is initiated automatically.

Setup Instance cycles through the dialog boxes in the following order:

- *Zone Setup* - see **Section 7.1.6.**
- *Zone Temp Setpoints* - see **Section 7.1.2.**
- *Zone Humidity Setpoints* - see **Section 7.1.3.**
- *Demand Shed Parameters* - see **Section 7.1.4.**
- *Zone Alarm Limits* - see **Section 7.1.5.**

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