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UltraSite User's Guide
BEC Supplement

COMPUTER PROCESS CONTROLS

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THIS PRODUCT IS AN FCC CLASS A DIGITAL DEVICE.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and—if not installed and used in accordance with this instruction manual—may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case correction of the interference will be at the user's expense.

Table of Contents

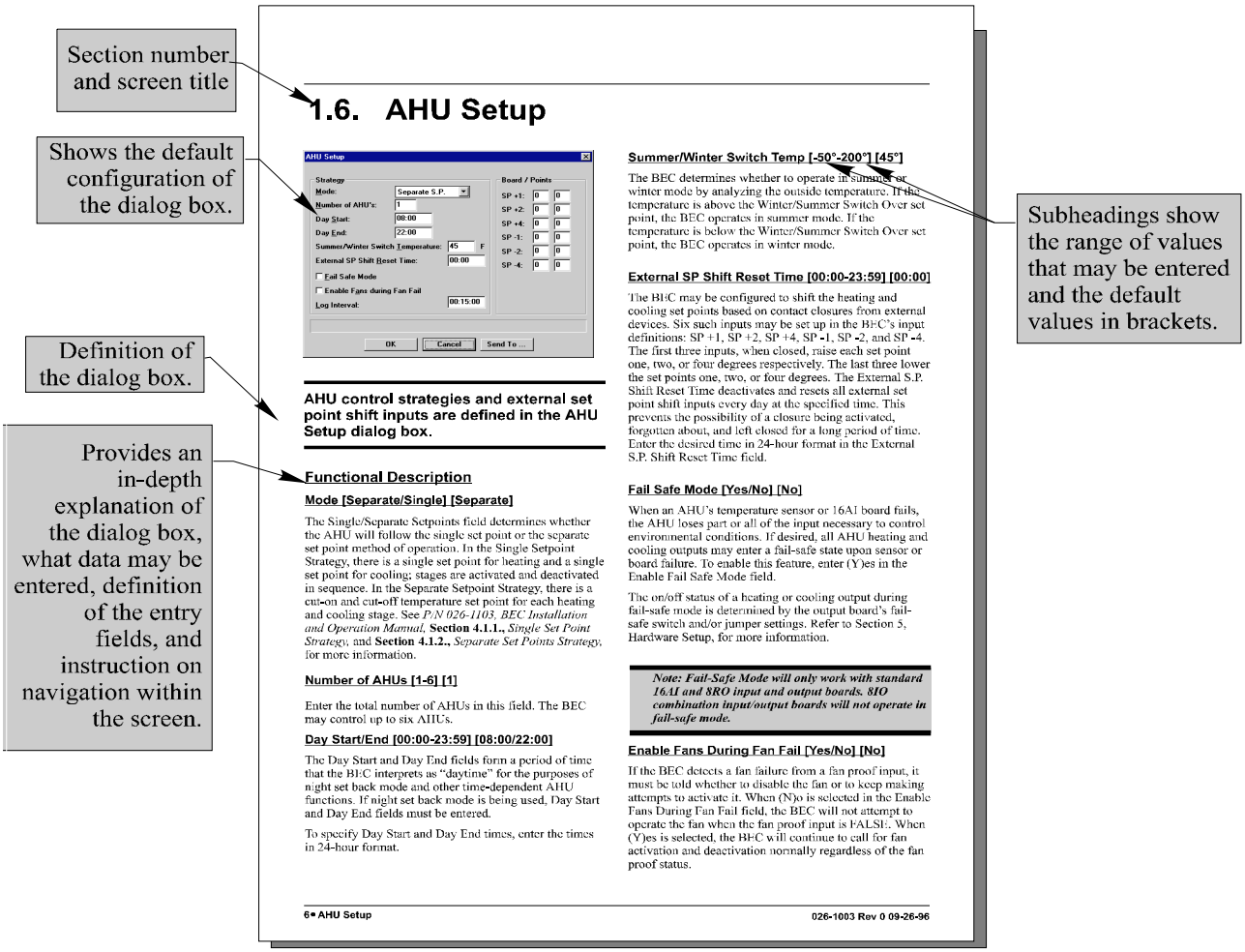
Introduction to the UltraSite BEC Supplement

The Building Environmental Control supplement for the UltraSite User's Guide *(P/N 026-1003)* provides a complete description of each dialog box associated with the BEC and accessible through UltraSite version 1.3. In-depth hardware and software information associated with the BEC may be found in *P/N 026-1103, Building Environmental Control Installation and Operation Manual.* To obtain supplements for other CPC REFLECS controllers or to obtain other product manuals, contact Computer Process Controls, Inc. at 1-800-829-2724.

This manual describes the specific dialog boxes unique to BEC versions 4.1 and above, presented in the order that they appear within specified pull-down and action menus. Each section begins with a "Screen Map" that shows the options available within each menu. The exact manual, section, and page number to refer to for information on each option follows. If another manual is not specified after a reference, the reference is contained within this manual. All unique dialog boxes for each option are shown and explained after the Screen Map.

Commands common in UltraSite, such as Add New or Print Setpoints, are not explained in this supplement; users will be referred to the appropriate section in the *UltraSite User's Guide (P/N 026-1002)* for more information on these options. This supplement also does not cover the basics of maneuvering within UltraSite, see *UltraSite User's Guide (P/N 026-1002)* for help on operating UltraSite menus.

The example below describes the layout and use of the system navigation pages:



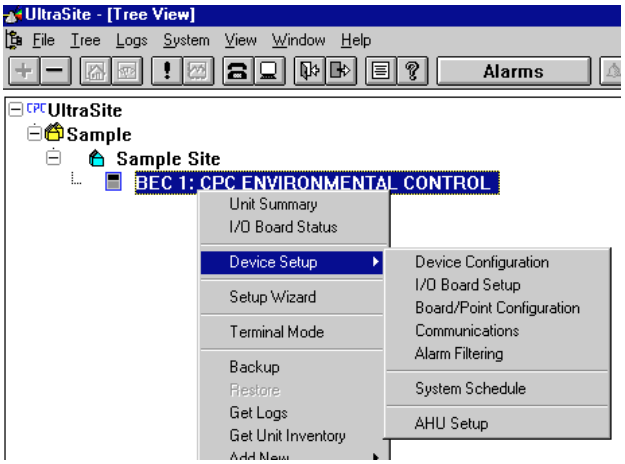
1 Device Setup

1.1. Main Menu

Definition

Information pertaining to operation and configuration of the BEC, including passwords, remote communication settings, and logging and alarm setup, may be entered using the Device Setup Menu options. The menu is activated by right clicking on the BEC unit and then highlighting the Device Setup option. Device Setup options are accessed by left clicking a particular item.

Screen Map



Option	Reference	Page
Device Configuration	**Section 1.1.1.,** *Device Configuration*	3
I/O Board Setup	**Section 1.1.2.,** *I/O Board Setup*	4
Board/Point Configuration	**Section 1.1.3.,** *Device Board/Point Configuration*	5
Communications	**Section 1.1.4.,** *Communications Information*	5
Alarm Filtering	**Section 1.1.5.,** *Alarm Filtering*	6
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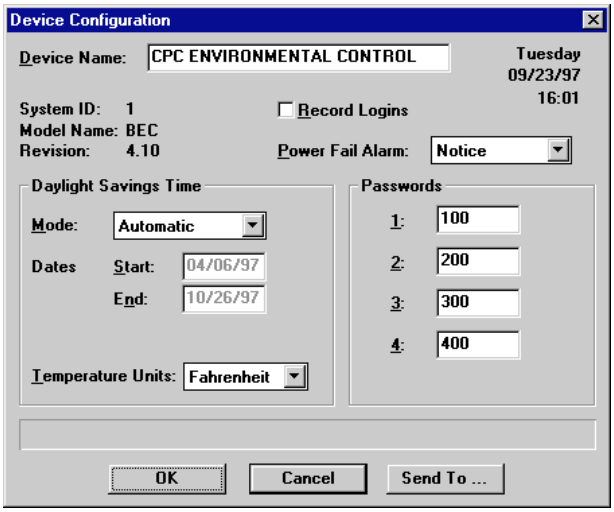
1.1.1. Device Configuration



General system information such as names, daylight savings time dates, and user passwords is defined in this dialog box.

Functional Description

Device Name [25 char. max]

The Unit Name is a user-defined identifier that is used to identify the specific BEC on modification and status screens within UltraSite™. Enter a unique name in the Unit Name field.

Record Logins [Yes/No] [No]

The Record Logins feature configures the BEC to record the password level of users logging into the controller. When Record Logins is activated, the BEC will send a notice to the BEC Alarm Log each time a users logs onto the BEC from the front panel or through a remote connection. Included in the log entry is the date, time, and password level.

To activate the Record Logins feature, check the Record Logins box.

Power Fail Alarm [Notice]

The BEC will generate a notice or an alarm when there is a power failure within the system. A notice is a low-level warning that alerts users of abnormal facility or control system conditions. A notice creates an entry in the BEC Alarm Log. An alarm is a high-level warning that also alerts users of abnormal facility or control system conditions. An alarm will appear in the BEC 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.

To activate an alarm or notice during a system power failure, choose either Alarm or Notice from the Power Fail Alarm options.

Daylight Savings Time [Automatic/Manual/None] [Automatic]

When the current time changes to standard time or to daylight savings time, the BEC's clock should be modified accordingly. Time changes occur twice a year in most areas. Methods for defining how the system will change its settings for daylight savings time are defined in the Daylight Savings Mode field.

The clock may be configured to change according to the standard USA Daylight Savings Time (DST) dates, according to a user-defined date, or for areas that do not participate in daylight savings time, the clock may be left unmodified.

To define how the system clock will be changed for daylight savings, select the appropriate method from the Daylight Savings Mode options. Choosing Automatic will initiate DST changes on April 7 and October 29 of each year. Choosing Manual will initiate DST changes on the dates specified in the DST Manual Set Start and DST Manual Set End fields. Choosing None will disable DST mode.

Start/End Dates

If the Manual method is chosen in the Daylight Savings Mode field, the BEC will modify the system time on the specified dates. BEC system settings will be changed to daylight savings time starting on the date defined in the DST Manual Set Start field, and will return to standard time on the date defined in the DST Manual Set End field. System time changes at approximately 2:00 a.m.on the dates specified.

Warning: Because the defined dates are specific for each year, the Date fields must be updated each year by the user.

Temperature Units

Temperature readings can be set to display in either Fahrenheit or Celsius from the Temperature Units dialog box. If Celsius is chosen as the default unit, all default temperatures will be changed from the Fahrenheit defaults to Celsius default.

Passwords

The BEC system requires a password for all users to enter into and modify system settings. There are four levels of

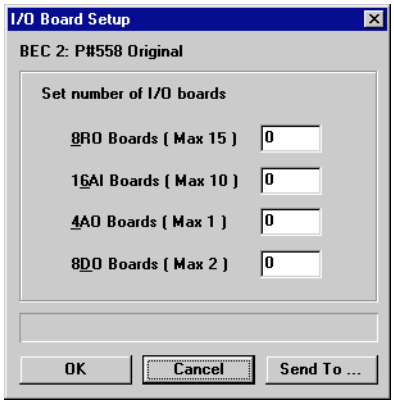
access to the BEC. A detailed description of each access level is given in **Table 1-1**. To change the passwords, enter the desired password in each password level field. This value may be changed at any time to any six digit character string. After a new password is defined, it may be used to log into the system at the corresponding access level.

Choose a different password for each level of access. If all passwords are defined the same, users will only be able to log in at 100-level access.

Level	Default Password	Actions Allowed
1	100 (default)	• Viewing Status Screens • Viewing set points/setup data • Viewing logs/graphs • Overriding anti-sweat heaters • Resetting host network • Setting device numbers • Acknowledging and resetting alarms
2	200	Level 1 actions, in addition to • Adjusting set points • Bypassing and overriding devices • Performing setup functions
3	300	Level 2 actions, in addition to • Setting input and output definitions • Performing communications setup
4	400	Level 3 actions, in addition to • Clearing Alarm Logs

Table 1-1 *- Password Levels and Available Tasks*

1.1.2. I/O Board Setup



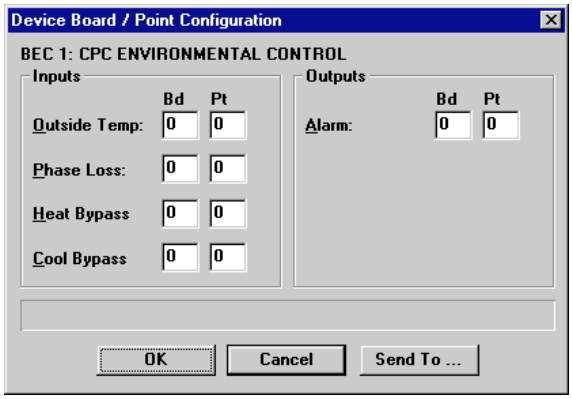
The number of input and output boards in the BEC network must be specified in the I/O Board Setup dialog box.

Functional Description

Each BEC supports up to fifteen 8RO Boards, up to ten 16AI Boards, up to two 8DO boards, and one 4AO Board. To define the number of boards connected to the BEC, enter the board type totals in the corresponding fields at the Set Device Numbers screen. Defining these numbers allows the BEC to calculate the number of boards within the system. This screen displays the maximum number of 8RO, 16AI, 8DO, and 4AO boards the BEC may hold, and the current number of boards defined for each type.

When setting up an 8IO in this screen, count the 8IO as one 16AI, one 8RO, and one 4AO board. Note that the 8IO takes up the only available 4AO connection. If an 8IO and a 4AO must exist on the same network, it is necessary to disable the two analog outputs on the 8IO. Remove the jumper JU4 (see *P/N 026-1103, BEC Installation and Operation Manual*, **Section 2.4.1.,** *8IO Board*) on the 8IO that enables the analog outputs and define the 8IO as one 16AI and one 8RO in the Set Device Numbers screen. The 4AO may then be connected as normal.

1.1.3. Device Board/Point Configuration

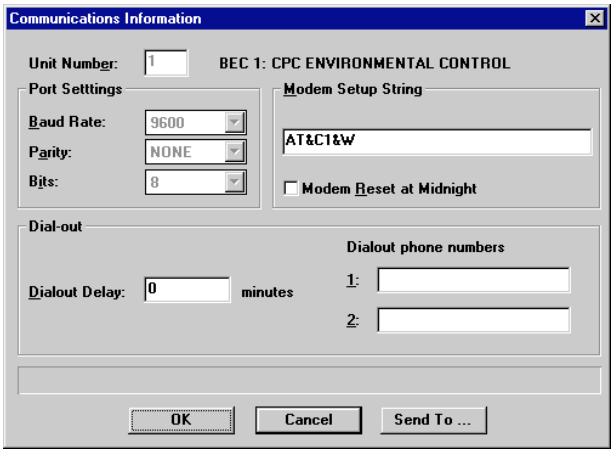


A BEC's outside temperature sensor, phase loss monitoring device, and external alarm output are given board and point addresses in this dialog box.

Functional Description

Board and point addresses are physical locations on an input and output board that must be defined in order for an input or output to function properly. Refer to **Section 5** of the BEC manual for more information on board and point numbering.

1.1.4. Communications Information



Settings necessary for remote communications, such as baud rates, dialout phone numbers and modem setup strings, are defined here.

Functional Description

Unit Number [0 - 30] [Next #]

The Unit Number for each BEC is the number UltraSite uses to determine the specific BEC controller from which information is being received. No two REFLECS controllers may have the same Unit number.

For the specified BEC to communicate properly with the remote communication software, the Unit Number must be entered in the Unit # field.

Baud Rate [9600 bps]

Most standard Hayes compatible modems with a baud rate of at least 9600 will operate properly with the BEC network. The baud rate should be set according to the type network modem used with the remote network. The BEC is capable of operating at baud rates of 300, 1200, 2400, and 9600 with 9600 being the preferred rate. Refer to the modem user's manual for specific baud rate information.

Parity/Data Bits [NONE/8]

These fields represent the Parity and Data Bits values. The BEC automatically calculates the appropriate settings required for the remote network to communicate properly according to the specified baud rate settings. Refer to the modem user's manual for specific information on Parity and Data Bits.

Modem Setup String [AT&W]

Modems are initiated by receiving an attention code followed by the appropriate command or set of commands the modem should implement. This command set, or initialization string, is different for most modem vendors. The initialization string for the modem operating within the remote network is defined in the Initialization String field.

If unsure about the correct string to use for a particular modem, call CPC Technical Support.

Modem Reset At Midnight [YES/NO] [NO]

If a modem continuously loses its string, UltraSite can be set to reset the modem at midnight. When a modem is set

to be reset at midnight, UltraSite will automatically send the modem setup string to the modem. This keeps the modem updated and communicating with UltraSite.

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

Before the BEC may make an alarm dialout, it must wait for an amount of time specified in the Delay Before Dialout field. Enter a value between 0 and 240 minutes.

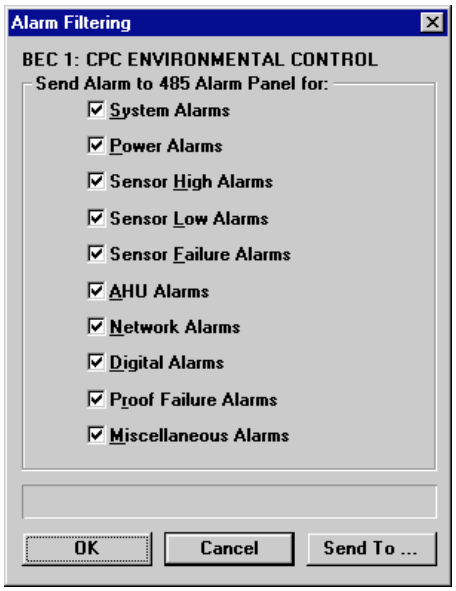
Phone Numbers

Phone numbers to be called when an alarm is generated are defined in the Phone Numbers fields. Phone numbers for daytime dialouts as well as nighttime dialouts must be defined in these fields to activate the remote dialout function.

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 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 BEC Alarm Log and cease dialout.

To define the phone numbers, enter the available phone numbers in the Phone Numbers fields.

1.1.5. Alarm Filtering



Alarm Groups can be set to go or not to go to the 485 Alarm Panel.

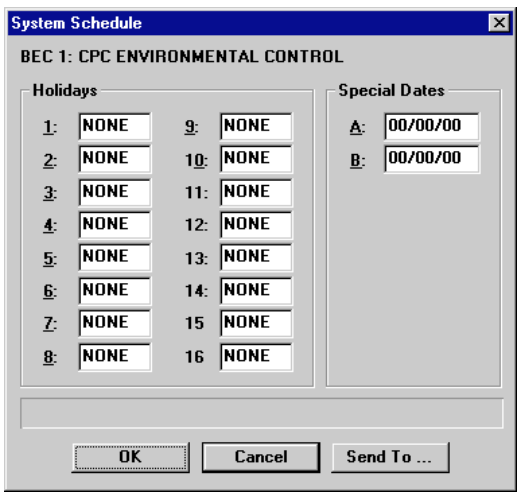
Alarms and notices are defined by filter group. Alarm filtering allows for definition of which alrms and notices will be sent to the 485 Alarm Panel. All alarms default as YES and are sent to the 485 panel unless they are set otherwise.

Table 1-1 lists the alarms and notices that accompany specific alarm groups.

Alarm Filtering Group	Alarm/Notice Messages	Alarm Filtering Group	Alarm/Notice Messages
SYSTEM ALMS	Setpts Corrupt Emergency Off Reset Restore Error Remote Login Fpanel Login	NETWORK ALMS	Missed Token No Response Bad Message Bad Checksum
POWER ALMS	Curtailment On Curtailment Off Power Failed Power Restored Phase Fail Demand High	DIGITAL ALMS	Mins On Dur > Mins OFF Dur > Events Accum > Events x 1000 > ON Events/Int > Accum Hrs ON Accum Min ON > Hrs ON Dur > Hrs OFF Dur > Max-Min Int > Max-Min Int <
SENS HI ALMS	High Sensor High Xducer		
SENS LO ALMS	Low Sensor Low Xducer		
SENS FAIL ALMS	Sensor Short Sensor Open Xducer Short Xducer Open	PROOF ALMS	Fan Fail AHU VS Fail
AHU ALMS	Low Temp AHU High Temp AHU High Humid AHU	MISC ALMS	All Lights On

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

1.1.6. System Schedule



Holidays and special event dates used by all BEC schedules are defined in this dialog box.

Functional Description

Holidays

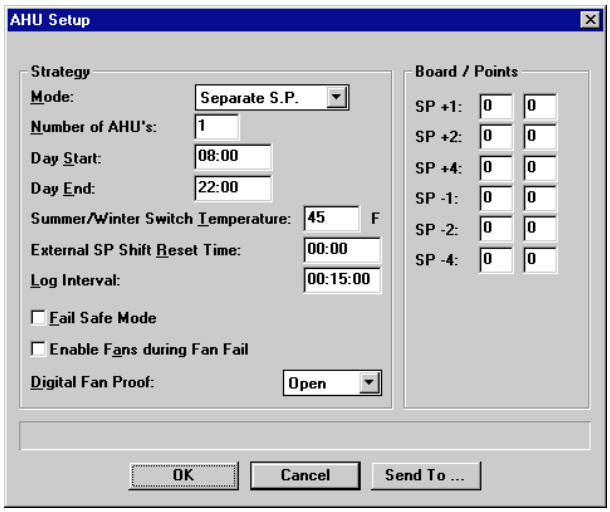
Up to sixteen holidays may be defined in the Holidays fields. Holidays may be used by schedules to alter everyday BEC operation during annual holidays. See **Section 7.2.1.,** *Schedule Events*, for information on how to use holidays in scheduling.

Special Event Dates

Up to two special event dates may be defined in the Special Dates fields. Special events work almost exactly like holi-

days, except they occur only in a specified year. See **Section 7.2.1.,** *Schedule Events*, for information on how to use special event dates in scheduling.

1.1.7. AHU Setup



AHU control strategies and external set point shift inputs are defined in the AHU Setup dialog box.

Functional Description

Mode [Separate/Single] [Separate]

The Single/Separate Setpoints field determines whether the AHU will follow the single set point or the separate set point method of operation.

In the Single Setpoint Strategy, there is a single set point for heating and a single set point for cooling; stages are activated and deactivated in sequence. In the Separate Setpoint Strategy, there is a cut-on and cut-off temperature set point for each heating and cooling stage. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.1.1.,** *Single Set Point Strategy*, and **Section 6.1.1.,** *Single Set Point Strategy*, for more information.

Number of AHUs [1 - 6] [1]

Enter the total number of AHUs in this field. The BEC may control up to six AHUs.

Day Start/End [00:00 - 23:59] [08:00/22:00]

The Day Start and Day End fields form a period of time that the BEC interprets as "daytime" for the purposes of night set back mode and other time-dependent AHU functions. If night set back mode is being used, Day Start and Day End fields must be entered.

To specify Day Start and Day End times, enter the times in 24-hour format.

Summer/Winter Switch Temp [-50° - 200° F] [45° F]

The BEC determines whether to operate in summer or winter mode by analyzing the outside temperature. If the temperature is above the Winter/Summer Switch Over set point, the BEC operates in summer mode. If the temperature is below the Winter/Summer Switch Over set point, the BEC operates in winter mode.

External SP Shift Reset Time [00:00 - 23:59] [00:00]

The BEC may be configured to shift the heating and cooling set points based on contact closures from external devices. Six such inputs may be set up in the BEC's input definitions: SP +1, SP +2, SP +4, SP -1, SP -2, and SP -4. The first three inputs, when closed, raise each set point one, two, or four degrees respectively. The last three lower the set points one, two, or four degrees.

The External S.P. Shift Reset Time deactivates and resets all external set point shift inputs every day at the specified time. This prevents the possibility of a closure being activated, forgotten about, and left closed for a long period of time.

Enter the desired time in 24-hour format in the External S.P. Shift Reset Time field.

Log Interval [00:00:00 - 99:99:99] [00:15:00]

The Log Interval is the amount of time between data log entries. When the BEC records data into the Data Log, it waits the amount of time specified in the Log Interval field before taking another record. This log interval is applied to all AHU-related logs.

Enter the desired Log Interval in hour:minute:second format.

Fail Safe Mode [Yes/No] [No]

When an AHU's temperature sensor or 16AI board fails, the AHU loses part or all of the input necessary to control environmental conditions. If desired, all AHU heating and cooling outputs may enter a fail-safe state upon sensor or board failure. To enable this feature, enter (Y)es in the Enable Fail Safe Mode field.

The on/off status of a heating or cooling output during fail-safe mode is determined by the output board's fail-safe

switch and/or jumper settings. Refer to *BEC Installation and Operation Manual,* **Section 4.14.,** *Fail-Safe Dip Switch Settings,* for more information.

Note: Fail-Safe Mode will only work with standard 16AI and 8RO input and output boards. 8IO combination input/output boards will not operate in fail-safe mode.

Enable Fans During Fan Fail [Yes/No] [No]

If the BEC detects a fan failure from a fan proof input, it must be told whether to disable the fan or to keep making attempts to activate it. When (N)o is selected in the Enable Fans During Fan Fail field, the BEC will not attempt to operate the fan when the fan proof input is FALSE. When (Y)es is selected, the BEC will continue to call for fan activation and deactivation normally regardless of the fan proof status.

Digital Fan Proof

A fan proof checking device sends the proof status of a fan to the BEC by sending a digital signal. Depending upon the proof checking device being used, the signal that signifies a failure may be either OPEN or CLOSED. By default, an OPEN signifies a fan failure. Select the appropriate setting from the Digital Fan Proof dialog box.

Board/Points

Enter the board and point addresses for the AHU external set point shift contacts in the appropriate fields.

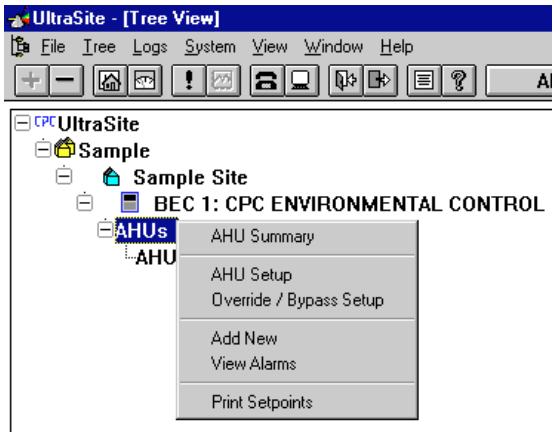
2 AHU

2.1. Main Menu

Definition

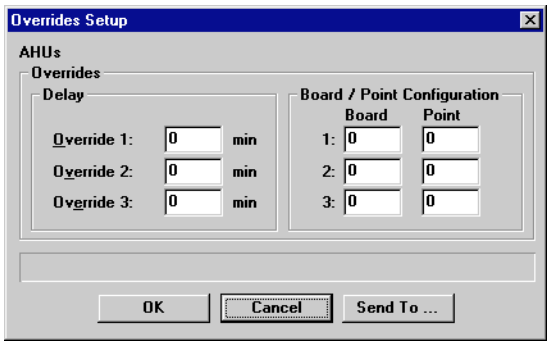
Setup information that affects all AHUs, such as set point strategies, overrides and bypasses, and day start and end times may be defined using the AHU Main Menu options.

Screen Map



Option	Reference	Page
AHU Summary	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens.*	63
AHU Setup	Same as what is shown in **Section 1.1.7.,** *AHU Setup*.	8
Override/Bypass Setup	**Section 2.1.1.,** *Override/Bypass Setup*.	10
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

2.1.1. Override/Bypass Setup



External AHU override input addresses and their corresponding override delays are configured in this dialog box.

Functional Description

Override 1-3

When any of the three defined override inputs relay a contact closure to the BEC, all AHUs are forced off for a dura-

tion of time equal to the override's specified delay. Specify a delay between 0 and 240 minutes for each defined override input.

Board/Point Configuration

Enter the board and point addresses for overrides 1-3 in these fields.

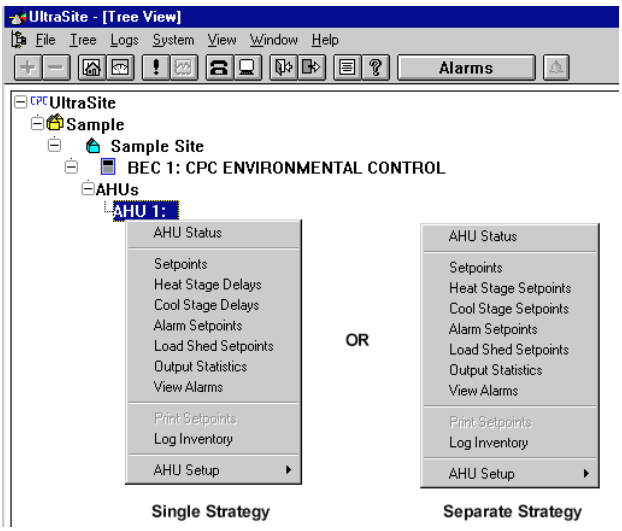
2.2. Individual AHU Menu

Definition

Information specific to individual AHUs may be viewed and defined using the Individual AHU Menu options.

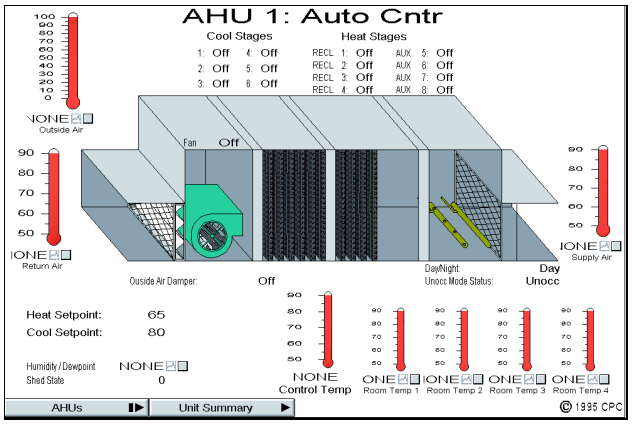
The Individual AHU Menu can also be accessed by right clicking the mouse button while a specific AHU is highlighted.

Screen Map



Option	Reference	Page
AHU Status	**Section 2.2.1.,** *AHU Status Screen.*	12
Setpoints	**Section 2.2.2.,** *Heat/Cool Setpoints.*	14
Heat Stage Delays	**Section 2.2.3.,** *Heat Stage Delays (Single Set Point Only).*	15
Cool Stage Delays	**Section 2.2.4.,** *Cool Stage Delays (Single Set Point only).*	16
Heat Stage Setpoints	**Section 2.2.5.,** *Heat Stage Setpoints (Separate Set Point only).*	16
Cool Stage Setpoints	**Section 2.2.6.,** *Cool Stage Setpoints (Separate Set Point only).*	17
Alarm Setpoints	**Section 2.2.7.,** *Alarm Setpoints.*	18
Load Shed Setpoints	**Section 2.2.8.,** *Load Shed Setpoints.*	19
Output Statistics	**Section 2.2.9.,** *Output Statistics.*	20
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 1.6.2,** *Component Log Inventory.*	47
AHU Setup	**Section 2.3.,** *Individual AHU Setup Menu.*	21

2.2.1. AHU Status Screen



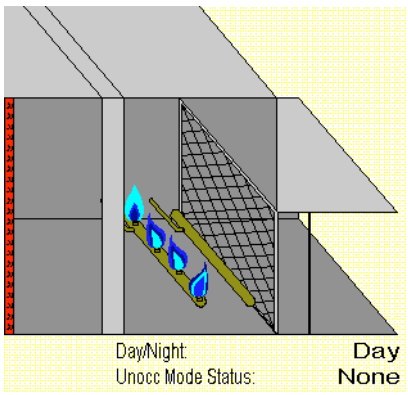
The real-time status of an AHU may be viewed in the AHU Status screen.

Functional Description

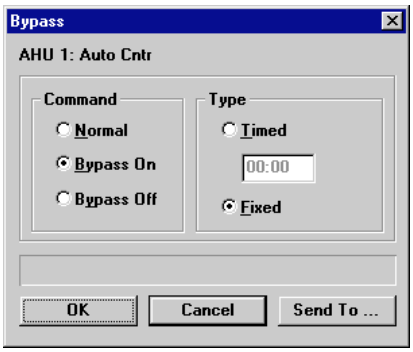
Cooling/Heating Stages

The status of the selected AHU's heating and cooling stages is shown in the AHU diagram in the middle of the screen and in the Cool Stages and Heat Stages fields above the AHU diagram. When a cooling stage is on, the appropriate stage turns blue in the diagram, and the corresponding Cool Stages field reads "On". When a stage is off, the appropriate stage is black in the diagram, and the Cool Stages field reads "Off". Reclaim heating stages operate the same way, except an active reclaim heating stage will turn red in the AHU diagram.

Auxiliary heating stages in the diagram are represented by burners located near the AHU's output grate. When an auxiliary stage is ON, a blue flame will appear at the appropriate burner, and the corresponding Heating Stages field reads "On".



Double-clicking the left mouse button on a stage in the AHU diagram or on a Heat Stages or Cool Stages field will bring up a dialog box that allows users to order a bypass on or bypass off command for the selected stage.



From this dialog box, existing bypasses may also be turned off. Bypassed heating and cooling stages are highlighted blue in the Heat Stages and Cool Stages fields of the AHU Status Screen.

Right-clicking the mouse button on a stage in the AHU diagram or on a Heat Stages or Cool Stages field brings up the Individual AHUs Menu (see **Section 2.2.**). Also, by choosing the Bypass option at the top of this menu, heat and cool stages may be bypassed on and off or returned to normal operation.

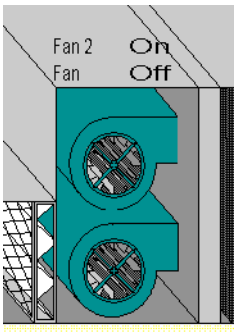
Fans

Fan status is represented differently in the AHU Status screen, depending on what type of fan is being used.

Single-speed fans are represented by a single fan in the AHU diagram and a single Fan field, located above the fan in the diagram. When the fan is ON, the fan in the diagram will be in motion and the Fan field will read "On".

Two-speed fans are represented by two fans in the AHU diagram and two fields called Fan and Fan 2. When the fan is operating at low speed, the bottom fan will be in motion and the Fan field will read "On". When the fan is operating at high speed, the top fan will be in motion and the Fan 2 field will read "On". If the AHU is set up to close both fan relays during high-speed operation, both fans will be ON (see **Section 2.3.4.,** *Two-Speed Fan Setup*).

The following graphic shows a two speed fan that is bypassed on and is operating at high speed.



Variable-speed fans are represented by a single fan in the AHU diagram and a Variable Speed Fan% field, located below the fan in the AHU diagram. When the fan is operating, the fan in the AHU diagram will be in motion, and the speed percentage will be shown in the Variable Speed Fan% field.

Double-clicking the left mouse button on a fan in the AHU diagram or on one of the Fan Status fields will bring up a dialog box where users may bypass the fan ON or OFF. From this dialog box, existing bypasses may also be turned off. Bypassed fans are highlighted blue in the Fan Status fields.

Right-clicking the mouse button on a stage in the AHU diagram or on a Heat Stages or Cool Stages field brings up the Individual AHUs Menu (see **Section 2.2.**). Also, by choosing the Bypass option at the top of this menu, heat and cool stages may be bypassed on and off or returned to normal operation.

Outside Air

The current value of the outside air temperature sensor is shown in the thermometer in the upper left corner of the screen. A log of this sensor may be viewed by checking the graph box and selecting Collect Logs from the Actions menu or the button bar. See *P/N 026-1002,UltraSite User's Guide*, **Section 1.10.1,** *Collect Logs*, for more information.

Supply/Return Air

The supply air temperature and return air temperature sensor values are shown in the thermometers to the left and right of the AHU diagram. Logs of these sensors may be viewed by checking the graph boxes and selecting Collect Logs from the Actions menu or the button bar. See *P/N 026-1002,UltraSite User's Guide*, **Section 1.10.1,** *Collect Logs*, for more information.

Day/Night

The Day/Night field located below the return duct in the AHU diagram shows whether the AHU is operating in day or night mode.

Unoccupied Status

The Unoccupied Status field located below the return duct in the AHU diagram shows whether the AHU is operating in occupied or unoccupied mode.

Heat/Cool Setpoints

The heating and cooling set points specified in **Section 2.2.2.,** *Heat/Cool Setpoints*, or **Section 2.2.5.,** *Heat Stage Setpoints (Separate Set Point only)*, are shown in the Heat and Cool Setpoints fields located in the lower left corner of the screen. If a separate set point strategy is being used, the Heat Setpoint and Cool Setpoint fields will show the cut-on setpoints for heating stage 1 and cooling stage 1.

Humidity/Dewpoint

The current reading of the AHU's humidity or dewpoint sensor is shown in the Humidity/Dewpoint field located in the lower left corner of the screen.

Shed State

If the AHU is currently in load shed, the Shed State field located in the lower left corner of the screen will display the lowest number stage that has been shed. That is, if cooling stages one and two have been shed, then a one will be shown in the status field.

Control Temp/Room Temps

The current values for room temperature sensors one through four are shown in the thermometers in the lower right corner of the screen. The larger thermometer to the left of the Room Temp thermometers is the control value calculated from the combination of the Room Temp thermometers. See **Section 2.3.1.,** *AHU Main Setup*, for information about control temperatures.

Logs of these sensors may be viewed by checking the graph boxes and selecting Collect Logs from the Actions menu or the button bar. See *P/N 026-1002,UltraSite User's Guide*, **Section 1.10.1,** *Collect Logs*, for more information.

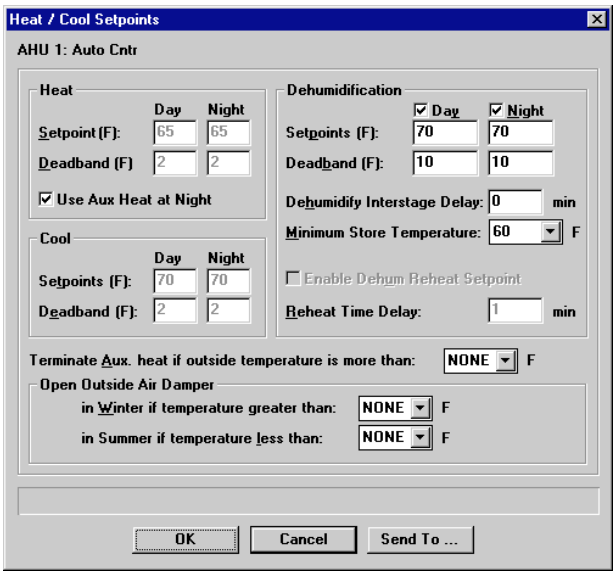
AHUs Button

Left-clicking the AHUs button brings up a dialog box where other AHU status screens may be accessed. Right-clicking the AHUs button brings up the Individual AHUs Menu (see **Section 2.2.**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide*, **Section 1.5,** *Unit Level*, for more information).

2.2.2. Heat/Cool Setpoints



Heating and cooling set points for Single Setpoint AHUs and dehumidification set points for both Single and Separate Setpoint AHUs are entered here.

Functional Description

Heating Set Points/Deadbands [0° - 200° F] [65° F/2° F]

The Winter Heating set point is defined only for AHUs following single set point strategies (specified in **Section 1.1.7.,** *AHU Setup*). See **Section 2.2.5.,** *Heat Stage Setpoints (Separate Set Point only)*, for separate-strategy set points.

The Winter Heating Setpoint is the temperature the BEC tries to maintain in the building during the winter season. The dead band is a range of temperatures above and below the Winter Heating Setpoint within which the temperature is considered to be acceptable. When the temperature falls below the heat set point minus one-half the dead band, the BEC cycles on heating stages until the temperature rises back into the dead band. When the temperature rises above the heat set point plus one-half the dead band, the heat stages will cycle off. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.1.1.,** *Single Set Point Strategy*, for more about single set point operation.

When Night Set Back is enabled in **Section 2.3.1.,** *AHU Main Setup*, the set point and dead band entered in the Winter Heating Night fields are used during the night time period defined in **Section 1.1.7.,** *AHU Setup*.

Use Aux Heat at Night [Yes/No] [Yes]

When this box is checked, the BEC will use auxiliary heating stages as necessary during night operations. When the box is empty, nighttime auxiliary heat will be disabled.

Cooling Setpoints/Dead Bands [0° - 200° F] [70°/2° F]

The Summer Cooling Setpoint is defined only for AHUs following single set point strategies (specified in **Section 1.1.7.,** *AHU Setup*). See **Section 2.2.6.,** *Cool Stage Setpoints (Separate Set Point only)*, for separate-strategy set points.

The Summer Cooling Setpoint is the temperature the BEC tries to maintain in the building during the summer season. The dead band is a range of temperatures above and below the Summer Cooling Setpoint within which the temperature is considered to be acceptable. When the temperature rises above the cool set point plus one-half the dead band, the BEC cycles on cooling stages until the temperature falls back into the dead band. When the temperature falls below the cool set point minus one-half the dead band, the cool stages will cycle off. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.1.1.,** *Single Set Point Strategy*, for more about single set point operation.

When Night Set Back is enabled in **Section 2.3.1.,** *AHU Main Setup*, the set point and dead band entered in the Winter Heating Night fields are used during the night time period defined in **Section 1.1.7.,** *AHU Setup*.

Day/Night [Yes/No] [Yes]

Checking the Day or Night boxes will enable dehumidification mode during the day or night.

Dehumidification Setpoints/Deadbands

The Dehumidification Set Point is the humidity level the BEC tries to maintain. The dead band is a range of humidities above and below the Dehumidification Set Point within which the humidity is considered to be acceptable. When the humidity rises above the Dehumidification Set Point plus one-half the dead band, the BEC cycles on cooling stages until the temperature falls back into the dead band. When the humidity falls below the set point minus one-half the dead band, the BEC cycles off the cooling stages. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.2.,** *Dehumidification*, for more about dehumidification operation.

When Night Set Back is enabled in **Section 2.3.1.,** *AHU Main Setup*, the set point and dead band entered in the Dehum Night fields are used during the night time period defined in **Section 1.1.7.,** *AHU Setup*.

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

When in dehumidification mode, the BEC activates and deactivates cool stages one at a time. The delay between stage activations and deactivations (in minutes) is specified in this field. Enter a value between 0 and 240 minutes.

Minimum Store Temperature [-50° - 100° F] [60° F]

Activating cooling stages during dehumidification may have a secondary effect: lower building temperature. The Minimum Store Temperature set point prevents the temperature from dropping too low during dehumidification. If the building temperature falls below the Minimum Store Temperature set point, dehumidification is locked out.

Enable Dehum Reheat Setpt [Yes/No] [No]

The Enable Dehumidification Reheat Set Point feature provides users with a method of keeping heating and cooling stages in single-setpoint AHUs from working against each other during dehumidification. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.2.2.,** *Dehumidification Reheat Set Point*, for more information.

Dehum Reheat Time Delay [0 - 240 min.] [1 min.]

When the Enable Dehumidification Reheat Set Point box is checked, the Dehum Reheat Time Delay is the number of minutes the BEC will wait before activating all reclaim heat stages. See *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.2.2.,** *Dehumidification Reheat Set Point*, for more.

Term. Aux. Heat [-50° - 99° F] [NONE]

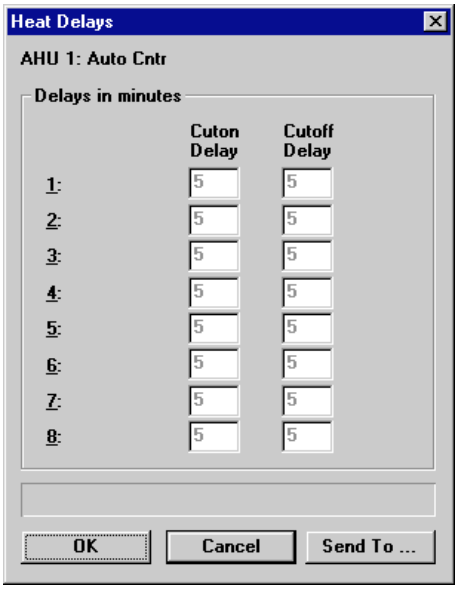
Specifying a temperature value in this field will disable use of auxiliary heating stages when the outside ambient temperature sensor reads a value higher than the set point. Entering None in this field disables this function.

Open Outside Air Damper [-50° - 99° F] [NONE]

The BEC is capable of controlling outside air dampers based on ambient temperature sensor readings. During the winter season, the outside air damper uses the set point entered in the During Heat Season field; when the outside air temperature is higher than the set point, the air damper will open. During the summer season, the outside air damper uses the set point entered in the During Cool Season field; when the outside air temperature is lower than the set point, the air damper will open.

To use air damper control, specify temperature values in the Outside Air Damper fields. Enter None if no air damper control is necessary.

2.2.3. Heat Stage Delays (Single Set Point Only)



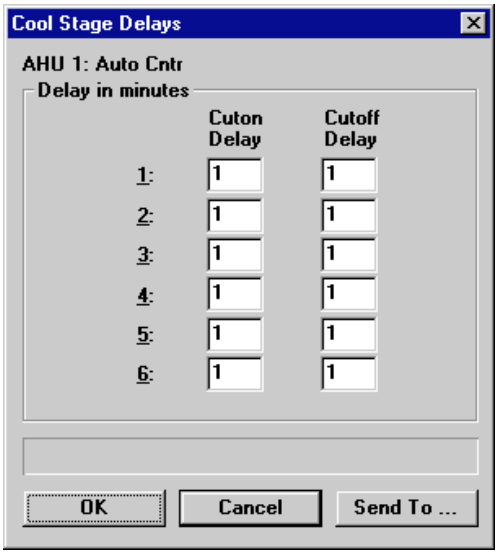
Cut-on and cut-off delays for AHU heating stages following a single set point strategy are defined here.

Functional Description

In this dialog box, each heating stage may be given an on and off delay. After a call for activation or deactivation of a stage, the BEC must wait the specified on or off delay before turning the heating stage on or off.

For each stage listed under Stage #, specify an on delay in the ON field and an off delay in the OFF field. The values must be between 0 and 240 minutes.

2.2.4. Cool Stage Delays (Single Set Point only)



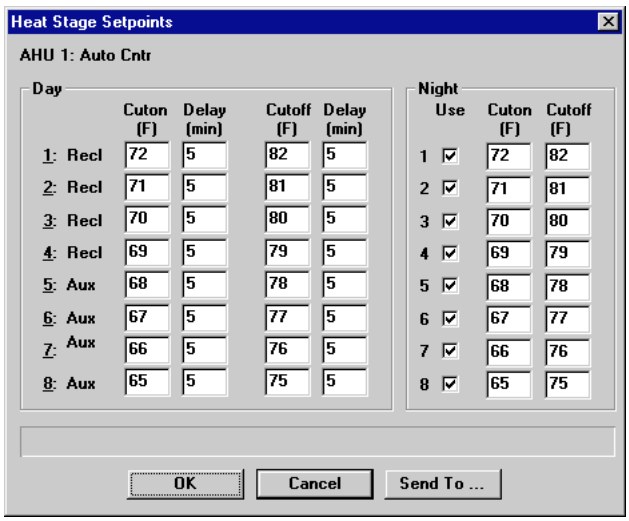
Cut-on and cut-off delays for AHU cooling stages following single set point strategies are defined here.

Functional Description

In this dialog box, each cooling stage may be given an on and off delay. After a call for activation or deactivation of a stage, the BEC must wait the specified on or off delay before turning the cooling stage on or off.

For each stage listed under Stage #, specify an on delay in the ON field and an off delay in the OFF field. The values must be between 0 and 240 minutes.

2.2.5. Heat Stage Setpoints (Separate Set Point only)



Cut-on and cut-off set points for AHU heating stages following separate set point strategies are defined here.

Functional Description

Cut On [-50° - 99° F] [see description]

When the AHU's control temperature is above a heating stage's Cut On temperature set point, the stage is activated. By default, stage one's Cut On temperature is 72° F, and each successive stage has a set point one degree lower than the previous stage.

Delay [0 - 240 min.] [5 min.]

Before activation, the BEC must wait an amount of time equal to the specified Cut On Delay value if one is entered. Delays can be varied so that successive heat stages come on more quickly or more slowly as well.

Cut Off [-50° - 99° F] [see description]

When the AHU's control temperature is above a heating stage's cut-off temperature set point, the stage is deactivated. By default, stage one's Cut Off set point is 82° F, and each successive stage has a set point one degree lower than the previous stage.

Delay [0 - 240 min.] [5 min.]

Before deactivation, the BEC must wait an amount of time equal to the specified Cut Off Delay value.

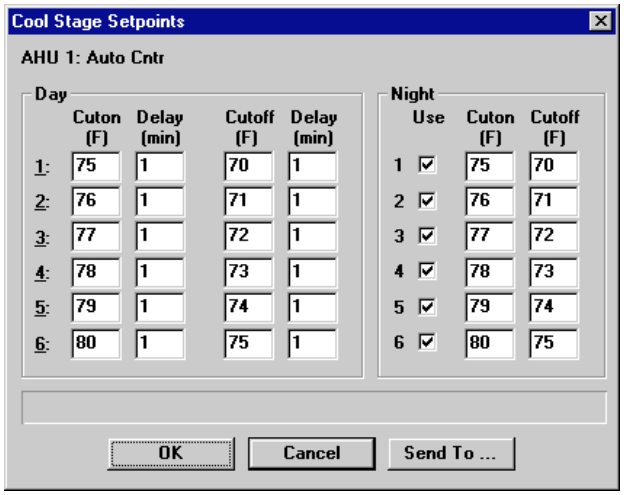
Use [Yes/No] [Yes]

When a stage's Use box is checked, the stage may be activated during night set back. When the box is left empty, the stage will be locked off during the night hours.

Night Cut-On/Cut-Off

The Night Cut-On and Night Cut-Off set points are the heating set point values used during night set back mode. Night Set Back is enabled in **Section 2.3.1.,** *AHU Main Set-up*.

2.2.6. Cool Stage Setpoints (Separate Set Point only)



Cut-on and cut-off set points for AHU cooling stages following separate set point strategies are defined here.

Functional Description

Cut On [-50° - 99° F] [see description]

When the AHU's control temperature is above a cooling stage's cut-on temperature set point, the stage is activated.

By default, stage one's Cut On set point is 75° F, and each successive stage's set point is one degree higher than the previous stage.

Delay [0 - 240 min.] [5 min.]

Before activation, the BEC must wait an amount of time equal to the specified Cut On Delay value.

Cut Off [-50° - 99° F] [see description]

When the AHU's control temperature is below a cooling stage's cut-off temperature set point, the stage is deactivated. By default, stage one's Cut Off set point is 70° F, and each successive stage's set point is one degree higher than the previous stage.

Delay [0 - 240 min.] [5 min.]

Before deactivation, the BEC must wait an amount of time equal to the specified Cut Off Delay value.

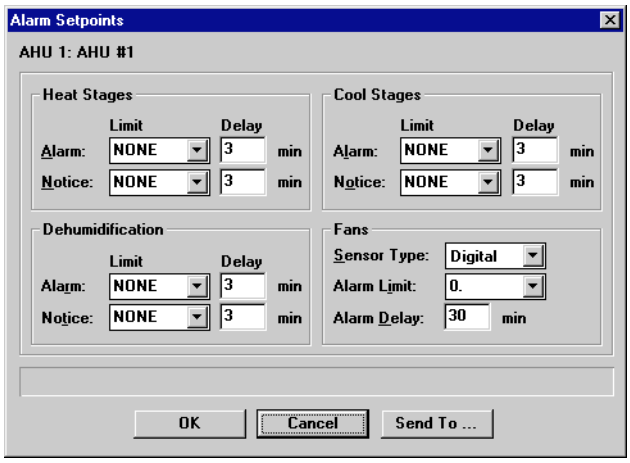
Use [Yes/No] [Yes]

When a stage's Use box is checked, the stage may be activated during night set back. When the box is left empty, the stage will be locked off during the night hours.

Night Cut-On/Cut-Off

The Night Cut-On and Night Cut-Off set points are the cooling set point values used during night set back mode. Night Set Back is enabled in **Section 2.3.1.,** *AHU Main Set-up*.

2.2.7. Alarm Setpoints



Heating, cooling, dehumidification, and fan failure alarms for individual AHUs are entered from the Alarm Setpoints dialog box.

Functional Description

Heat/Cool Alarms and Notices[-50° - 999° F, OPEN, or CLOSED] [NONE]

Alarm and notice set points may be entered as NONE (for no alarms), a temperature, or as OPEN or CLOSED. Whenever the AHU's control temperature reading is below a heating notice set point or above a cooling notice set point for a number of minutes equal to the set point's notice delay, a notice will be generated. A notice is a low-level warning written into the BEC Alarm Log.

Whenever the AHU's control temperature reading is below a heating alarm set point or above a cooling alarm set point for a number of minutes equal to the set point's alarm delay, an alarm will be generated. An alarm is a high-level warning written into the BEC Alarm Log that may be accompanied by on-site operation of a bell, light, horn, or other warning device. Alarms may also initiate a modem dialout sequence and/or the activation of a 485 Alarm Annunciator Panel.

Dehumidification Alarms and Notices [0 - 100% or -50° - 999° F, OPEN, or CLOSED] [NONE]

Dehumidification alarm and notice set points may be entered as NONE (for no alarms), a dewpoint temperature, a relative humidity, or as OPEN or CLOSED. Whenever the AHU's humidity sensor reading is above an alarm or notice set point for a number of minutes equal to the alarm or notice delay, an alarm or a notice will be generated.

Delays [0 - 240 min.] [3 min.]

Delays, which are amounts of time the BEC must wait before generating an alarm, may be set as any number between 0 and 240 minutes.

Fan Failure Alarms

Sensor Type [Digital/Pressure] [Digital]

Fan failure inputs must be specified in the Sensor Type field as either a digital closure or as a pressure sensor.

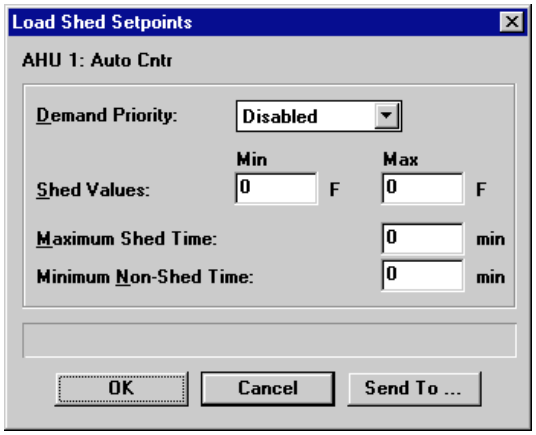
Alarm Limit [-50 - 999, OPEN, or CLOSED] [0]

The alarm set point may be set as a pressure value from -50 to 999 (for pressure sensors), or as OPEN or CLOSED (for digital sensors). Whenever the AHU's fan failure input exceeds the alarm or notice set point for an amount of time equal to the set point's delay, an alarm or notice will be generated.

Alarm Delay [0 - 240 min.] [30 min.]

The BEC must wait for an amount of time equal to the Alarm Delay before a fan failure alarm may be generated.

2.2.8. Load Shed Setpoints



Demand priorities and kW values for individual AHUs are specified in this dialog box.

Functional Description

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

For each AHU, a load shed priority must be defined. There are 16 levels of priorities to choose from, one being the lowest, and 16 being the highest. When the demand control algorithm sheds loads, it begins by shedding loads with high priority numbers. As the need for shedding increases, loads with lower priority levels are shed.

The priority level set in this field is applied to all stages within the AHU. Stages are shed from highest stage to lowest stage based upon the number of kW needed to shed.

Heating and cooling kW ratings for each AHU are defined in **Section 2.3.6.,** *Load Shed Setup.*

Min Shed Value [0° - 9999° F] [0° F]

When the AHU temperature control value drops below the set point specified in the Min Shed Value field, the AHU will come out of shed. If the AHU is not in shed when the Min Shed Value set point is reached, the AHU will not be allowed to shed.

Max Shed Value [0° - 9999° F] [0° F]

When the AHU temperature control value exceeds the set point specified in the Max Shed Value field, the AHU will come out of shed. If the AHU is not in shed when the Max Shed Value set point is reached, the AHU will not be allowed to shed.

Enter a temperature value from 0-9999 in the Max Shed Value field.

Max Shed Time [0 - 240 min.] [0 min.]

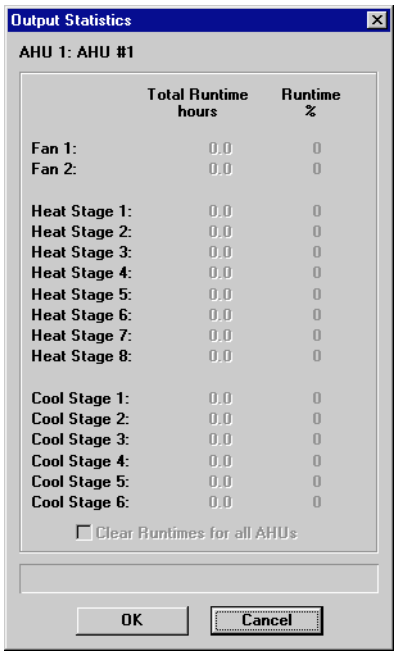
The Shed Duration set point is the maximum amount of time an AHU may remain in shed. When the AHU has been shed for an amount of time equal to the Shed Duration, the AHU will reactivate.

Entering a zero will allow the AHU to be shed for as long as necessary.

Max Non-Shed Time [0 - 240 min.] [0 min.]

After an AHU has come out of load shedding, the BEC must wait for an amount of time equal to the Interval Between Sheds before it may call upon the AHU to be shed again.

2.2.9. Output Statistics



Runtimes and runtime percentages for all AHU fans, heating stages, and cooling stages are shown in the Output Statistics dialog box.

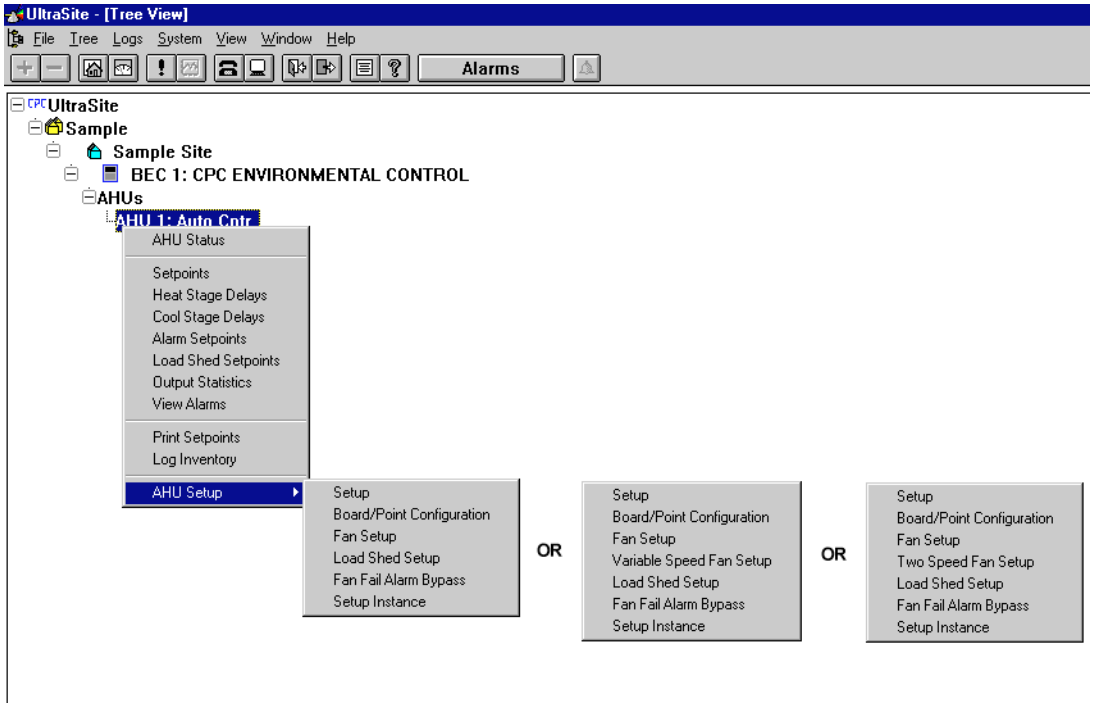
Functional Description

The Output Statistics dialog box displays the runtimes statistics of each fan input, heating stage, and cooling stage. The total number of hours each component has been running is shown in the Total Runtimes Hours column. The percentage of the total AHU runtime the component has been running is shown in the Runtime% field.

Runtimes for all components in all AHUs may be reset to zero by checking the Clear Runtimes For All AHUs box and clicking OK.

2.3. Individual AHU Setup Menu

Screen Map

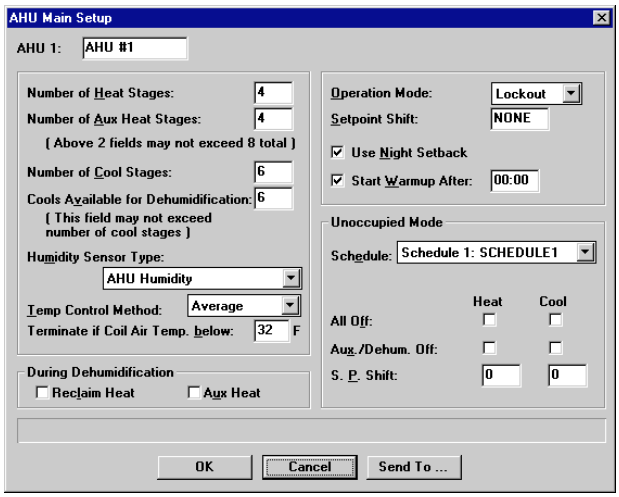


Definition

Setup information specific to an individual AHU, such as stage numbers, fan settings, and kW usage, is defined using the options under the Individual AHU Setup Menu.

Option	Reference	Page
Setup	**Section 2.3.1.,** *AHU Main Setup.*	22
Board/Point Configuration	**Section 2.3.2.,** *AHU Board/Point Configuration*.	24
Fan Setup	**Section 2.3.3.,** *Fan Setup*.	25
Two Speed Fan Setup	**Section 2.3.4.,** *Two-Speed Fan Setup* (Option Will Not Be Displayed Unless Defined In Fan Setup).	25
Variable-Speed Fan Setup	**Section 2.3.5.,** *Variable-Speed Fan Setup* (Option Will Not Be Displayed Unless Defined In Fan Setup).	26
Load Shed Setup	**Section 2.3.6.,** *Load Shed Setup*.	27
Fan Fail Alarm Bypass	**Section 2.3.7.,** *Fan Fail Alarm Bypass*	27
Setup Instance	**Section 2.3.8.,** *Setup Instance*.	28

2.3.1. AHU Main Setup



Setup data for individual AHUs are defined here.

Functional Description

of Reclaim. Heat Stages [0 - 8] [0]

The number of reclaim heat stages in the AHU is specified in this field. No more than eight heat stages, whether they be reclaim or auxiliary, may be set up.

of Aux. Heat Stages [0 - 8] [0]

The number of auxiliary heat stages in the AHU is specified in this field. No more than eight heat stages, whether they be reclaim or auxiliary, may be set up.

of Cool Stages [0 - 6] [0]

The number of cool stages in the AHU is specified in this field. No more than six cool stages may be set up.

Available for Dehumidification [0 - 6] [0]

The number entered in the Available for Dehum field will be the number of cooling stages the BEC may use during dehumidification.

Humidity Sensor type [options] [AHU Humidity]

The sensor or combination of sensors that the AHU uses to read dewpoint or humidity is specified in the Humidity Control Source field. Users may choose from the following sensor types:

- *AHU Humidity* - the sensor is a relative humidity sensor.
- *AHU Humidistat* - the sensor is a humidistat, which opens and closes at a fixed humidity.
- *AHU Dewpoint Cell* - the sensor is a dewpoint cell.
- *AHU Dewpoint Calc* - the BEC uses a relative humidity sensor on the AHU and the control temperature calculated by the AHU's temperature sensors to calculate a dewpoint value.
- *Anti-Sweat 1 Humidity* - the AHU uses the relative humidity sensor defined for anti-sweat circuit one.
- *Anti-Sweat 2 Humidity* - the AHU uses the relative humidity sensor defined for anti-sweat circuit two.
- *Anti-Sweat 1 Dewpoint* - the AHU uses the dewpoint cell defined for anti-sweat circuit one.
- *Anti-Sweat 2 Dewpoint* - the AHU uses the dewpoint cell defined for anti-sweat circuit two.

See **Section 3.1.6.,** *Anti-Sweat Circuit Setpoints*, for information on how to set up anti-sweat humidity or dewpoint sensors.

Temp Control Method [options] [Average]

The BEC may be set up with up to six temperature sensors to monitor the inside temperature of an area. The BEC must be told how to combine these sensor values to calculate a control temperature that may be used in heating and cooling control. Users may choose between four sensor combination strategies:

- *One* - when only one temperature sensor is being used, select One.
- *Average* - the sensor values are averaged to yield the control temperature.
- *Maximum* - the highest sensor value is used as the control temperature.
- *Minimum* - the lowest sensor value is used as the control temperature.

Terminate if Coil Air Temp Below [-50° - 99° F] [32° F]

To prevent moisture from freezing on cooling stage coils, Cool Termination set points may be defined for all AHUs. When a coil air temperature sensor reads a temperature below the Cool Termination set point defined for the AHU, all cooling stages within the AHU deactivate.

Coil Air Temperature sensors must be given board and point addresses in the FRZSTAT fields in **Section 2.3.2.,** *AHU Board/Point Configuration.*

Reclaim Heat During Dehum[Yes/No] [No]

By checking the Reclaim Heat During Dehum box, users may lock out the use of reclaim heating stages during dehumidification.

Auxiliary Heat During Dehum[Yes/No] [No]

By checking the Auxiliary Heat During Dehum box, users may lock out the use of auxiliary heating stages during dehumidification.

Operation Mode [options] [Lockout]

The Mode of Operation field determines how the BEC will react to detected changes in seasons. Users may select either of two different options:

- *Seasonal Lockout* - during winter-like conditions, cooling mode is locked out; during summer-like conditions, heating mode is locked out.
- *Auto* - regardless of seasonal conditions, the BEC will activate heating during summer and cooling during winter as necessary. Heating and cooling set points may be shifted

The BEC determines summer and winter by comparing the outside temperature to the Winter/Summer Switch Over set point defined in **Section 1.1.7.,** *AHU Setup*.

Seasonal Setpoints Shift [-20° - 20°] [0°]

If Auto is selected under the Mode of Operation field, a set point shift value from -20° to +20° may be entered in the Seasonal Setpoints Shift field. When the BEC operates in Winter mode, the value specified in the Seasonal Setpoints Shift is subtracted from both the heating and cooling set points. Therefore, if lower set points are desired, enter a positive value, and vice-versa.

Use Night Set Back [Yes/No] [Yes]

When the Use Night Set Back box is checked, different heating and cooling set points may be used for day and night operation. Leaving the box unchecked will cause the BEC to use normal day settings during night operation.

Start Warm Up After [Yes/No] [Yes]

In normal night set back operations, the BEC's heating and cooling set points are shifted down when Night Set Back mode begins and returned to normal when Night Set Back ends. When the Warm Up feature is being used, rather than switching immediately from night set points to day set points, the BEC will gradually increment the building temperature set points during the final hours of Night Set Back mode. As a result, when night set back mode terminates, the building temperature will be closer to the desired daytime temperature.

To enable the Warm Up feature, check the Use Warm Up box and enter a start time from 00:00 to 23:59.

Unoccupied Mode Schedule # [options] [Sch. 1]

The BEC uses schedules to determine what times the building will be unoccupied. When the schedule number is defined in the Use Schedule Number field, the selected AHU will operate in unoccupied mode when the schedule is OFF and operate in occupied mode when the schedule is ON. See **Section 7** for information on how to define schedules.

Heat All Off [Yes/No] [No]

Checking this box bypasses all heat stages off during unoccupied mode.

Cool All Off [Yes/No] [No]

Checking this box bypasses all cool stages off during unoccupied mode.

Heat Aux Off [Yes/No] [No]

Checking this box disables all auxiliary heat stages during unoccupied mode.

Dehum Off [Yes/No] [No]

Checking this box prevents the AHU from entering dehumidification mode during unoccupied hours.

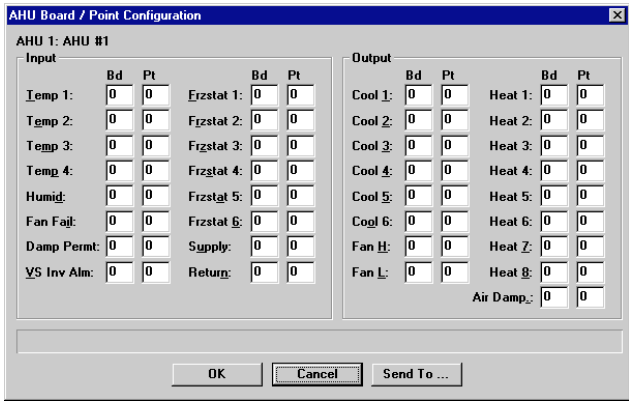
Heat Set Point Shift [-50° - 99°] [0°]

If desired, the heating set point(s) defined in **Section 2.2.2.,** *Heat/Cool Setpoints*, or **Section 2.2.5.,** *Heat Stage Setpoints (Separate Set Point only)*, may be raised or lowered during unoccupied hours. To enable Heat Set Point Shift, enter a value in this field.

Cool Setpoint Shift [-50° - 99°] [0°]

If desired, the cooling set point(s) defined in **Section 2.2.2.,** *Heat/Cool Setpoints*, or **Section 2.2.6.,** *Cool Stage Setpoints (Separate Set Point only)*, may be raised or lowered during unoccupied hours. To enable Cool Set Point Shift, enter a value in this field.

2.3.2. AHU Board/Point Configuration



Board and point addresses for most AHU-related inputs and outputs are defined in this dialog box.

Functional Description

Bd

The network address of an input communication board is defined by the network dip switch on the 16AI board or rotary dials on the 8IO board. The number entered in the Board Number field is used by the BEC in conjunction with the Point address defined below to locate the selected sensor.

Pt

Each input sensor is physically connected to a specific point on an input communication board. The point numbers are printed on the board above the input connections. This point address is used by the BEC in conjunction with the board address to locate the selected sensor.

Table 2-1 and **Table 2-2** below lists the inputs and outputs configured in this dialog box.

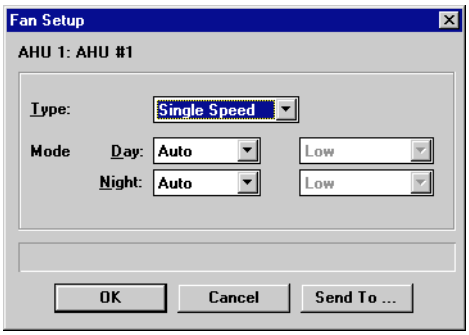
Input Name	Input Description
Temp #1-#4	AHU temperature sensors one through four
Humidity	AHU's humidity sensor
Fan Fail	Fan proof input
Damp Permt	When closed, the AHU's air damper is permitted to open.
VS Inv Alm	Variable-speed fan inverter alarm
Frzstat 1-6	Coil air termination temperature sensors for cool stages 1 through 6
Supply	Supply air temperature sensor
Return	Return air temperature sensor

***Table 2-1** - List of AHU Board/Point Configuration Inputs*

Output Name	Output Description
Cool #1-#6	AHU cooling stages one through six
Fan H	High-speed fan output (If using single or variable-speed fans, define fan here.)
Fan L	Low-speed fan output
Heat #1-#8	AHU heating stages one through eight
Air Damp	Outside air damper control

***Table 2-2** - List of AHU Board/Point Configuration Outputs*

2.3.3. Fan Setup



Day and night modes of operation for single-, two-, and variable-speed AHU fans are selected here.

Functional Description

Type [options] [Single Speed]

There are three types of AHU fans: single-speed, two-speed, and variable-speed. Specify the appropriate fan type in the Fan Type field. The BECs above 4.10 support variable speed fans on AHUs 1-6.

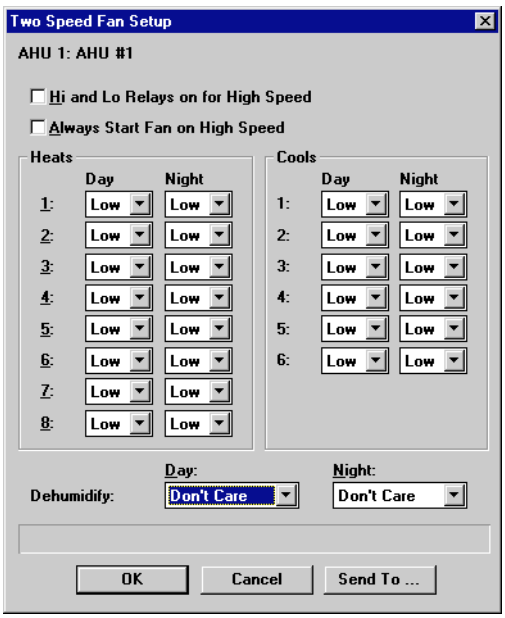
Mode Day/Night [Auto/Always On] [Auto]

AHU fans may operate in either of two modes: Always On or Auto. In Always On mode, the fan will run constantly. In Auto mode, the fan will only run when a heating or cooling stage is active.

AHU fans may be configured to operate differently during the day and night hours. Specify the desired daytime and nighttime modes in the Day and Night fields.

If Always On is specified for daytime or nighttime operation of a two-speed fan, a default speed must be chosen (either LOW or HIGH). The fan will operate at this speed when no stages are active.

2.3.4. Two-Speed Fan Setup



Fan speeds for two-speed AHU fans are configured in this dialog box.

Functional Description

Hi and Lo Relays on for High Speed [Yes/No] [No]

If desired, on a call for high fan speed, both the Fan Hi and Fan Lo outputs may be called to close. To activate both relays during high speed, check this box.

Always Start Fan on High Speed [Yes/No] [No]

When an idle fan receives a call to begin operation, its initial speed is determined by whether it is called on to operate at low or high speed. By entering YES in the Always Start Fan On High Speed field, the fan may be ordered to always begin operating at high speed.

Heat/Cool [Low/High] [Low]

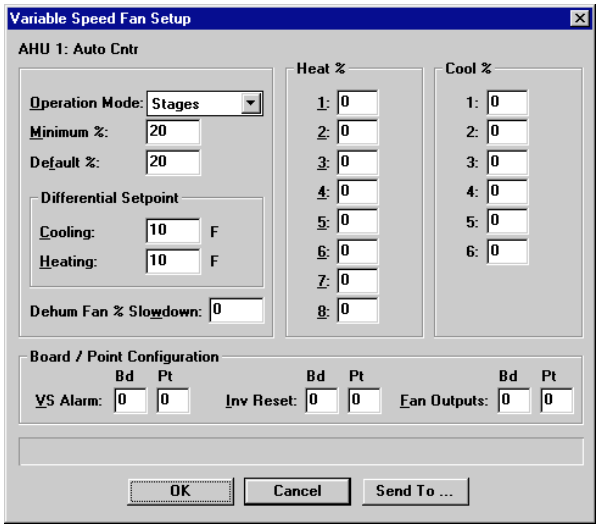
The fan speed for each stage may be specified as either Low or High. Different speeds may be specified for day and night modes of operation.

When a single stage is activated, the AHU fan will run at the speed specified in the stage's heat or cool field. When multiple stages are on, the BEC looks at all active stages' fan speed settings and operates the fan at the highest of all settings. For example, if three heating stages were active and all three had low-speed settings, the fan would operate at low speed. If a fourth stage were activated that had a high-speed setting, the fan would begin operating at high speed.

Dehumidify [Don't Care/Force Low] [Don't Care]

The speed setting fields below DEH in this screen represent the fan speed during dehumidification. Fan speed may be slowed during dehumidification by forcing the fan to operate at low speed. Choosing Low will force the fan to run at low speed during dehumidification mode; choosing "don't care" will allow the fan speed to be determined by the settings of the active stages.

2.3.5. Variable-Speed Fan Setup



Fan speed settings for variable-speed AHU fans are specified in this dialog box.

Functional Description

Operation Mode

Variable-speed fans may operate in either of two modes: stages and differential mode. When Stages is selected, the fan speed is determined by the defined fan speed settings of each heating and cooling stage. When Differential is selected, the fan speed is determined by the differential between the supply and return air temperature sensors. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.3.,** *Fan Control*, for more information.

Minimum VS%

The Minimum Variable Speed percentage is the lowest possible speed at which the fan can operate when active. Enter a percentage from 0-100%.

Default VS%

If the fan has been set up as Always On in **Section 2.3.3.,** *Fan Setup*, the Default VS% is the speed percentage at which the fan will operate when no heating or cooling stage is active.

Differential Setpoint in Cooling Mode

When Differential is selected as the variable-speed fan's mode of operation, the Differential Setpoint in Cooling Mode is the desired differential between the return and supply air temperature sensors during cooling. If the differential is greater than the set point, the fan speed will increase; if the differential is smaller than the set point, the fan speed will decrease. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.3.3.2.,** *Differential*, for more information.

Differential Setpoint in Heating Mode

When Differential is selected as the variable-speed fan's mode of operation, the Differential Setpoint in Heating Mode is the desired differential between the supply and return air temperature sensors during heating. If the differential is greater than the set point, the fan speed will increase; if the differential is smaller than the set point, the fan speed will decrease. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.3.3.2.,** *Differential*, for more information.

Heat/Cool%

The numbers 1-8 under HEAT% and 1-6 under COOL% represent the AHU's eight heating and six cooling stages. The field beneath each number is where fan speed percentages from 0-100% are specified.

When a single heating or cooling stage is on, the variable-speed fan will operate at the speed percentage defined for the stage. When multiple heating or cooling stages are on, the BEC looks at the defined speed percentages for all active stages and operates the fan at the highest setting.

If, for example, two cooling stages are on with fan speed settings of 20% and 40% respectively, the fan will operate at 40% speed. If a third stage were to come on with a 60% speed setting, the fan would operate at 60%.

Dehum Slow Down

Fan speed during dehumidification is calculated as normal using the individual heating and cooling stage fan speed settings. A Dehum Slow Down percentage may be specified to slow the fan down during dehumidification. When a percentage greater than zero is entered in the Dehum Slow Down field, the Dehum Slow Down percentage is subtracted from the normal fan speed during dehumidification.

For example, if a cooling stage with a 30% fan speed setting is activated during dehumidification mode and the De-

hum Slow Down percentage is set at 10%, the fan will operate at 20% speed. If a second cooling stage with a 50% fan speed were to come on, the fan speed would rise to 40%.

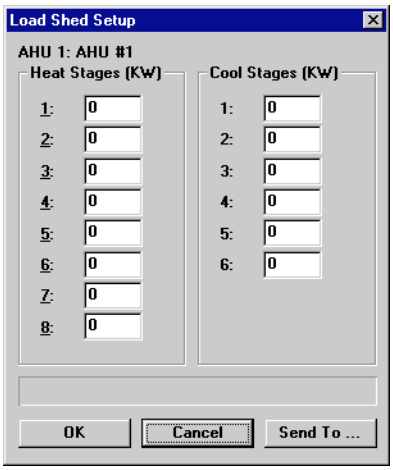
Board / Point Configuration

When a variable speed fan is being used that is controlled by an inverter, it is possible to configure the fan so that an alarm will be made if a problem with the inverter arises. The VS Alarm must be configured to an available input point on a control board. If the fan is having an inverter problem, an alarm can be received here.

Inv Reset can be used when a VS Alarm has been received to cycle power. This board and point number must correspond to an available output point on a control board.

Fan Output is used to control what % of the speed the variable speed fan is running at. This board and point number must correspond to an available point on a 4AO board for correct operation.

2.3.6. Load Shed Setup



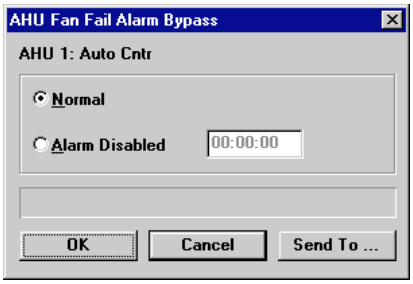
KW requirements for heating and cooling stages are entered in the Load Shed Set-up dialog box.

Functional Description/Navigation

The AHU Load Shed Setup screen is where kilowatt requirements for each heating and cooling stage within an AHU are defined. For each defined stage, specify a kW value from 0-240.

The kW ratings defined for the AHU stages are used in demand control to shed loads. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.7.,** *Demand Control,* for more information.

2.3.7. Fan Fail Alarm Bypass



A timed bypass may be configured for an AHU's fan alarm.

Functional Description/Navigation

Fan failure alarms and notices may be bypassed for a fixed period of time using the Fan Fail Alarm Bypass window.

Fan Failure Alarm [Normal/Alarm Disabled] [Normal]

While set as Normal, all Notices and Alarms can be generated and are reported. If the Alarm Disabled option is selected and a time is entered in the box next to it, no Notices or Alarms will be generated or reported.

2.3.8. Setup Instance

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

Functional Description/Navigation

When Setup Instance is chosen, all dialog boxes related to AHU 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 AHU is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *AHU Main Setup* - see **Section 2.3.1.**
- *AHU Board/Point Configuration* - see **Section 2.3.2.**
- *Fan Setup* - see **Section 2.3.3.**
- *Load Shed Setup* - see **Section 2.3.6.**
- *Heat/Cool Setpoints* - see **Section 2.2.2.**
- ***(Single S.P. Only)*** *Heat Delays* - see **Section 2.2.3.**
- ***(Single S.P. Only)*** *Cool Delays* - see **Section 2.2.4.**
- ***(Separate S.P. Only)*** *Heat Stage Setpoints* - see **Section 2.2.5.**
- ***(Separate S.P. Only)*** *Cool Stage Setpoints* - see **Section 2.2.6.**
- *Alarm Setpoints* - see **Section 2.2.7.**
- *Load Shed Setpoints* - see **Section 2.2.8.**

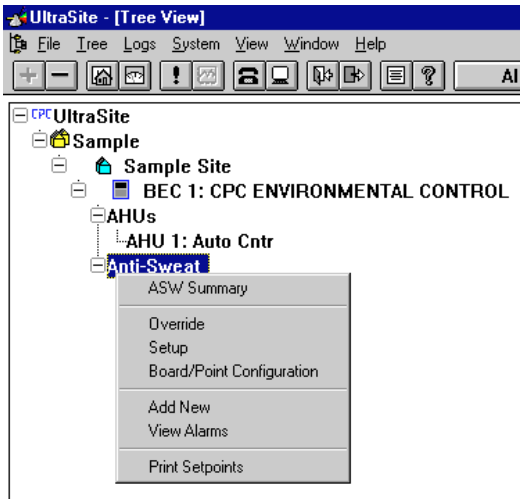
3 Anti-Sweat Control

3.1. Main Menu

Definition

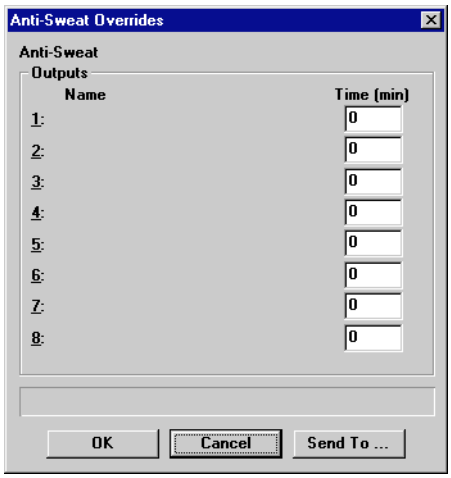
Anti-Sweat circuit assignments, overrides, and physical locations may be defined using the Anti-Sweat Control Main Menu commands.

Screen Map



Option	Reference	Page
ASW Summary	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens*.	63
Override	**Section 3.1.1.,** *Anti-Sweat Overrides.*	30
Setup	**Section 3.1.2.,** *Anti-Sweat Outputs Setup.*	30
Board/Point Configuration	**Section 3.1.3.,** *Board/Point Configuration*.	31
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

3.1.1. Anti-Sweat Overrides



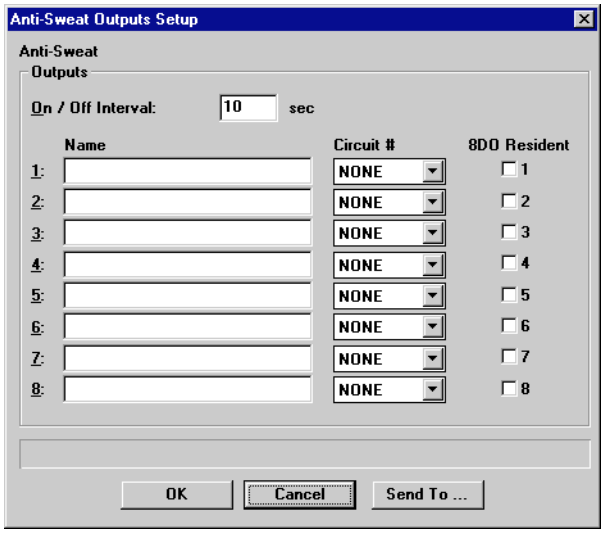
Timed overrides of anti-sweat heaters may be configured from the Anti-Sweat Overrides dialog box.

Functional Description

Anti-sweat heaters may be overridden OFF by closing an external input. When this input is closed, the heater will remain OFF for as long as the output is closed or for an amount of time equal to the number of minutes in the Time field, whichever is greater. Enter the minimum amount of time (from 0 to 240 minutes) the heater will remain OFF in this field.

Anti-sweat override inputs must be configured in the Anti-Sweat Board/Point Configuration dialog box (see **Section 3.1.3.**).

3.1.2. Anti-Sweat Outputs Setup



Anti-sweat heaters and their characteristics are defined in this dialog box.

Functional Description

ON/OFF Interval [0 - 999 sec.] [10 sec.]

All anti-sweat circuits pulse heaters ON for a percentage of a defined time interval. This interval is entered in the ON/OFF Interval field. Any value from one to 999 seconds may be entered here; however, if an 8DO board is being used, the value should be less than 240 seconds.

Name [15 char. max]

In the field to the right of the anti-sweat heater number, a name may be entered. Enter any name up to 15 characters.

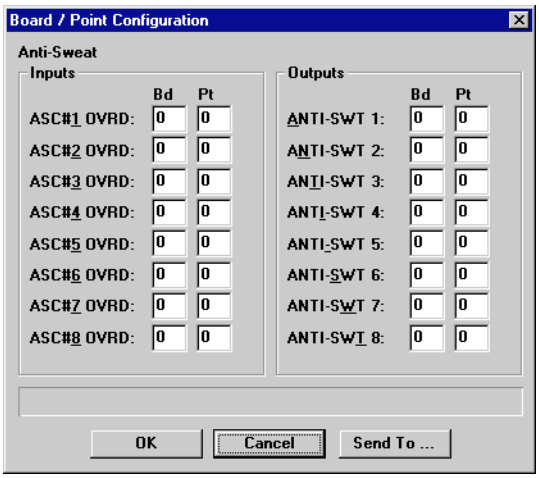
Circuit # [1 or 2] [NONE]

There are two separate anti-sweat circuits. Each circuit has its own dewpoint sensor and set points, and all heaters within a circuit operate at the same rate. To assign the heater to a circuit, choose Circuit 1 or Circuit 2. For unused heaters, None should be chosen.

8DO [Yes/No] [No]

CPC recommends anti-sweat heaters be operated by 8DO Digital Output boards. If a heater is connected to an 8DO board, check the 8DO box; otherwise, leave the box empty.

3.1.3. Board/Point Configuration



Board and point addresses for anti-sweat override inputs and anti-sweat heaters are defined in this dialog box.

Functional Description

When an anti-sweat override input is closed, a timed override of the input's corresponding heater is initiated. The time intervals for these overrides are defined in **Section 3.1.1.,** *Anti-Sweat Overrides*.

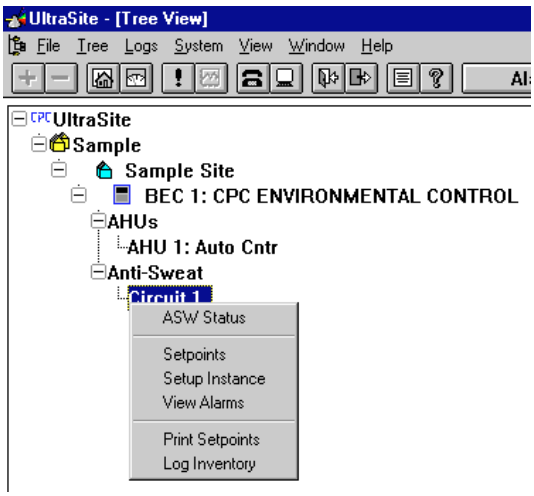
Setup data for anti-sweat heaters are defined in **Section 3.1.2.,** *Anti-Sweat Outputs Setup*.

3.1.4. Anti-Sweat Individual Circuits Menu

Definition

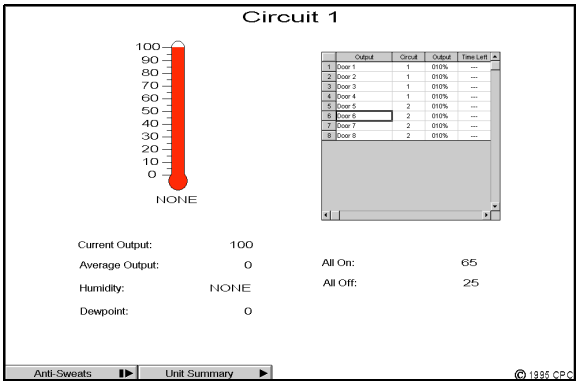
Individual anti-sweat circuits are viewed and set up using commands from the Anti-Sweat Circuits Menu.

Screen Map



Option	Reference	Page
ASW Status	**Section 3.1.5.,** *Anti-Sweat Status Screen*.	32
Setpoints	**Section 3.1.6.,** *Anti-Sweat Circuit Setpoints*.	33
Setup Instance	**Section 3.1.7.,** *Setup Instance*.	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 1.6.2,** *Component Log Inventory*.	47

3.1.5. Anti-Sweat Status Screen



The real-time status of anti-sweat circuits is displayed at the Anti-Sweat Status screen.

Functional Description

Dewpoint values used to control anti-sweat circuits are determined from either a dewpoint cell or from a combination of humidity and temperature sensors. If a dewpoint cell is being used, the measured dewpoint is shown in the Dewpoint field. If a humidity and temperature sensor is being used, the humidity sensor reading is shown in the Humidity field, the temperature sensor reading is shown in the thermometer, and the calculated dewpoint is shown in the Dewpoint field.

A summary of all anti-sweat heaters defined for the selected circuit is shown in the upper right of the status screen. Each anti-sweat heater is displayed along with its circuit number, ON percentage, and the time left before the next change of state. This summary operates similar to other summary screens in UltraSite; see *P/N 026-1002,UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens*, for more information.

The All On and All Off set points defined in **Section 3.1.6.,** *Anti-Sweat Circuit Setpoints*, are shown in the All On and All Off fields. These set points determine the ON percentage of the circuit's anti-sweat heaters. See *BEC Installation and Operation Manual,* **Section 6.5.,** *Anti-Sweat Control,* for more information on how anti-sweat set points work.

The current output percentage for the circuit is shown in the Current Output field. The average ON percentage for the day is shown in the Average Output field.

Double-clicking the left mouse button on the thermometer or any of the fields in the Anti-Sweat Status screen brings up the Anti-Sweat Setpoints dialog box (see **Section 3.1.6.,** *Anti-Sweat Circuit Setpoints*).

Clicking the right mouse button on the thermometer or any of the fields in the Anti-Sweat Status screen brings up the Anti-Sweat Individual Circuits Menu (see **Section 3.1.4.**).

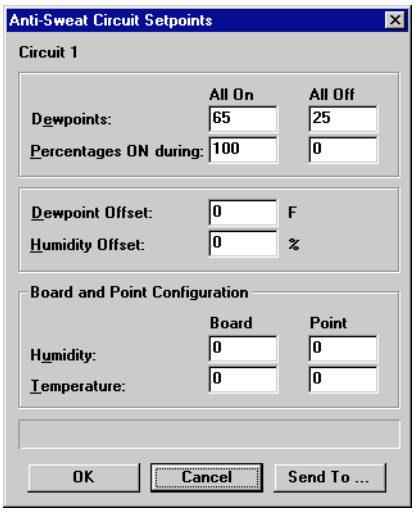
Anti-Sweats Button

Clicking the left mouse button on the Anti-Sweats button brings up a dialog box where users may select other anti-sweat status screens. Clicking the right mouse button on the Anti-Sweats button brings up the Anti-Sweat Control Main Menu (see **Section 3**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide,* **Section 1.5,** *Unit Level*, for more information).

3.1.6. Anti-Sweat Circuit Setpoints



Set points used in the operation of anti-sweat circuit control are defined here.

Functional Description

Dewpoint All OFF/All ON [-20° - 99° F] [65°/25° F]

The Dewpoint All OFF set point is the minimum dewpoint below which the anti-sweat circuit's heaters will remain OFF at all times. The Dewpoint All ON set point is the maximum dewpoint above which the anti-sweat circuit's heaters will remain ON at all times. Between these dewpoint values, the anti-sweat circuit will pulse ON and OFF for a percentage of the time interval defined in **Section 3.1.2.,** *Anti-Sweat Outputs Setup*.

Percent On During All OFF/All ON [0 - 100%] [100%/0%]

By default, anti-sweat circuits operate at 0% when the dewpoint is below the Dewpoint All OFF set point and at 100% when the dewpoint is above the Dewpoint All ON set point. If desired, a higher value for All OFF and a lower value for All ON may be specified. Enter a value between 0%-30% in the Percent On During All OFF field and between 70%-100% in the Percent On During All ON field.

Dewpoint/Humidity Offsets [-20 - 20] [0]

Anti-sweat circuits are controlled by dewpoint. Dewpoint in an anti-sweat circuit's area may be determined either by a dewpoint cell or by a relative humidity sensor used in conjunction with a temperature sensor. If the dewpoint cell or relative humidity sensor is known to read high or low, offsets may be specified in the Dewpoint Offset and Humidity Offset fields to correctly calibrate the sensors. Users may enter a value from -20% to 20% or from -20° F to 20° F.

3.1.7. Setup Instance

Setup Instance allows users to access all anti-sweat circuit-related dialog boxes in succession.

Functional Description/Navigation

When Setup Instance is chosen, all dialog boxes related to anti-sweat circuit 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 anti-sweat circuit is created in UltraSite, the Setup Instance sequence is initiated automatically.

Since the only dialog box exclusive to anti-sweat circuit control is Anti-Sweat Circuit Setpoints, this dialog box is called up when Setup Instance is chosen. See **Section 3.1.6.,** *Anti-Sweat Circuit Setpoints*.

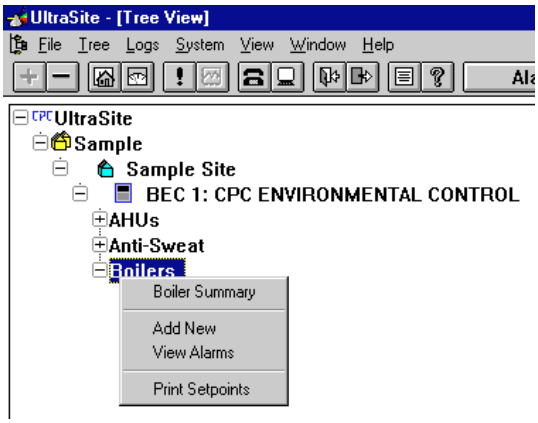
4 Boilers

4.1. Main Menu

Definition

From the Boilers Main Menu, a summary of all boilers may be viewed, new boilers may be added, alarms affecting all boilers may be viewed, and set points for all boilers may be printed.

Screen Map



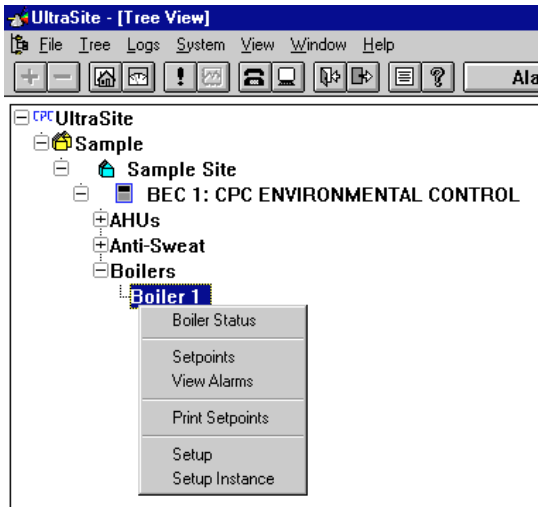
Option	Reference	Page
Boiler Summary	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens*.	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.5.7,** *Add New (Enhanced REFLECS only).*	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,* **Section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

4.2. Individual Boilers Menu

Definition

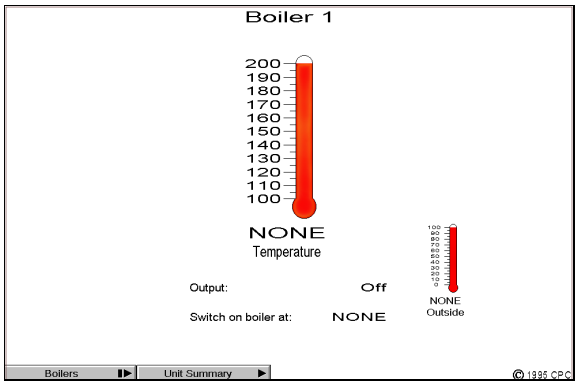
Individual boilers are configured and viewed using options from the Individual Boilers Menu.

Screen Map



Option	Reference	Page
Boiler Status	**Section 4.2.1.,** *Boiler Status Screen*.	36
Setpoints	**Section 4.2.2.,** *Boiler Setpoints*.	36
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 4.2.3.,** *Boiler Setup*.	37
Setup Instance	**Section 4.2.4.,** *Setup Instance*	37

4.2.1. Boiler Status Screen



The real-time status of a boiler is shown in the Boiler Status screen.

Functional Description/Navigation

The current boiler temperature or pressure is displayed in the large thermometer or gauge located in the middle of the screen. The smaller thermometer to the right of the boiler indicator shows the current reading of the outside temperature sensor.

The output field shows whether the boiler output is ON or OFF. The cut-on or cut-off set point, which varies according to outside temperature and the set points defined in **Section 4.2.2.,** *Boiler Setpoints*, is shown in the Switch On/Off Boiler At field. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.4.,** *Boiler Control*, for more information about boiler set points and operation.

Double-clicking the left mouse button on any of the fields or indicators in this screen brings up the Boiler Setpoints dialog box. See **Section 4.2.2.** for more information.

Clicking the right mouse button on any of the fields or indicators in this screen will bring up the Individual Boilers Menu (see **Section 4.2.**).

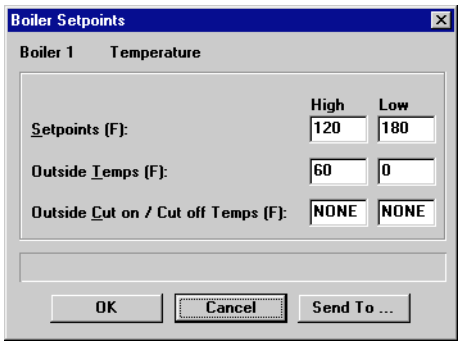
Boilers Button

Clicking the left mouse button on the Boilers button brings up a dialog box where users may select other boiler status screens. Clicking the right mouse button on the Boilers button brings up the Boilers Main Menu (see **Section 4**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide,* **Section 1.5,** *Unit Level*, for more information).

4.2.2. Boiler Setpoints



The range of temperatures used in controlling a boiler temperature is defined in the Boiler Setpoints dialog box.

Functional Description

Setpoints High/Outside Temps High [see description] [120° F at 60° F]

When the outside temperature equals or exceeds the value entered in the Outside Temps High field, the temperature or pressure specified in the Setpoint High field will become the boiler set point.

Specify a value from 80° F to 200° F or -1 to 500 lbs. in the Setpoints High field. Enter a value from -10° F to 65° F in the Outside Temps High field.

Setpoints Low/Outside Temps Low [see description] [180° F at 0° F]

When the outside temperature equals or falls below the value entered in the Outside Temps Low field, the temperature or pressure specified in the Setpoints Low field will become the boiler set point.

Specify a value from 80° F to 200° F degrees or -1 to 500 lbs. in the Setpoints Low field. Enter a value from -10° F to 65° F in the Outside Temps Low field.

Outside Cut-Off [-10° - 140° F] [NONE]

When the outside temperature equals or exceeds the temperature listed in this field, the output will turn off. The output will remain off until the temperature falls below the Outside Temps High field.

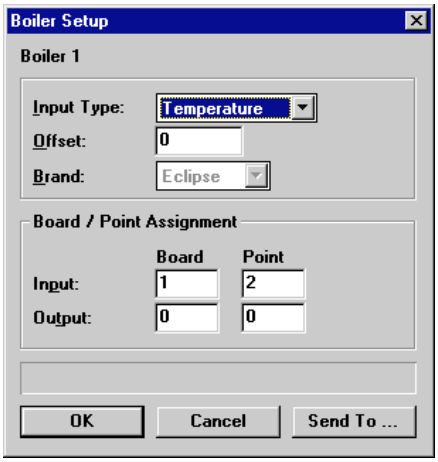
Specify a temperature from -10° F to 140° F in this field, or None to disable this override.

Outside Cut-On [-40° - 65° F] [NONE]

When the outside temperature equals or falls below the temperature listed in this field, the output will turn on and remain on until the temperature falls below the Outside Temps Low field.

Specify a temperature from -40° F to 65° F in this field, or None to disable this override.

4.2.3. Boiler Setup



Boiler input types, offsets, and board and point addresses are specified here.

Functional Description

Input Type [options] [Temperature]

Four different types of sensors may be entered in the Boiler Input Type field:

- *(T)emp* - temperature sensor.
- *(1)00 lb.* - 100 lb. pressure transducer.
- *(2)00 lb.* - 200 lb. pressure transducer.
- *(5)00 lb.* - 500 lb. pressure transducer.

Choosing a temperature or a pressure sensor in the Boiler Input Type field determines whether the set points in **Section 4.2.2.,** *Boiler Setpoints*, may be entered as temperature set points or pressure set points.

Offset [-99 - 99 ° or lb.] [0 ° or lb.]

If a boiler sensor is known to consistently read a value higher or lower than the actual temperature or pressure, an offset value may be specified in this field. Enter a value from -99 to 99 in this field. The offset can be in either degrees or lbs. depending on the input type.

Board/Point Assignment

The board and point addresses of the boiler input sensor and the boiler output are defined in the Input and Output fields.

4.2.4. Setup Instance

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

Functional Description/Navigation

When Setup Instance is chosen, all dialog boxes related to anti-sweat circuit 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 anti-sweat circuit is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Boiler Setup* - see **Section 4.2.3.**
- *Boiler Setpoints* - see **Section 4.2.2.**

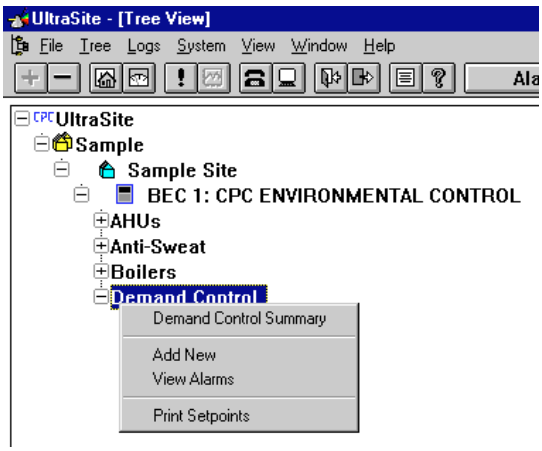
5 Demand Control

5.1. Main Menu

Definition

From the Demand Control Main Menu, summary screens and alarm views for all demand control circuits may be viewed, new circuits may be added, and set points may be printed.

Screen Map



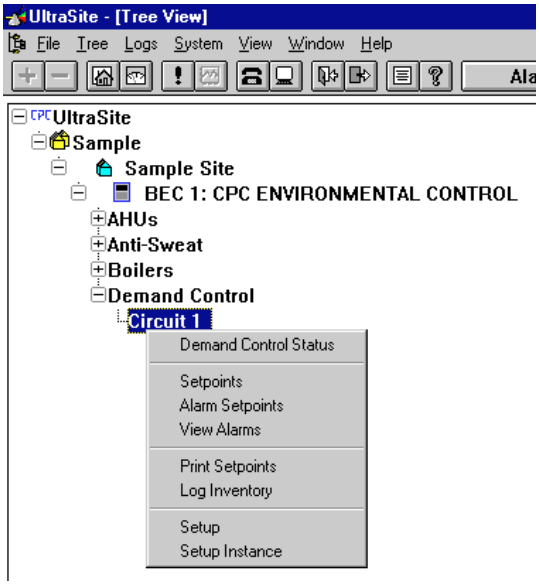
Option	Reference	Page
Demand Control Summary	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens.*	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.5.7,** *Add New (Enhanced REFLECS only).*	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,*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

5.2. Demand Control Circuits Menu

Definition

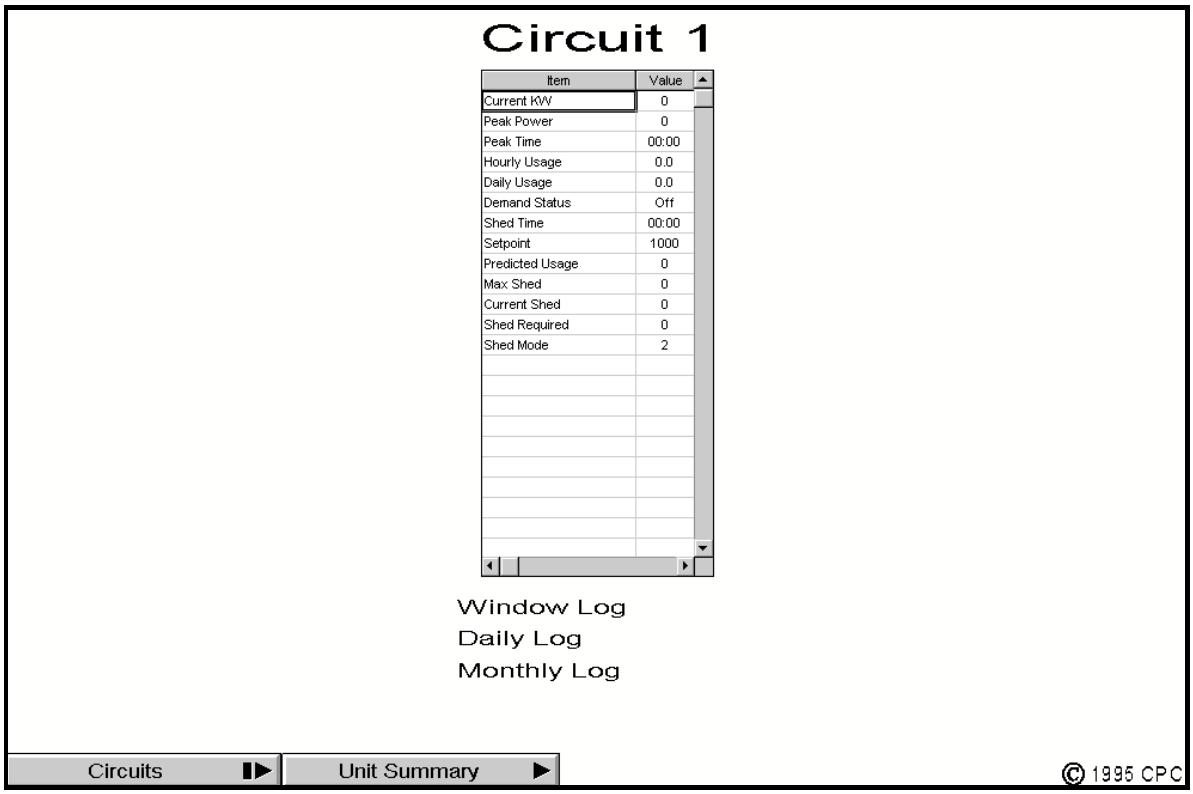
Demand control settings may be viewed and edited using the Demand Control Circuits Menu options.

Screen Map



Option	Reference	Page
Demand Control Status	**Section 5.2.1.,** *Demand Control Status*.	40
Setpoints	**Section 5.2.2.,** *Demand Setpoints*.	41
Alarm Setpoints	**Section 5.2.3.,** *Alarm Setpoints*.	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
Log Inventory	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.6.2,** *Component Log Inventory*	47
Setup	**Section 5.2.4.,** *Demand Setup*.	42
Setup Instance	**Section 5.2.5.,** *Setup Instance*	43

5.2.1. Demand Control Status



The current power usage and the daily and monthly usage statistics may be viewed in the Demand Control Status screen.

Functional Description

A summary of all information related to demand monitoring and control of the selected circuit is shown in the summary box in the middle of the screen. This summary operates similar to other summary screens in UltraSite; see *P/N 026-1002,UltraSite User's Guide*, **Section 1.10,** *Status and Summary Screens*, for more information.

Different fields appear in the summary box depending on whether Circuit 1 or Circuit 2 is being viewed. Since Circuit 2 is used for demand monitoring only, fields related to demand controlling (such as load shed fields) are not available in the summary box.

A description of the fields in the demand control summary box is given below:

- *Current kW* - the current amount of kW being used.
- *Peak Power* - the highest amount of kW usage recorded in the current day.
- *Peak Time* - the time at which the Peak Power value was recorded.
- *Hourly Usage* - the total kW used during the current hour.
- *Daily Usage* - the total kW used during the current day.
- ***(Circuit 1 only)*** *Shed Time* - a counter showing the number of hours and minutes the circuit has been in shed mode in the current day.
- ***(Circuit 1 only)*** *Setpoint* - the demand set point, defined in **Section 5.2.2.,** *Demand Setpoints.*
- ***(Circuit 1 only)*** *Predicted Usage* - the predicted energy consumption based on the predictive calculations performed by the demand control algorithm.
- ***(Circuit 1 only)*** *Max Shed* - the maximum number of kWs which may be shed in the entire system is shown in the Max Shed field. Only loads that have priority levels higher than zero and specified kW values will be included in this total.
- ***(Circuit 1 only)*** *Current Shed* - the number of kWs currently being shed.
- ***(Circuit 1 only)*** *Shed Required* - the amount of kW that must be shed to keep the power consumption under the demand set point.

- ***(Circuit 1 only)*** *Shed Mode* - an indicator of load shedding activity used by CPC for observational and troubleshooting purposes.

Window/Daily/Monthly Logs

Graphs of the window, daily, and monthly logs for this circuit may be viewed by putting a check in the desired log select boxes and selecting Collect/Graph Logs from the button bar or by choosing Collect Logs from the Actions menu.

Window logs are average rates of energy consumption during the defined Demand Window. Daily and monthly logs are collections of average energy consumption rates during each day and month.

See *P/N 026-1002, UltraSite User's Guide,* **Section 1.8,** *Graph View*, for more information about log and graph options.

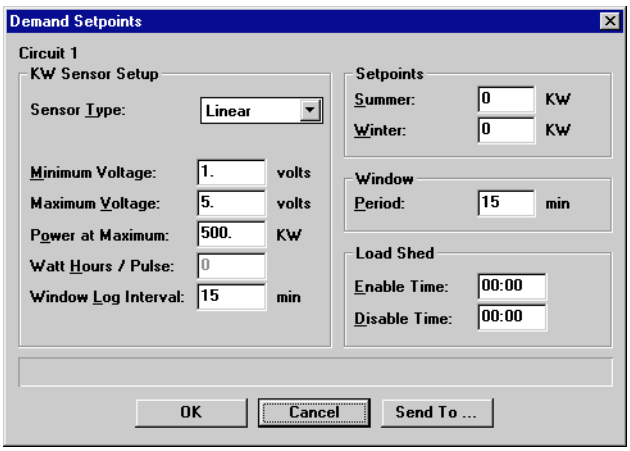
Circuits Button

Left-clicking the Circuits button brings up a dialog box where users may access demand control status screens for other circuits. Right-clicking the Circuits button brings up the Demand Control Main Menu (see **Section 5**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide*, **Section 1.5,** *Unit Level*, for more information).

5.2.2. Demand Setpoints



Set points related to demand monitoring and load shedding, as well as setup data for the kW sensor, are specified in this dialog box.

Functional Description

Sensor Type [Linear/kW Digital] [Linear]

Kilowatt sensors for each circuit may be set up as either linear sensors or digital sensors. Choose either Linear or KW Digital in the Sensor Type fields.

If a digital sensor is being used, it may only be connected to point 1 of a 16AI board that is version D.03 or higher. See BEC Installation and Operation Manual, "Sensor Type"

Minimum/Maximum Voltage [0 - 6 V] [1 V/5 V]

Linear kilowatt sensors signify the measured power usage by emitting a voltage. In order for the BEC to read that voltage, the minimum and maximum voltages of the sensor outputs must be specified. Enter the minimum and maximum voltages in these fields. Refer to the sensor's installation manual for the minimum and maximum values.

Power at Maximum [0 kW - 3200 kW] [500 kW]

The Power at Maximum value is the kW value that, when measured by the sensor, will emit a voltage to the BEC equal to the value defined in the Maximum Voltage.

The BEC assumes that a sensor output equal to the Minimum Voltage field value represents a KW measurement of zero. Therefore, once the Power at Maximum, Minimum Voltage, and Maximum Voltage fields are defined, the BEC becomes capable of translating voltages between the Minimum and Maximum Voltages as KW values between zero and the Power at Maximum value.

Watt Hours/Pulse [0 kW - 9999 kW]

A digital kW sensor measures watt-hours by reading a pulse supplied by a power company, which represents a fixed number of watt-hours. The BEC uses the watt-hour information to calculate a kW value for use by the Demand Control algorithm. Enter the number of watt-hours represented by a single pulse.

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

Enter the logging interval the BEC will use to send kW readings to the Demand Status log.

Summer/Winter Setpoints [0 - 9999 kW] [0 kW]

The Demand Limit set point is a pre-defined level of energy consumption at which a power company greatly increases its rates. Separate set points for summer and for winter may be defined.

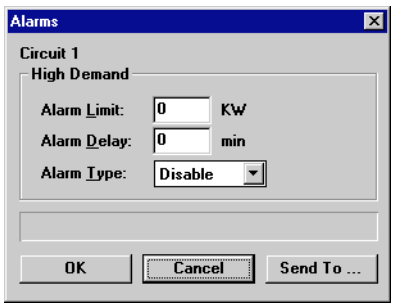
Window Period [3 - 60 min.] [15 min.]

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. Enter the demand window used by the power company in the Window Period field.

Enable/Disable Times [00:00 - 23:59] [00:00]

Load shedding may be enabled for a specific period of each day. Define where this period begins in the Enable field and where the period ends in the Disable field. If both are left undefined (00:00), load shedding will be enabled at all hours.

5.2.3. Alarm Setpoints



High Demand alarms are configured in this dialog box.

Functional Description

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

The BEC will send an alarm or notice when the selected circuit's kW reading exceeds the High Demand Alarm set point.

Enter the High Demand alarm set point in the Alarm Limit field.

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

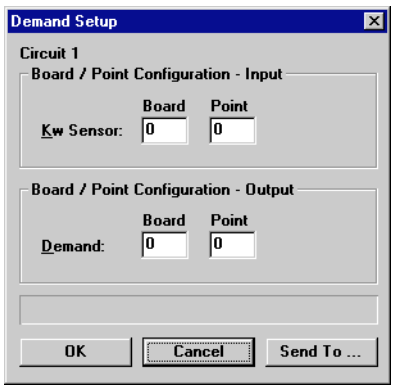
The Time Delay is the specified duration the BEC must wait before generating an alarm or notice. Enter a delay value in the Alarm Delay field.

Alarm Type [options] [Disable]

In the Alarm Type field, high demand conditions may be configured to produce an alarm, a notice, or no warnings at all.

An 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. A notice creates an entry in an alarm log and initiates no other signal.

5.2.4. Demand Setup



Inputs and outputs related to demand monitoring and control are defined in this dialog box.

Functional Description

The physical location of the KW sensor is entered in the KW Sensor Bd and Pt fields. KW sensor setup data are specified in **Section 5.2.2.,** *Demand Setpoints*.

The board and point address entered in the Demand Bd and Pt fields is the physical location of the circuit's demand relay. When the circuit's kW sensor is reading a power level higher than the demand set point, the demand relay closes.

5.2.5. Setup Instance

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

Functional Description

When Setup Instance is chosen, all dialog boxes related to demand circuits 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 demand circuit is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Demand Setup* - see **Section 5.2.4.**
- *Demand Setpoints* - see **Section 5.2.2.**
- *Demand Alarms* - see **Section 5.2.3.**

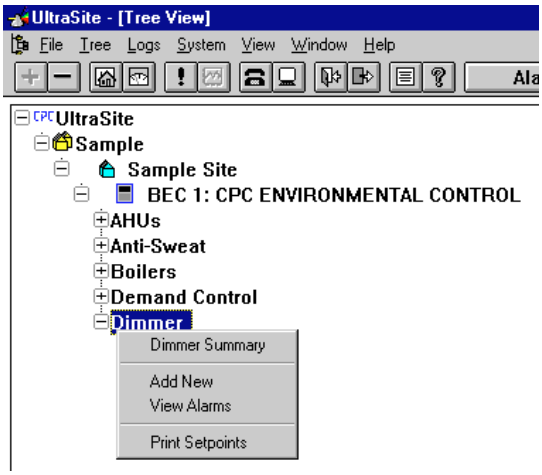
6 Dimmer Control

6.1. Main Menu

Definition

From the Dimmer Control Main Menu, existing zones may be viewed, new zones may be added, alarms may be viewed, and set points for all zones may be printed.

Screen Map



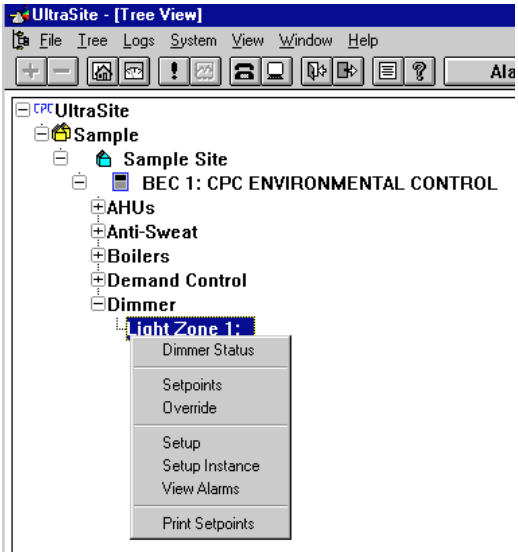
Option	Reference	Page
Dimmer Control Summary	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens.*	63
Add New	See *P/N 026-1002, UltraSite User's Guide,* **Section 1.5.7,** *Add New (Enhanced REFLECS only).*	42
View Alarms	See *P/N 026-1002, UltraSite User's Guide,*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

6.2. Dimmer Zones Menu

Definition

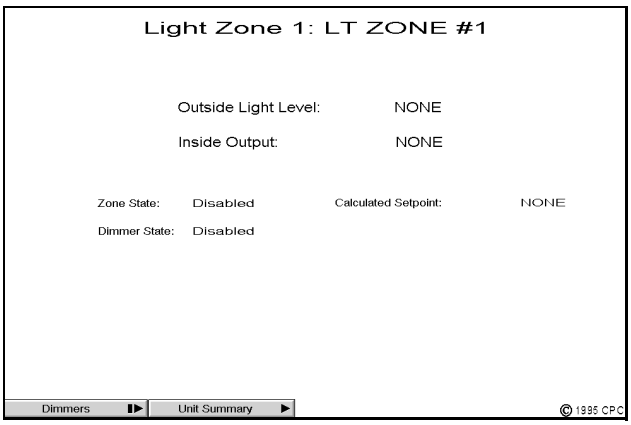
Dimmer control parameters may be viewed and defined using the Dimmer Control Zone Menu options.

Screen Map



Option	Reference	Page
Dimmer Status	**Section 6.2.1.,** *Dimmer Status*.	45
Setpoints	**Section 6.2.2.,** *Dimmer Setpoints*.	46
Override	**Section 6.2.3.,** *Dimmer Override*.	47
Setup	**Section 6.2.4.,** *Dimmer Setup*.	47
Setup Instance	**Section 6.2.5.,** *Setup Instance*	48
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

6.2.1. Dimmer Status



The real-time status of a dimmer zone may be viewed from the Dimmer Status screen.

Functional Description

Dimmer circuits operate by reading the outside light level, calculating a corresponding inside light level based on light level setpoints (see **Section 6.2.2.,** *Dimmer Setpoints*), and raising or lowering the indoor light level as called for by an indoor light level sensor or dimmer output.

The outside light level sensor reading is shown in the Outside Light Level field. The current indoor light level or dimmer output percentage is given in the Inside Output field. The inside light level set point calculated from the outside light level value is shown in the Calculated Setpoint field.

The Zone State field shows whether the zone is operating in Occupied or Unoccupied mode. See **Section 6.2.2.,** *Dimmer Setpoints,* for information on how to schedule occupied and unoccupied building times.

The Dimmer State field shows whether the light level is currently being raised, lowered, or kept constant.

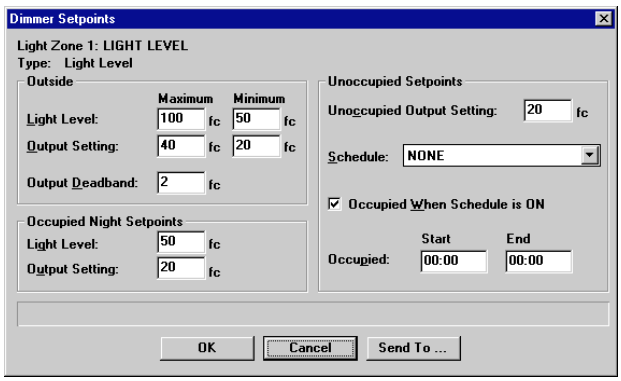
Dimmers Button

Left-clicking the Dimmers button brings up a dialog box where users may access Dimmer Status screens for other light zones. Right-clicking the Dimmers button brings up the Dimmer Control Main Menu (see **Section 6**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide,* **Section 1.5,** *Unit Level,* for more information).

6.2.2. Dimmer Setpoints



Set points used in the control of light zones are defined here.

Functional Description

Light Level Max/Output Setting [see description] [100 fc at 40 fc]

When the outside light level equals or exceeds the value entered in the Light Level Maximum field, the light level value or dimmer output percentage entered in the Max Output Setting field becomes the indoor light level set point.

Specify a light level value, in foot-candles, or enter a percentage from 0-100% in the Maximum Output Setting field. Specify an outside maximum light level from 0-9999 foot-candles in the Light Level Maximum field.

Light Level Min/Output Setting [see description] [50 fc at 20 fc]

When the outside light level equals or falls below the value entered in the Light Level Minimum field, the light level value or dimmer output percentage entered in the Min Output Setting field becomes the indoor light level set point.

Specify a light level value, in foot-candles, or enter a percentage from 0-100% in the Minimum Output Setting field. Specify an outside maximum light level from 0-9999 foot-candles in the Light Level Minimum field.

Output Deadband [0 - 999 fc / 0 - 40%] [2 fc / 6%]

The output deadband is a value equally above and below the current output setting within which the indoor lighting setting is considered acceptable. If the indoor lighting level or dimmer output percentage is below the output setting plus one-half the dead band and above the output setting minus one-half the dead band, the BEC will not call for a dimmer adjustment.

Enter a value between 0 and 999 foot-candles or a percentage between 0 and 40 percent.

Occupied Night Setpoints [0 - 999 fc at 0 - 9999 fc or 0 - 100%] [50 fc at 20 fc]

Alternate set points may be defined for occupied night operation. Night, as it applies to dimmer control, is defined as an outside light level sensor value at below the value specified in the Occupied Night Level field. Any foot-candle value from 0-9999 may be entered in this field.

When the outside light level is at or below the Occupied Night Level set point, the indoor light level for the selected zone will be fixed at the value specified in the Occupied Night Output Setting field.

Unoccupied Output Settings [0 - 999 fc] [20 fc]

During Unoccupied Mode, the indoor light level or dimmer output stays at a fixed level. Enter this level in the Unoccupied Output Setting field.

Schedule [options] [NONE]

Occupied and unoccupied status may be linked to a schedule. To link dimmer control to a schedule, select a schedule from the scroll options.

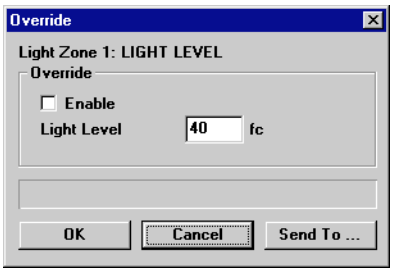
Occupied When Schedule is ON [Yes/No] [Yes]

If this box is checked, the lighting zone will operate in occupied mode when the schedule is ON and in unoccupied mode when the schedule is OFF. If this box is unchecked, the lighting zone will operate in unoccupied mode when the schedule is ON and in occupied mode when the schedule is OFF.

Occupied Starts/Ends[00:00 - 23:59] [00:00]

When no schedule is defined for operating the lighting zone in unoccupied mode, occupied building times may be specified in the Occupied Starts/Ends fields. Enter the times in 24-hour format.

6.2.3. Dimmer Override

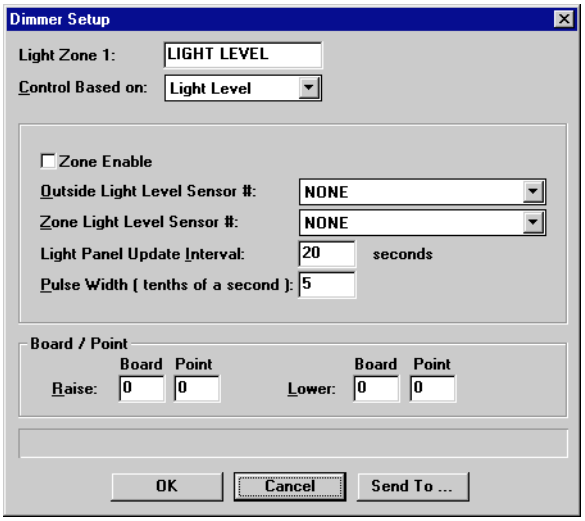


Overrides may be ordered from the Dimmer Override dialog box.

Functional Description

A lighting zone may be overridden with a constant light level or dimmer output value. To override a zone, check the Enable box, and enter a light level or dimmer output value in the Light Level or Dimmer Output field. The lighting zone will remain fixed at the override value until a user terminates the override by de-checking the Override Enable box.

6.2.4. Dimmer Setup



Control specifications, light sensor locations, and other setup data are defined in this dialog box.

Functional Description

Control Based On [options] [Light Level]

In order for a dimmer panel to accurately adjust inside light levels to the desired luminance, the BEC must have a means of determining the inside light level. This may be done in either of two ways.

A light level sensor directly measures the amount of inside light, in foot-candles. If an indoor light sensor is being used, choose Light Level from the scroll options.

If an inside light level sensor is unavailable, an output from the dimmer panel may be used to relay the percentage at which the circuit's dimmer is currently operating. When adjusting the dimmer, the BEC will use the dimmer output percentage to estimate the indoor light level. If a dimmer output is being used, choose Dimmer Output from the scroll options.

Zone Enable [Yes/No] [No]

Check this box to enable dimmer control for this lighting zone.

Outside Light Level Sensor # [options] [NONE]

The outside light level sensor must be set up as one of the 64 system sensors configurable in the BEC. Choose the appropriate sensor from the scroll options.

Sensors must be defined in the BEC before they will appear in the Outside Light Level Sensor Number scroll options. See **Section 8,** *Sensor Control*.

Zone Light Level Sensor # [options] [NONE]

The zone light level sensor must be set up as one of the 64 system sensors configurable in the BEC. Choose the appropriate sensor from the scroll options.

Sensors must be defined in the BEC before they will appear in the Outside Light Level Sensor Number scroll options. See **Section 8,** *Sensor Control*.

Light Panel Update Interval [0 - 60 min.] [20 min.]

After the BEC checks the outside light level and makes any necessary adjustments to the dimmer, the BEC waits for an amount of time equal to the Light Panel Update Interval before making another check. Enter a number of seconds from 1 to 60 in the Light Panel Update Interval field.

Pulse Width [1 - 100 tenths of sec] [5 tenths of sec]

The BEC adjusts dimmer settings by sending a series of 12 V DC digital pulses to the dimmer panel. Each pulse raises or lowers the dimmer percentage by a slight amount. The desired width of the pulse is entered in the Pulse Width field. Specify a value from 1 to 100 tenths of a second.

Raise/Lower

The Raise output sends 12 V DC pulses to the dimmer panel when the BEC calls for a higher indoor light level. The Lower output sends pulses when the BEC calls for a lower light level. Specify the board and point addresses of these outputs in the Raise/Lower fields.

6.2.5. Setup Instance

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

Functional Description

When Setup Instance is chosen, all dialog boxes related to lighting 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 new zone is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Dimmer Setup* - see **Section 6.2.4.**
- *Dimmer Setpoints* - see **Section 6.2.2.**

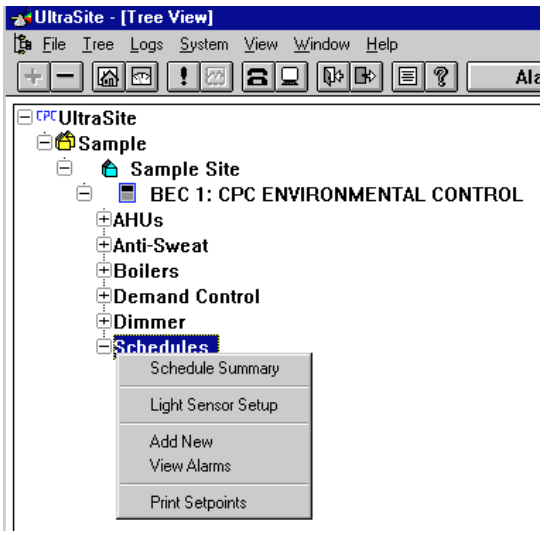
7 Schedules

7.1. Main Menu

Definition

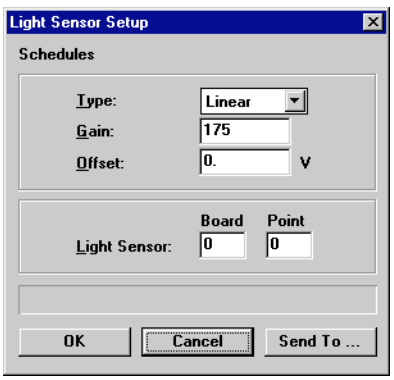
Schedules are defined, overridden, and configured for light sensor overrides using the Schedules Menu options.

Screen Map



Option	Reference	Page
Schedule Summary	*P/N 026-1002, UltraSite User's Guide,* **Section 1.10,** *Status and Summary Screens.*	63
Light Sensor Setup	**Section 7.1.1.,** *Light Sensor Setup.*	49
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

7.1.1. Light Sensor Setup



The light sensor used in schedule light sensor overrides is set up in this dialog box.

Functional Description

Type

The light sensor type is specified in the Type field. Choose either Linear or Digital.

Gain

Linear light level sensors must be provided with a gain value. The sensor's gain value should be given in the light level sensor's installation manual. Enter the gain value in the Gain field.

Offset

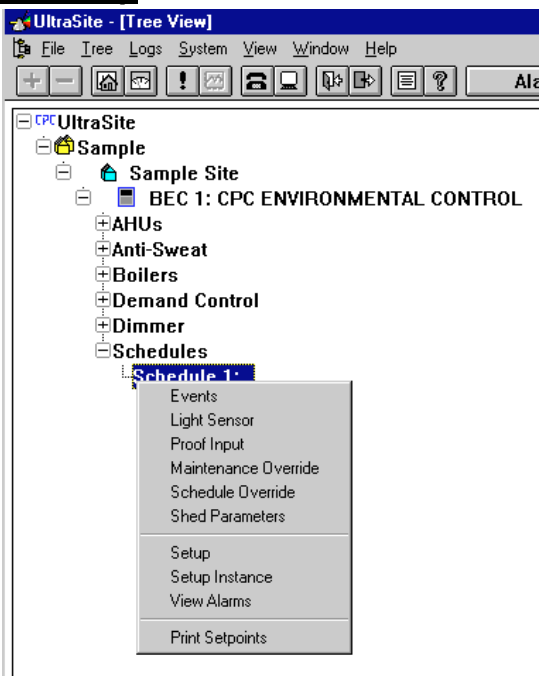
In cases where a light level sensor is known to read higher or lower values than the actual light level, an offset value may be specified. The number of foot-candles entered in the Offset field will be automatically added to the light level sensor's reading.

7.2. Individual Schedules Menu

Definition

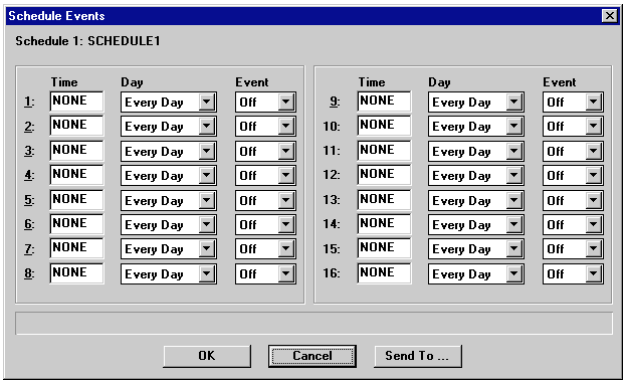
Schedules are defined, overridden, and configured for light sensor overrides using the Individual Schedules Menu.

Screen Map



Option	Reference	Page
Events	**Section 7.2.1.,** *Schedule Events*.	51
Light Sensor	**Section 7.2.2.,** *Light Sensor Overrides*.	51
Maintenance Override	**Section 7.2.4.,** *Maintenance Override*.	52
Schedule Override	**Section 7.2.5.,** *Schedule Override*.	53
Shed Parameters	**Section 7.2.6.,** *Shed Parameters*.	53
Setup	**Section 7.2.7.,** *Schedule Setup*.	54
Setup Instance	**Section 7.2.8.,** *Setup Instance*.	54
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

7.2.1. Schedule Events



On/off events for schedules are defined in the Schedule Events dialog box.

Functional Description

A schedule is a group of dates and times that designates when a building is occupied and unoccupied or when a particular system or component should be activated and deactivated. All HVAC, lighting, and sensor functions may be controlled using a schedule. Each of the BEC's 24 schedules is composed of 16 separate ON and OFF operation times (events). These events determine when the system will be active or inactive. Only systems assigned to the schedule will be affected.

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

The time of day in which the event will take place is entered in the Time field. The time must be specified in 24-hour format.

Day [options] [Every Day]

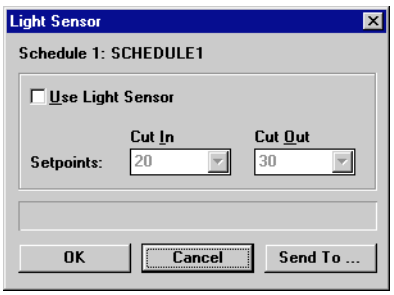
The day or group of days in which the event will take place is entered in this field. The possible day settings that may be used are listed below:

- *All Holidays* - All defined Holidays.
- *Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday* - individual days of the week.
- *Monday-Friday* - Monday through Friday.
- Everyday - all seven days every week
- *Holiday 1-8* - Holidays 1 through 8, as defined in **Section 1.1.6.,** *System Schedule*.
- *(A)* - Special Event A, as defined in **Section 1.1.6.,** *System Schedule*.
- *(B)* - Special Event B, as defined in **Section 1.1.6.,** *System Schedule*.
- *Weekend* - all weekends.

Event [On/Off] [Off]

The Event field determines whether the schedule will turn off or on when the event takes place. Enter either OFF or ON in the Func field.

7.2.2. Light Sensor Overrides



Light sensor overrides for schedules are configured in this dialog box.

Functional Description

Use Light Sensor [Yes/No] [No]

To set up a light sensor override for the selected schedule, check the Use Light Sensor box. If no light sensor override is desired, leave this box empty.

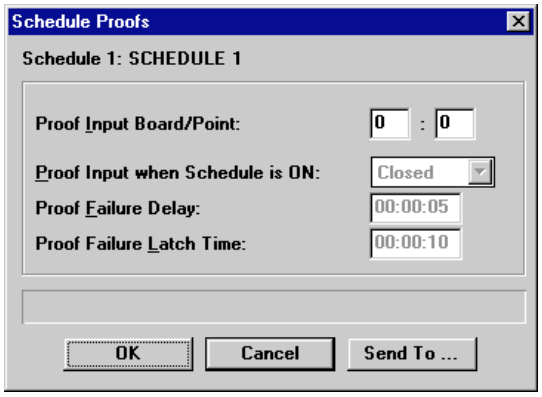
Cut In [fc value, OPEN, CLOSED] [20 fc]

The Cut In value is the light level at which the override turns on. If the sensor reading equals or is below the Cut In set point, the light level sensor override activates. Specify a foot-candle value, OPEN, or CLOSED in the Cut In field.

Cut Out [fc value, OPEN, CLOSED] [30 fc]

The Cut Out value is the light level at which the override turns off. If the sensor reading equals or exceeds the Cut Out set point, the light level sensor override deactivates. Specify a foot-candle value, OPEN, or CLOSED in the Cut Out field.

7.2.3. Schedule Proof



Schedule proofs can be set so that an alarm is generated if the proof fails.

Functional Description

Twenty-four schedule input proofs can be defined within the BEC. If a schedule is ON, and the associated schedule proof input is defined as being OPEN or CLOSED, an alarm will be generated if the proof fails.

Proof Input Board/Point

The proof input must be defined by board and point in the two fields provided.

Proof Input When Schedule is ON [Open/ Closed][Closed]

Select whether the associated schedule proof input is to be OPEN or CLOSED when the schedule is on.

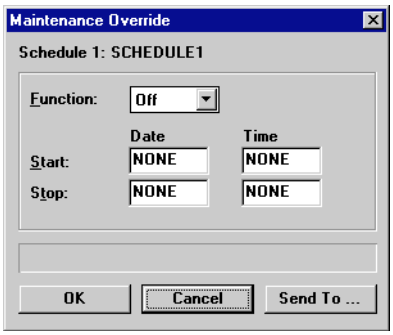
Proof Failure Delay [hrs./min./sec.][00:00:05]

The proof input must fail for the delay time before an alarm will be made. Define the delay in this field.

Proof Failure Latch Time [hrs./min./sec.] [00:00:10]

After an alarm has been made, the associated proof input may revert to a pre-alarm state. If this occurs, the latch time can discontinue the alarm. Set the latch time in this field.

7.2.4. Maintenance Override

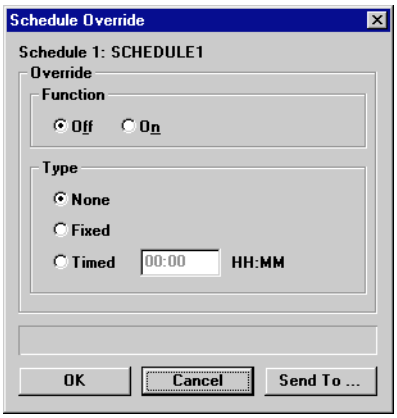


Maintenance overrides are configured in this dialog box.

Functional Description

Using the Maintenance Override screens, schedules may be configured to override OFF during specified periods of the year. To configure a maintenance override in a schedule, several items of information must be entered: whether the maintenance override will be an ON or OFF override, the From Date and Time, the To Date and Time, and.

7.2.5. Schedule Override



Fixed and timed manual overrides of schedules are ordered from the Schedule Override dialog box.

Functional Description

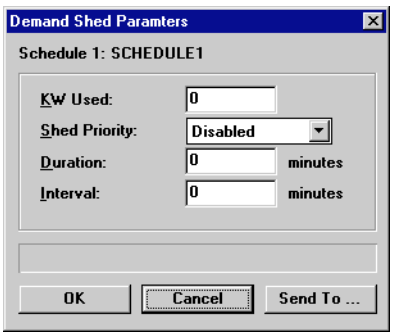
To manually override a schedule, two parameters need to be specified: the override type and the on/off status.

Override types may be either fixed or timed. Fixed overrides remain active indefinitely until a user terminates the override by choosing None in the Type field and clicking OK. Timed overrides last for a period of time equal to the number of hours and minutes entered in the Type field.

To begin a fixed override, choose Fixed from the options in the Type field and click OK. To begin a timed override, choose Timed from the options in the Type field, enter an override duration in hour:minute format, and click OK.

Schedules may be overridden ON or OFF using manual overrides. Specify either ON or OFF from the Function options.

7.2.6. Shed Parameters



Load shed characteristics for individual schedules are specified in this dialog box.

Functional Description

KW Used [0 - 240 kW] [0 kW]

The amount of KW Used must be entered in the KW Used field.

Shed Priority [1 - 16] [Disabled]

For each schedule, a load shed priority must be defined. There are 16 levels of priorities to choose from, one being the lowest, 16 being the highest. When the demand control algorithm sheds loads, it begins by shedding loads with high priority numbers. As the need for shedding increases, loads with lower priority levels are shed.

Schedules that have the same priority level are prioritized based on KW ratings.

Duration [0 - 240 min.] [0 min.]

The Duration set point is the maximum amount of time a schedule may remain in shed. When the schedule has been shed for an amount of time equal to the Shed Duration, the schedule will be allowed to reactivate.

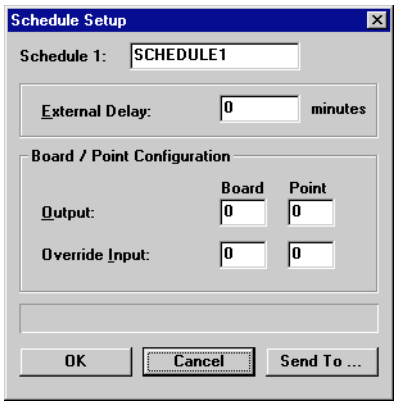
Enter a value from 0 to 240 minutes in the Shed Duration field. Entering a zero will allow the schedule to be shed for as long as necessary.

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

After a schedule has come out of load shedding, the BEC must wait for an amount of time equal to the Interval Between Sheds before it may call upon the schedule to be shed again.

Enter a value from 0 to 240 minutes in the Interval Between Sheds field. Entering a zero will allow the schedule to be shed at any time necessary.

7.2.7. Schedule Setup



Schedule names, external override delays, and physical addresses for schedules are specified in this dialog box.

Functional Description

A schedule may be configured with external override inputs that, when closed, overrides the schedule ON for a specified period of time. To specify an external override duration, enter a number of minutes from 0 to 240 in the schedule's External Delay field. The external override input is defined in the Override Input Bd and Pt fields.

7.2.8. Setup Instance

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

Functional Description

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:

- *Schedule Setup* - see **Section 7.2.7.**
- *Schedule Events* - see **Section 7.2.1.**
- *Light Sensor* - see **Section 7.2.2.**
- *Demand Shed Parameters* - see **Section 7.2.6.**

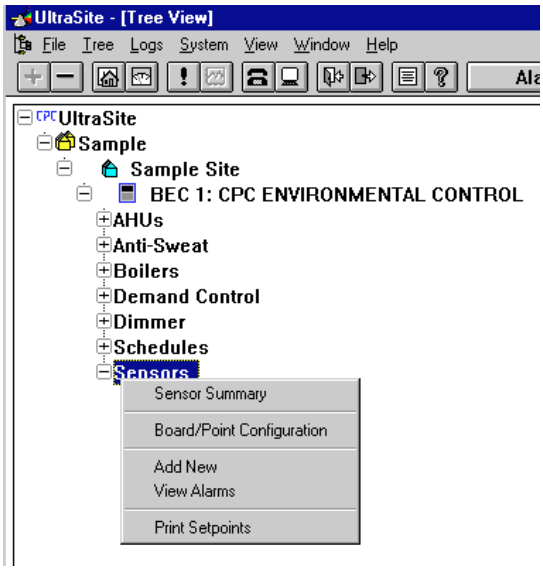
8 Sensor Control

8.1. Main Menu

Definition

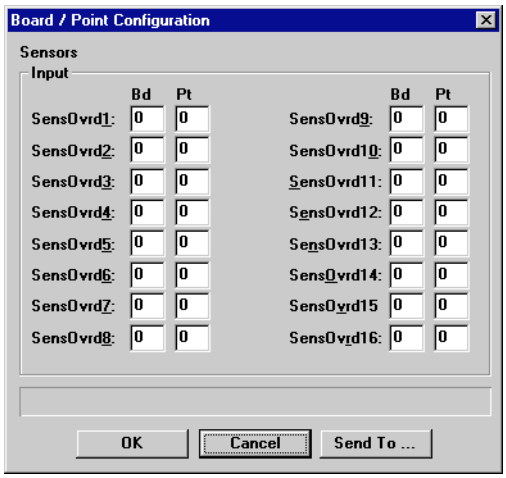
From the Sensor Control Main Menu, sensor override inputs are configured, alarms and characteristics for sensors may be viewed, and set points may be printed out.

Screen Map



Option	Reference	Page
Sensor Summary	See *P/N 026-1002, UltraSite User's Guide*, **Section 1.10,** *Status and Summary Screens*.	63
Board/Point Configuration	**Section 8.1.1.,** *Board/Point Configuration*.	56
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

8.1.1. Board/Point Configuration



Board and point addresses of sensor override inputs are specified in this dialog box.

Functional Description

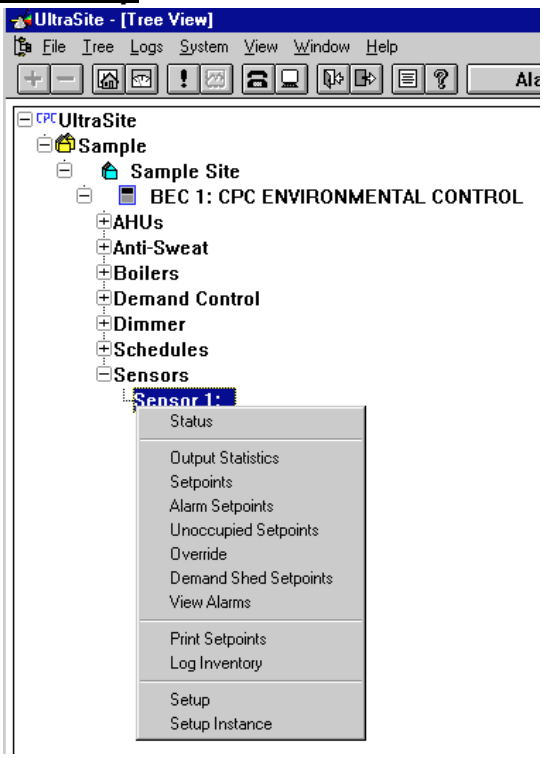
The BEC may be configured with up to 16 inputs that may be used to override sensor outputs. When a contact closure is detected from one of these inputs, all sensors connected to the input will override ON or OFF for a specified duration. Override durations for sensors are specified in **Section 8.2.6.,** *Overrides*.

8.2. Individual Sensors Menu

Definition

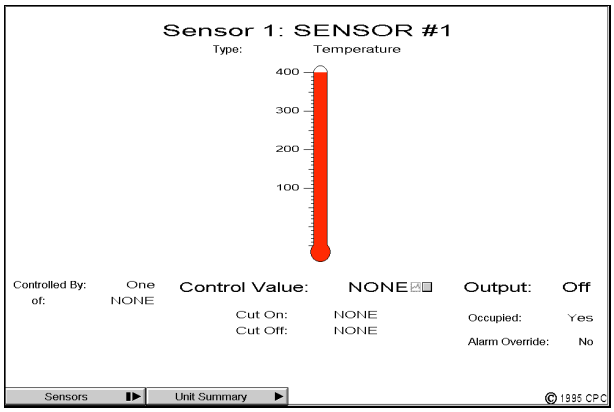
From the Individual Sensors Menu, status and statistics for individual sensors may be viewed, and settings and set points may be defined.

Screen Map



Option	Reference	Page
Status	**Section 8.2.1.,** *Sensor Status*.	58
Output Statistics	**Section 8.2.2.,** *Output Statistics*.	59
Setpoints	**Section 8.2.3.,** *Setpoints*.	60
Alarm Setpoints	**Section 8.2.4.,** *Alarm Setpoints*.	61
Unoccupied Setpoints	**Section 8.2.5.,** *Unoccupied Set Points*.	62
Override	**Section 8.2.6.,** *Overrides*.	63
Demand Shed Setpoints	**Section 8.2.7.,** *Sensor Load Shed Setpoints*.	64
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 1.6.2,** *Component Log Inventory*.	47
Setup	**Section 8.2.8.,** *Sensor Setup*	65
Setup Instance	**Section 8.2.9.,** *Setup Instance*.	65

8.2.1. Sensor Status



The real-time status of a sensor may be viewed in the Sensor Status screen.

Functional Description

The selected sensor's current reading is shown in the indicator located in the middle of the status screen. The appearance of this indicator depends on the type of sensor. If the sensor is a pressure transducer, the gauge will look like a pressure gauge; if the sensor is a temperature or dewpoint sensor, the gauge will look like a thermometer, etc.

The fields shown at the bottom of the Sensor Status screen pertain to the controlled output, and are defined as follows:

Controlled By

The selected sensor's value may be combined with up to three other sensor values to yield a single control value. The Controlled By field indicates the method used to combine the sensor values. See **Section 8.2.3.,** *Setpoints*, for information on how to set the combination method.

Control Value

This is the value calculated by the combination of the sensors listed in the Controlled By field. The Control Value is used to turn the controlled output on or off based on the Cut-On and Cut-Off set points.

Cut-On/Cut-Off

The Cut-On and Cut-Off set points may be defined in the Sensor Setpoints dialog box (see **Section 8.2.3.,** *Setpoints*) as specific numerical values, OPEN, or CLOSED. The Cut-On set point is the value at which the controlled output will turn on, and the Cut-Off set point is the value at which the controlled output will turn off. There is a one unit dead band around each set point.

Output/Alarm Override

The Output and Alarm Override fields display the status of the output (either On or Off) and whether the sensor is in alarm override mode (either On or Off).

Sensors

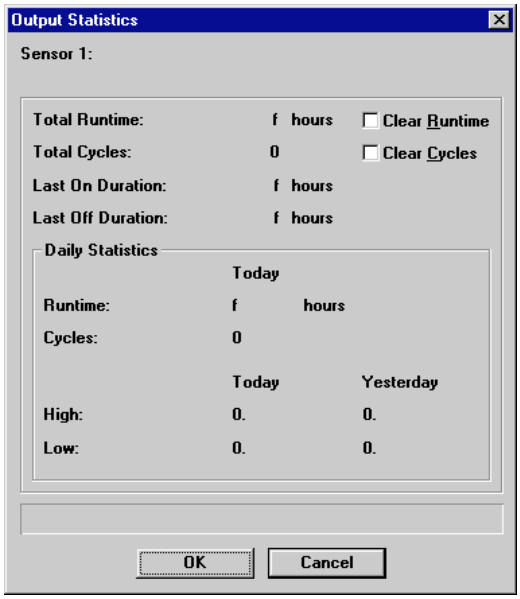
Clicking the left mouse button on the Sensors button brings up a dialog box where status screens for other sensors may be accessed.

Clicking the right mouse button on the Sensors button brings up the Sensor Control Main Menu (see **Section 8**).

Unit Summary Button

Left-clicking the Unit Summary button calls up the Unit Summary screen. Right-clicking the Unit Summary button calls up the same menu brought up by right-clicking the BEC from the system tree (see *P/N 026-1002, UltraSite User's Guide*, **Section 1.5,** *Unit Level*, for more information).

8.2.2. Output Statistics



Runtime statistics for sensors may be viewed and cleared from the Output Statistics dialog box.

Functional Description

Total Runtime

The Total Runtime field displays the total amount of time the sensor output has been ON since the last Clear Runtimes command was executed.

Total Cycles

The Total Cycles field displays the total number of times the sensor output has turned ON since the last Clear Cycles command was executed.

Last ON/OFF Duration

The Last ON and Last OFF times show the duration of the last ON and OFF events for the controlled output. This includes the amount of time the output has been in its current state. For example, if a sensor-controlled output that has been on for three hours shuts off, the Last ON field will show 3 hours and the Last OFF time will begin displaying the current amount of time the output has been OFF (starting from zero). If the output turned on again two seconds later, the Last OFF timer would stop at two seconds, and the Last ON time would begin recording the current ON time.

Clear Runtimes [Yes/No] [No]

By checking the Clear Runtimes box and clicking OK, the Total Runtimes and Runtime Today fields are cleared.

Clear Cycles [Yes/No] [No]

By checking the Clear Cycles box and clicking OK, the Total Cycles and Cycles Today fields are cleared.

Runtime Today

The Runtime Today field shows how long the controlled output has been active in the current day.

Cycles Today

The Cycles Today field shows how many times the controlled output has been turned ON in the current day.

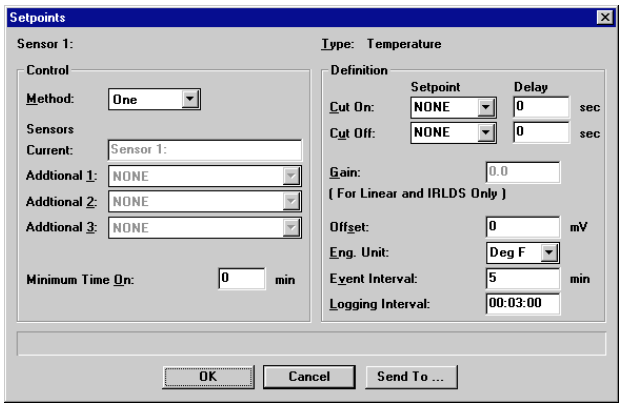
High Today/Yesterday

The High Today and High Yesterday fields show the highest sensor value recorded for the current and previous days.

Low Today/Yesterday

The Low Today and Low Yesterday fields show the lowest sensor value recorded for the current and previous days.

8.2.3. Setpoints



Sensor control strategies, output set points, and other sensor configuration data are entered in this dialog box.

Functional Description

Method [options] [One]

The control method defined in the Method field determines how to combine the values from up to three other sensors. 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 three control methods:

- *ONE* - The BEC uses the selected sensor's value as the control value.
- *AVG* - The BEC calculates the control value using the average reading of one or more sensors.
- *MAX* - The BEC calculates the control value using the maximum sensor reading of one or more sensors.
- *MIN* - The BEC calculates the control value using the minimum sensor reading of one or more sensors.

Additional Sensors [options] [None]

Up to three other sensor values may be combined with the selected sensor into a control value. The current sensor is shown in the Current field. Other sensors may be chosen from the scroll options in the Additional fields.

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

When the Cut-In set point has been reached and the controlled output is activated, the output must remain on for the Minimum ON Time regardless of the Cut-Out set point.

Cut-On/Cut-Off [options or -50 - 99] [NONE]

Sensor Cut-On and Cut-Off set points may be defined as specific values for analog input sensors or simply as contact closed or contact open for digital input sensors in the Cut On and Cut Off fields respectively. The Cut-In set point is the value at which the controlled output will turn on and the Cut-Out set point is the value at which the controlled output will turn off. There is a one unit dead band around each set point.

Cut-On Delay/Cut-Off Delay [0 - 9999 sec.] [0 sec.]

The BEC must wait a number of seconds equal to the Cut-On Delay or Cut-Off Delay before activating or deactivating a sensor-controlled output.

Gain [-999 - 999] [0]

If the sensor was set up as a Linear sensor in the Sensor Set-up dialog box (see **Section 8.2.8.**), the Gain field is enabled. The gain is a number multiplied by the number of volts in the senor input signal to yield a sensor value. Enter a value from -999 to 999 in the Gain field.

Offset [-999 - 999 mV] [0 mV]

If a sensor is known to read higher or lower than the correct measurement, an offset may be specified to compensate.

Eng. Unit [options] [dep. upon sensor type]

The engineering unit of the sensor value may specified in the Eng. Unit field. Specifying a unit is optional; the BEC does not need a specified unit to read the sensor value properly. The string entered in the Eng. Unit field is shown in status screens and data logs alongside the sensor values solely for the purpose of making the values easier to read.

By default, the BEC enters a unit in this field depending upon the sensor type defined in **Section 8.2.8.,** *Sensor Set-up*. If a different unit is desired, enter it (5 characters max) in the Eng. Unit field or choose a unit from the scroll options.

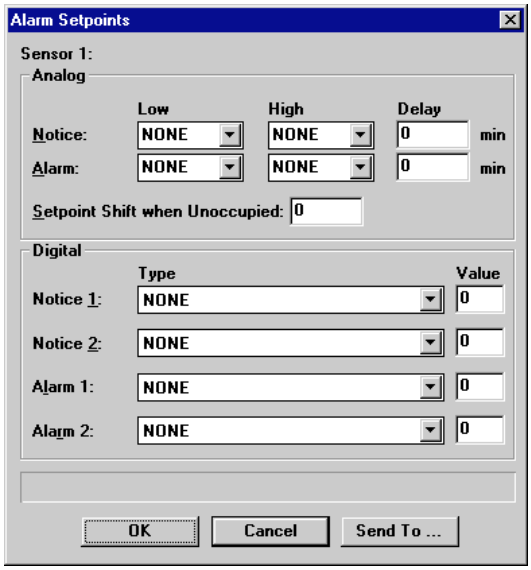
Event Interval [0 - 32767 min.] [100 min.]

Some digital sensor alarms require an event interval to be specified. An event interval is a period of time in which the BEC counts ON and OFF events, maximum values, and minimum values for the purposes of generating alarms. See **Section 8.2.4.,** *Alarm Setpoints* for more information on these types of alarms.

Logging Interval [00:00:00 - 99:99:99] [00:03:00]

The Log Interval is the amount of time between data log entries. When the BEC records data into the Data Log, it waits the amount of time specified in the Log Interval field before taking another record. Enter the desired Log Interval in hour:minute:second format.

8.2.4. Alarm Setpoints



Analog and digital sensor alarms are set here.

Functional Description

Analog Notices & Alarms [options or value] [NONE]

When control values are received by the BEC from the specified sensors, they are compared to the user-defined High and Low alarm set points to determine if the BEC should generate an alarm or notice. A notice creates an entry in the BEC Alarm Log and initiates no other signal. An alarm is a high-level warning that will appear in the BEC 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.

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

To define sensor alarm set points and time delays, enter the appropriate High and Low set points and time delays in the appropriate High and Low fields. To generate an alarm when the control value exceeds the alarm set points, define the set points in the Alarms fields. To generate a notice when the control value exceeds the alarm set points, define the set points in the Notices fields. Sensor alarm set points may be defined as specific values for analog sensor inputs or simply as CLOSED or OPEN for digital input sensors.

Setpoint Shift when Unoccupied

If desired, the alarm and notice set points may be shifted up or down during unoccupied building times. The BEC adds the value of the Hi Alarm, Lo Alarm, Hi Notice, and Lo Notice set points when the sensor's defined schedule input sends an unoccupied signal.

To shift the set points up during unoccupied mode, enter a positive Alarm Setpt Shift value. To shift the set points down, enter a negative Alarm Setpt Shift value.

Digital Notices & Alarms [options] [NONE]

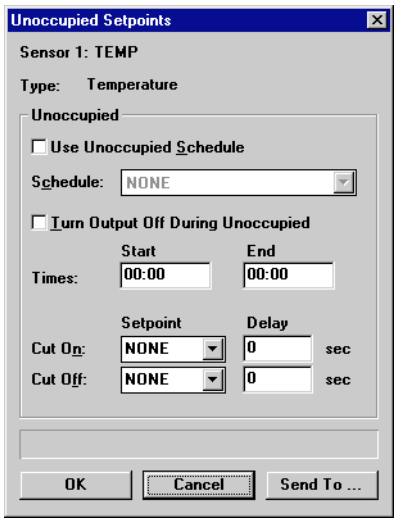
Digital alarms are generated by comparing a number of digital transitions to a user-defined value using a pre-defined comparison equation. Two alarm conditions and two notice conditions may be set up in this fashion.

Alarm and notice types are selected and entered in the first column of fields. The Value fields, rightmost on the screen, is where the comparison set point value is entered. There are twelve condition equations that may be entered in the Alarm/Notice Type field:

- *None* - No alarm.
- *Last ON Duration > minutes* - an alarm or notice will be generated when the sensor turns the controlled output ON for more than the specified value in minutes.
- *Last OFF Duration > minutes* - an alarm or notice will be generated when the sensor turns the controlled output OFF for more than the specified value in minutes.
- *Acc. number of ON events >* - an alarm or notice will be generated when the total number of times the sensor-controlled output turns ON is greater than the set point.
- *Acc. number of ON events x 1000 >* - an alarm or notice will be generated when the total number of times the sensor-controlled output turns ON is greater than the set point times 1000.
- *Number of ON events per interval >* - an alarm or notice will be generated if the total number of ON events during the sensor's Event Interval (see **Section 8.2.3.,** *Setpoints*) is greater than the set point.
- *Accumulated number of ON time hours >* - an alarm or notice will be generated if the accumulated run time of the sensor-controlled output is greater than the specified value in hours.

- *Accumulated number of ON time minutes >* - an alarm or notice will be generated if the accumulated run time of the sensor-controlled output is greater than the specified value in minutes.
- *Last ON duration > hours* - an alarm or notice will be generated when the sensor turns the controlled output ON for more than the specified value in hours.
- *Last OFF duration > hours* - an alarm or notice will be generated when the sensor turns the controlled output OFF for more than the specified value in hours.
- *Max minus Min for interval > (analog sensors only)* - an alarm or notice will be generated when, during the course of an Event Interval (see **Section 8.2.3.,** *Setpoints*), the difference between the highest recorded sensor reading and the lowest recorded sensor reading is greater than the set point.
- *Max minus Min for interval < (analog sensors only)* - an alarm or notice will be generated when, during the course of an Event Interval (see **Section 8.2.3.,** *Setpoints*), the difference between the highest recorded sensor reading and the lowest recorded sensor reading is less than the set point.

8.2.5. Unoccupied Set Points



Set points for operation of sensor-controlled outputs during unoccupied building times are defined in this dialog box.

Functional Description

Use Unoccupied Schedule [Yes/No] [No]

Unoccupied times for each sensor may be specified using the Schedules screen. When a sensor operates in unoccupied mode, it uses the unoccupied set points and delays. Unoccupied hours are defined in either of two ways: by using a schedule or by specifying start and end times.

To use a schedule for defining unoccupied times, check the Use Unoccupied Schedule box and choose the desired schedule number from the Use Schedule # scroll options. The sensor will use unoccupied settings when the schedule is OFF.

Turn Off During Unoccupied [Yes/No] [No]

When the Turn Off During Unoccupied box is checked, the sensor-controlled output will be disabled during unoccupied mode.

Start/End Times [00:00 - 23:59] [00:00]

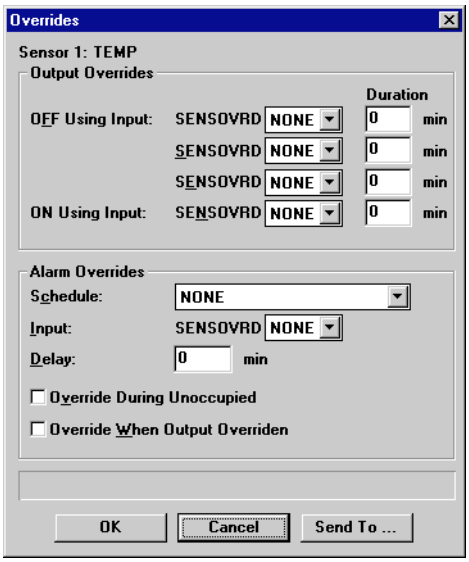
The hours in which the unoccupied settings start and end may be entered in the Unoccupied Starts and Unoccupied Ends fields. When these times are defined, unoccupied mode will start and end at the same times every day.

When both a schedule and the start/end times are defined, the schedule will always take priority when time conflicts occur.

Cut-On/Cut-Off [options or -50 - 999] [NONE]

The cut-on and cut-off set points defined here are used when the sensor is operating in unoccupied mode. See **Section 8.2.3.,** *Setpoints*, for more information about cut-on and cut-off set points.

8.2.6. Overrides



Sensor output and alarm overrides for individual sensors are set up in the Overrides dialog box.

Functional Description

OFF Using Input [options] [NONE]

The BEC may be configured with up to 16 inputs that may be used to override sensor outputs. When a contact closure is detected from one of these inputs, all sensors connected to the input will override OFF for the duration entered in the Duration field.

To configure the selected sensor to override when one of these inputs closes, enter the desired input number from 1 to 16, and enter a duration from 0 to 9999 seconds in the Duration field. Up to three sensor override inputs may be set up for a single sensor.

ON Using Input [options] [NONE]

One sensor override input may be used to override the sensor's output ON. Enter the desired input number from 1 to 16, and enter a duration from 0 to 9999 seconds in the Duration field.

Alarm Override Schedule [options] [NONE]

Sensor alarm overrides may follow a BEC schedule. When an override schedule is chosen, alarms will be overridden when the schedule is ON and enabled when the schedule is OFF.

Override Input [options] [NONE]

Sensor alarm overrides may be linked to one of the 16 sensor override inputs. When an input number from 1 to 16 is entered, alarms will be overridden when the specified input closes.

Delay [0 - 999 min.] [0 min.]

When a closed sensor override input opens, the BEC continues to override sensor alarms for an amount of time equal to the Delay before enabling sensor alarms. If a delay is desired, enter an amount of time in the Delay field.

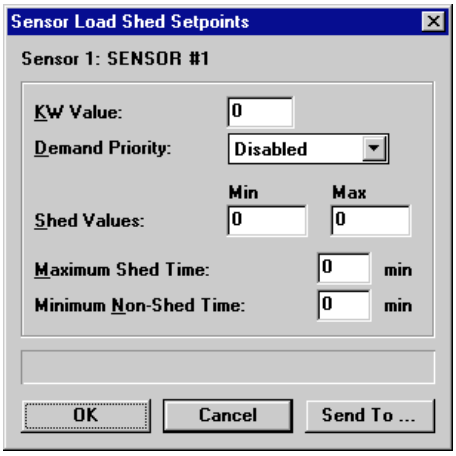
Override During Unoccupied [Yes/No] [No]

If the sensor is currently linked to an unoccupied schedule, sensor alarms may be configured to be overridden during unoccupied mode. Check the Override During Unoccupied box to override alarms during unoccupied mode.

Override When Output Overridden [Yes/No] [No]

Checking the Override When Output Overridden box automatically overrides the sensor alarms whenever the sensor-controlled output is overridden. For more information about output overrides, see **Section 8.2.5.,** *Unoccupied Set Points*.

8.2.7. Sensor Load Shed Setpoints



Load shed characteristics for sensors are configured in this dialog box.

Functional Description

KW Value [0 - 240 kW] [0 kW]

Enter the required number of KW used by the sensor input in the KW Value field.

Priority [1 - 16] [Disabled]

For each sensor, a load shed priority must be defined. There are 16 levels of priorities to choose from, one being the lowest, 16 being the highest. When the demand control algorithm sheds loads, it begins by shedding loads with high priority numbers. As the need for shedding increases, loads with lower priority levels are shed.

Sensors that have the same priority level are prioritized based on KW ratings.

Min Shed Value [0 - 9999] [0]

When the sensor control value drops below the set point specified in the Min Shed Value field, the sensor will come out of shed. If the sensor is not in shed when the Min Shed Value set point is reached, the sensor will not be allowed to shed.

Max Shed Value [0 - 9999] [0]

When the sensor control value exceeds the set point specified in the Max Shed Value field, the sensor will come out of shed. If the sensor is not in shed when the Max Shed Value set point is reached, the sensor will not be allowed to shed.

Enter a value from 0 to 9999 in the Max Shed Value field.

Max Shed Time [0 - 240 min.] [0 min.]

The Max Shed Time set point is the maximum amount of time a sensor may remain in shed. When the sensor has been shed for an amount of time equal to the Max Shed Time, the sensor output will be allowed to reactivate.

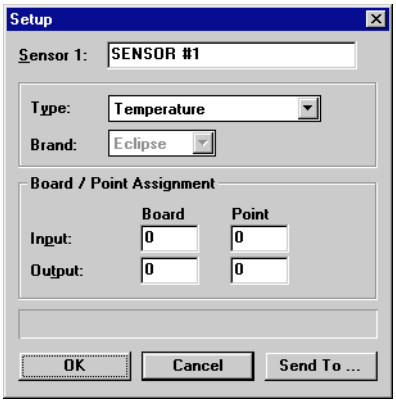
Enter a value in the Max Shed Time field. Entering a zero will allow the sensor to be shed for as long as necessary.

Min Non-Shed Time [0 - 240 min.] [0 min.]

After a sensor has come out of load shedding, the BEC must wait for an amount of time equal to the Max Non-Shed Time before it may call upon the sensor to be shed again.

Enter a value in the Max Non-Shed Time field. Entering a zero will allow the sensor to be shed at any time necessary.

8.2.8. Sensor Setup



The sensor type and address are specified in the Sensor Setup dialog box.

Functional Description

Sensor:

The sensor field allows a particular name to be given to the sensor that is being defined.

Type [options] [Temperature

The type of sensor must be specified in the Type field. ***Table 8-1*** shows all the possible sensor types that may be defined for a BEC.

Brand [Standard/Eclipse]

The brand of sensor that is being used must be defined when a pressure transducer is being defined. For all other sensor types, this field is not an option.

Board / Point Assignment

The sensor must be defined by board and point for both its input and output.

Input Type	Description	Input Type	Description
Temperature	Temperature Sensor	Relative Humidity	Humidity Sensor
100 lb.	100 Pound Pressure Transducer	Digital	Non-voltage Digital Sensor
200 lb	200 Pound Pressure Transducer	Linear	Generic Sensor
500 lb.	500 Pound Pressure Transducer	Dewpoint	Dewpoint Sensor
Refrigerant Leak	Refrigerant Leak Detector	IRLDS	Linear Output from IRLDS Unit
Liquid Level	Liquid Level Transducer		

Table 8-1 *- Sensor Types*

8.2.9. Setup Instance

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

Functional Description

When Setup Instance is chosen, all dialog boxes related to sensor 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 sensor is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Setup* - see **Section 8.2.8.**
- *Setpoints* - see **Section 8.2.3.**
- *Unoccupied Setpoints* - see **Section 8.2.5.**
- *Alarm Setpoints* - see **Section 8.2.4.**
- *Overrides* - see **Section 8.2.6.**
- *Sensor Load Shed Setpoints* - see **Section 8.2.7.**

9 Analog Input Modules

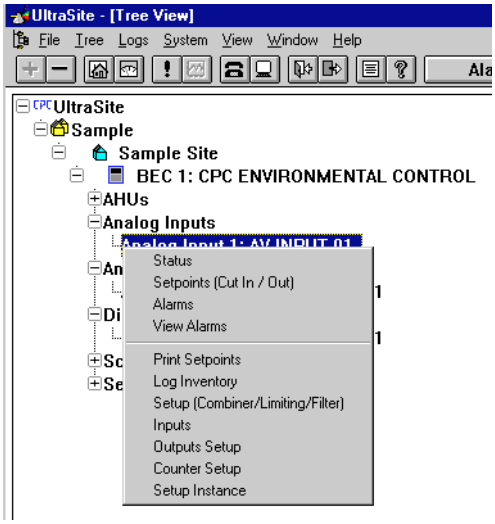
9.1. Individual Analog Input Modules Menu

Definition

In the Analog Input Modules menu, users may view active diagrams of Analog Input Modules and define cells within modules.

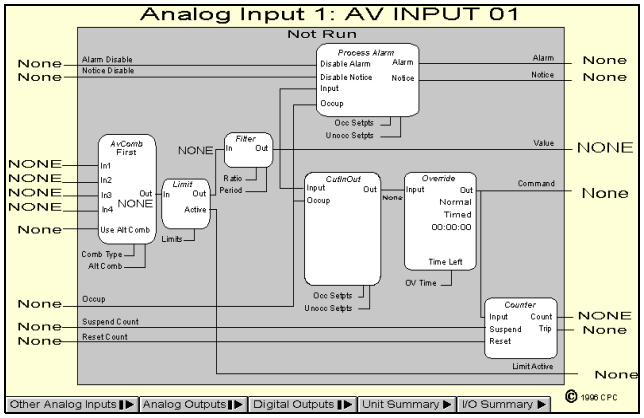
A quick reference, showing a diagram of the Analog Input Module and a brief description of all inputs, outputs, and cells, is given in ***Appendix B***.

Screen Map



Option	Reference	Page
Status	**Section 9.1.1.,** *Analog Input Module Status Screen*	67
Setpoints (Cut In/Out)	**Section 9.1.2.,** *Setpoints (Cut In/Out)*	68
Alarms	**Section 9.1.3.,** *Alarms*	68
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 (Combiner/Limiting/Filter)	**Section 9.1.4.,** *Setup (Combiner/Limiting/Filter)*	69
Inputs	**Section 9.1.5.,** *Analog Inputs Input Setup*	71
Outputs Setup	**Section 9.1.6.,** *Analog Inputs Output Setup*	71
Counter Setup	**Section 9.1.7.,** *Counter Setup*	72
Setup Instance	**Section 9.1.8.,** *Setup Instance*	72

9.1.1. Analog Input Module Status Screen



The current status of an Analog Input Module and all cells within the module are shown in the Analog Input Module Status Screen.

Functional Description

The Analog Input Module Status Screen gives a complete real-time view of the operating status of an Analog Input Module. Data are presented in a cell diagram form that shows not only the module's inputs and outputs, but also the values entering and leaving each cell within the module.

For a complete explanation of each cell's function within the Analog Input Module, refer to *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.10.2.3.,** *Analog Output Module*.

Other special operating characteristics are also displayed in the Analog Input Module Status Screen. The AVComb cell shows the combination strategy currently being used. If the module is in override, the Override cell shows whether the module is being overridden ON or OFF, whether the override is fixed or timed, and, if timed, how many minutes and seconds are left in the override.

Programming I/O Modules

Programming I/O modules may be done simply and quickly from the status screen. To make changes to any cell, input, or output, right-click on the desired element. A pop-up menu will appear, allowing the user to either change the settings in the selected cell, input, or output, or change settings in other cells, inputs, or outputs within the same module. The setup dialog boxes selected in this manner are described in more detail in the sections below.

Double-clicking the left mouse button on any of the hotspots on this screen brings up the Analog Inputs Setpoints dialog box (see **Section 9.1.2.**).

Bypassing

Users may bypass the Command output OFF or ON by right-clicking the Override cell in the Status screen and selecting "Bypass" from the menu that appears. In the Bypass dialog box that appears, users may specify the bypass value and choose either fixed or timed as the override type. Existing bypasses may also be terminated by selecting the Normal option in the Bypass dialog box.

Analog Inputs, Analog Outputs, and Digital Outputs Buttons

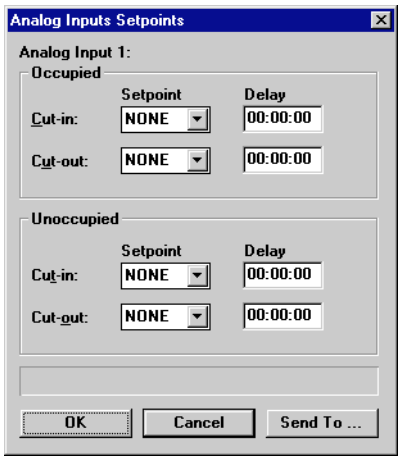
The Other Analog Inputs, Analog Outputs, and Digital Outputs buttons at the bottom of the screen, if left-clicked, bring up dialog boxes where status screens for other modules may be selected. Right-clicking any of these buttons brings up menus where users may view summary screens, add new modules, view module alarms, or print out set points.

Unit Summary Button

Clicking the left mouse button on the Unit Summary button will bring up the Unit Summary Screen.

Clicking the right mouse button on the Unit Summary button will bring up a menu identical to the menu called up by right-clicking a BEC unit at the system tree (see *P/N 026-1002, UltraSite User's Guide*, **Section 1.5,** *Unit Level*).

9.1.2. Setpoints (Cut In/Out)



All of the fields necessary to define the Analog Input Module's Cut In/Cut Out cell are in the Analog Inputs Setpoints dialog box.

Functional Description

The Cut In/Cut Out cell, which is defined in this dialog box, reads the combined input value from the AVCombiner and Filter cells (defined in **Section 9.1.4.**) and activates or deactivates the Command digital output based on the cut in and cut out setpoints.

Two different sets of set points may be defined: occupied and unoccupied. The occupied set points are used when the Occupied input is ON or NONE. The unoccupied set points are used when the Occupied input is OFF. See **Section 9.1.5.,** *Analog Inputs Input Setup* for information about how to define the Occupied input.

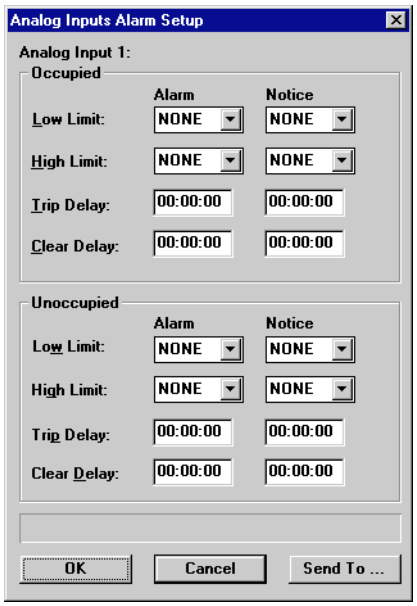
Cut In/Cut Out Setpoints [0 - 99] [NONE]

If the combined input value from the Filter cell is higher than the defined Cut In set point, the Command output (defined in **Section 9.1.5.**) will turn ON. If the input value is lower than the Cut Out set point, the Command output will turn OFF.

Cut In/Cut Out Delays [00:00:00 - 24:00:00] [00:00:00]

The BEC must wait for an amount of time equal to the Cut In Delay or the Cut Out delay before the Command output can turn ON or OFF. The delay is specified in hours:minutes:seconds format (HH:MM:SS).

9.1.3. Alarms



All fields necessary to set up the module's Process Alarm cell are in this dialog box.

Functional Description

The Process Alarm cell, which is defined in this dialog box, reads the combined input value from the AVCombiner and Filter cells (defined in **Section 9.1.4.**) and generates digital signals on the Alarm and Notice outputs (defined in **Section 9.1.6.,** *Analog Inputs Output Setup*) based on the specified alarm and notice set points.

Two different sets of set points may be defined: occupied and unoccupied. The occupied set points are used when the Occupied input is ON or NONE. The unoccupied set points are used when the Occupied input is OFF. See **Section 9.1.5.,** *Analog Inputs Input Setup*, for information about how to define the Occupied input.

Alarms generated by the Process Alarm cell are also sent to the BEC Alarm Log.

Low Limit Alarm/Notice [-999 - 999] [NONE]

If the combined input value from the Filter cell is lower than the Low Limit Alarm set point, the Alarm output will be ON. If the input value is below the Low Limit Notice set point, the Notice output will be ON.

High Limit Alarm/Notice [-999 - 999] [NONE]

If the combined input value from the Filter cell is higher than the High Limit Alarm set point, the Alarm output will be ON. If the input value is above the High Limit Notice set point, the Notice output will be ON.

Trip Delay [00:00:00 - 24:00:00] [00:00:00]

When the input value goes below a Low Limit or above a High Limit set point, the BEC will wait an amount of time equal to the Trip Delay before turning an output from OFF to ON.

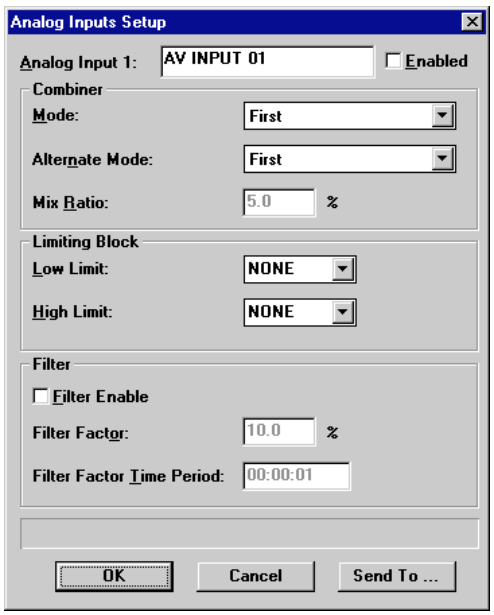
The Trip Delay is specified in hours:minutes:seconds format (HH:MM:SS).

Clear Delay [00:00:00 - 24:00:00] [00:00:00]

When an Alarm or Notice output is ON and the input value moves back into the acceptable set point range (i.e. above a Low Limit and below a High Limit set point), the BEC will wait an amount of time equal to the Clear Delay before turning the output OFF.

The Trip Delay is specified in hours:minutes:seconds format (HH:MM:SS).

9.1.4. Setup (Combiner/Limiting/Filter)



All fields necessary to set up the AVCombiner and Filter cells are in the Analog Inputs Setup dialog box.

Functional Description

The AVCombiner cell, defined in this dialog box, combines the values of up to four analog inputs using a defined combination strategy. The Limiting cell limits the combined input value to a specified high/low range. The Filter cell alters the rate at which the combined value changes over time. A full description of all these cells is given in **Section 3.7.2.1.,** *Analog Input Module*.

Name [15 Characters max] [AV INPUT ##]

If desired, a name may be entered for the Analog Input Module. The default name is AV INPUT ##, where ## is the input module's number.

Enabled [Yes/No] [No]

When the Enabled box is checked, the Analog Input Module functions normally. When the Enabled box is unchecked, all outputs of the Analog Input Module default to NONE regardless of the values of the module's inputs.

Combiner Mode/Combiner Alternate Mode [options] [First]

The input combination strategies used by the Analog Input Module are defined in the Combiner Mode and Combiner Alternate Mode fields.

The Alt Combiner input (defined in **Section 9.1.5.**) determines whether the normal or the alternate mode will be used. When the Alt Combiner input is ON, the strategy defined in the Combiner Alternate Mode field will be used. When this input is OFF, the Combiner Mode strategy will be used.

The combination strategies that may be defined are listed below. Note in the equations below that IV1, IV2, IV3, and IV4 refer to Input Values 1-4 as defined in **Section 9.1.5.,** *Analog Inputs Input Setup*.

- *Average* - average of all four inputs ((IV1 + IV2 + IV3 + IV4)÷4).
- *Minimum* - lowest value of all four inputs.
- *Maximum* - highest value of all four inputs.
- *First* - the first input value that is not NONE.
- *Mix* - a weighted mixture of the values of IV1 and IV2. See the description of the Combiner Mix Ratio field (below).

- *Add* - the first three inputs added together (IV1 + IV2 + IV3).
- *Subtract* - the first three inputs subtracted from each other (IV1 - IV2 - IV3).
- *Multiply* - the first three inputs multiplied together (IV1 * IV2 * IV3).
- *Divide* - the first two inputs divided by the third ((IV1 + IV2) ÷ IV3).
- *Multiply/Add* - The first two inputs multiplied together and added to the third ((IV1 * IV2) + IV3).
- *Subtract/Mult* - The first two inputs subtracted from each other and multiplied with the third ((IV1 - IV2) * IV3).
- *Abs/Divide* - The absolute value of (IV1 - IV2) ÷ IV3.
- *Abs/Mult* - The absolute value of (IV1 - IV2) * IV3.
- *Square Root* - The square root of the absolute value of IV1 - IV2, multiplied by IV3 (sqr(|IV1 - IV2|) * IV3).
- *Span*-The difference between IV1 and IV2 (IV1-IV2).

Combiner Mix Ratio [0 - 100%] [5.0%]

The Combiner Mix Ratio field is highlighted only if the Mix strategy is defined in either the Combiner Mode or Combiner Alternate Mode fields.

The Mix strategy takes a certain percentage of Input Value 1 and adds it to a certain percentage of Input Value 2. The Combiner Mix Ratio determines what percentages are applied to the input values.

The percentage entered in the Combiner Mix Ratio is applied directly to Input 1. The percentage applied to Input 2 is equal to 100% minus the Combiner Mix Ratio field. Thus, if the Combiner Mix Ratio were 60%, the Mix strategy would take 60% of Input 1 and add it to 40% of Input 2. Likewise, if the Combiner Mix Ratio were 25%, the output would be 25% of Input 1 and 75% of Input 2.

Limiting Block Low Limit[-999 to 999 or NONE] [NONE]

The Limiting Block Low Limit is the lowest limit of the combined value from the AVCombiner cell. If the combined input value is lower than this set point, the Limiting cell blocks the value from being passed on to the rest of the module, and instead passes on the Limiting Block Low Limit set point value.

Limiting Block High Limit[-999 to 999 or NONE] [NONE]

The Limiting Block High Limit is the highest limit of the combined value from the AVCombiner cell. If the combined input value is higher than this set point, the Limiting cell blocks the value from being passed on to the rest of the module, and instead passes on the Limiting Block High Limit set point value.

Filter Enable [Yes/No] [No]

The Filter Enable box enables the Filter cell. If no filtering is desired, uncheck this box; if filtering is desired, check this box.

Filter Factor [0% - 100%] [10%]

The Filter cell samples the combined input values at regular time intervals (defined in Filter Period below). This allows the Filter cell to compare newly sampled values to the previously sampled values and adjust the cell's output value accordingly. The amount the Filter cell adjusts the cell output is entered in the Filter Factor field.

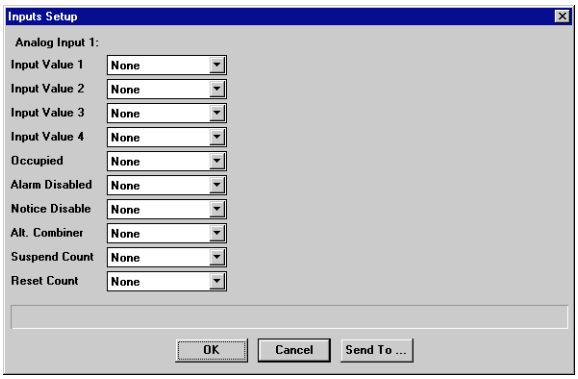
Simply put, the Filter cell subtracts the output value of the previous sampling period from the newly sampled value, and to this value it applies the Filter Factor percentage. The resulting value is the amount the Filter cell adds to the current Filter cell output. In this manner, the Filter cell slows the output's reaction time to changes in the combined input value.

For example, suppose a combined input value suddenly changes from 50 to 60. If a Filter Factor of 50% is active in this module, only half of that change will be reflected in the Filter cell output during a single sample period. Therefore, when the input change is first detected by the Filter cell, the output would immediately go to 55. Note, however, that as long as the input value remains at 60, the Filter cell's output will eventually climb to 60 after several sampling periods (going from 55 to 57.5 to 58.75 and so on until the output eventually reaches 60).

Filter Time Period [00:00:00 - 24:00:00] [00:00:01]

The Filter Time Period is the amount of time between input samples and output changes. The Filter cell reads the input value, adjusts the output value as described above, and waits an amount of time equal to the Filter Time Period before repeating the process.

9.1.5. Analog Inputs Input Setup



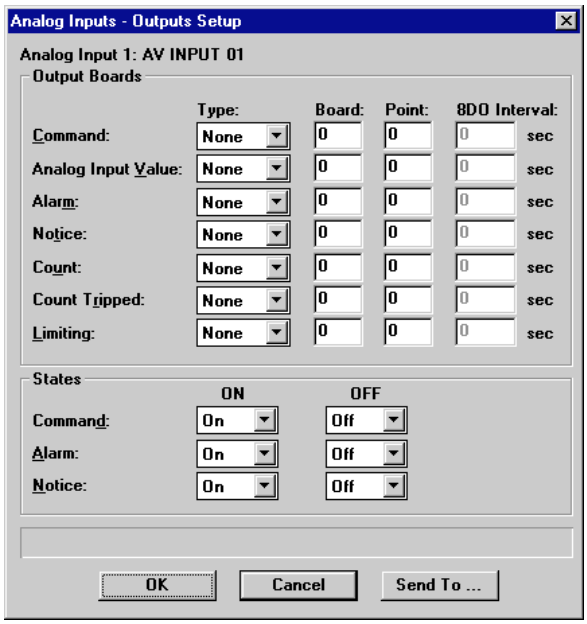
Sources for the Analog Input Module inputs are selected in this dialog box.

Functional Description

Refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.1.,** *Analog Input Module,* for a complete description of the module inputs.

A complete list of the possible input sources is given in Appendix A.

9.1.6. Analog Inputs Output Setup



In the Analog Inputs Output Setup dialog box, users may assign board and point addresses to module outputs and define the states of digital outputs.

Functional Description

All outputs in the Analog Input Module are defined in this dialog box. Refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.1.2.,** *Module Inputs and Outputs,* for more information about the outputs.

Type [8RO, 4AO, 8DO, None] [None]

The Type field is where the type of output board is defined. Users may select the 8RO Relay Board, the 4AO Analog Output Board, the 8DO Digital Output Board, or None if the output is not going to be given a board and point address.

Board and Point

The desired board and point address for the output is entered in the Board and Point fields.

8DO Interval

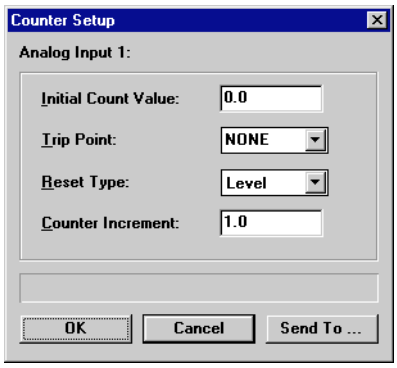
If 8DO is chosen in the Type field, specify an interval in the 8DO Interval field. The interval is the amount of time over which the 8DO's output will be applied; for example, if the output value being sent to the 8DO is 60% and the 8DO Interval is set to 1 second, the 8DO will turn the output on for 0.6 seconds (60% of a second), turn it off for 0.4 seconds, and repeat this cycle every second.

States ON and OFF [ON/OFF/NONE] [ON=ON, OFF=OFF]

When the module calls for the Command, Alarm, and Notice outputs to be either ON or OFF, it applies the digital values specified in the ON and OFF fields. The value specified in the ON field will be the actual state of the output when it is called to be ON. Likewise, the value in the OFF field will be the state of the output when it is called to be OFF.

For either the ON or OFF field, users may specify OFF, ON, or NONE (for "don't care"). See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.1.2.,** *Module Inputs and Outputs,* for a definition of the NONE state.

9.1.7. Counter Setup



All fields necessary to define an Analog Input Module's Counter cell are in the Counter Setup dialog box.

Functional Description

For a complete definition of how the Counter cell operates, refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.1.,** *Analog Input Module*.

Initial Count Value [0 - 32767] [0]

The Initial Count Value is the value at which the counter begins. When the Counter cell is reset, the Count output returns to the Initial Count value.

Trip Point [0 - 32767] [NONE]

If the Initial Count Value reaches a value higher than the defined Trip Point, the Counter cell calls for the Trip Alarm output to be ON.

Reset Type [Level, Edge, InvEdge] [Level]

The Counter cell's Count value is reset to the Initial Count Value upon receiving a signal from the Reset input. The type of signal that will reset the Counter cell is specified in the Reset Type field.

There are three different reset types:

- *Level* - the Count will reset whenever the Reset input is ON.
- *Edge* - the Count will reset whenever the Reset input goes from OFF to ON.
- *InvEdge* - the Count will reset whenever the Reset input goes from ON to OFF.

Count Increment [0 - 32767] [0]

Whenever the Command output of the Analog Input Module goes from OFF to ON, the Count Increment value is added to the current value of the Count output.

9.1.8. Setup Instance

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

Functional Description

When Setup Instance is chosen, all dialog boxes related to analog input 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 the module is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Analog Input Module Setup* - see **Section 9.1.4.**
- *Analog Input Inputs* - see **Section 9.1.5.**
- *Analog Input Outputs* - see **Section 9.1.6.**
- *Analog Input Counter* - see **Section 9.1.7.**
- *Analog Input Setpoints* - see **Section 9.1.2.**
- *Analog Input Alarms* - see **Section 9.1.3.**

10 Analog Output Modules

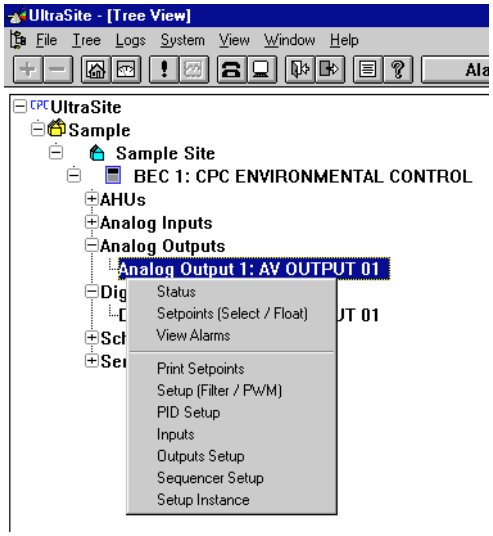
10.1. Individual Analog Output Modules Menu

Definition

In the Analog Output Modules menu, users may view active diagrams of Analog Output Modules and define cells within modules.

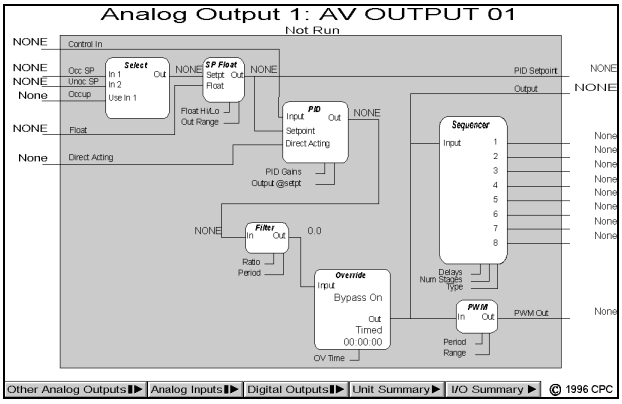
A quick reference, showing a diagram of the Analog Output Module and a brief description of all inputs, outputs, and cells, is given in ***Appendix B***.

Screen Map



Option	Reference	Page
Status	**Section 10.1.1.,** *Analog Outputs Status*	74
Setpoints (Select/Float)	**Section 10.1.2.,** *Analog Outputs Setpoints (Select/Float)*	75
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 (Filter/PWM)	**Section 10.1.3.,** *Analog Outputs Setup (Filter/PWM)*	76
PID Setup	**Section 10.1.4.,** *Analog Outputs PID Setup*	77
Inputs	**Section 10.1.5.,** *Analog Output Inputs Setup*	78
Outputs Setup	**Section 10.1.6.,** *Analog Output Outputs Setup*	78
Sequencer Setup	**Section 10.1.7.,** *Sequencer Setup*	79
Setup Instance	**Section 10.1.8.,** *Setup Instance*	79

10.1.1. Analog Outputs Status



The current status of an Analog Output Module and all cells within the module are shown in the Analog Output Module Status Screen.

Functional Description

The Analog Output Module Status Screen gives a complete real-time view of the operating status of an Analog Output Module. Data are presented in a cell diagram form that shows not only the module's inputs and outputs, but also the values entering and leaving each cell within the module.

For a complete explanation of each cell's function within the Analog Output Module, refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.3.,** *Analog Output Module*.

Other special operating characteristics are also displayed in the Analog Output Module Status Screen. If the module is in override, the Override cell shows whether the module is being overridden ON or OFF, whether the override is fixed or timed, and, if timed, how many minutes and seconds are left in the override.

Programming I/O Modules

Programming I/O modules may be done simply and quickly from the status screen. To make changes to any cell, input, or output, right-click on the desired element. A pop-up menu will appear, allowing the user to either change the settings in the selected cell, input, or output, or change settings in other cells, inputs, or outputs within the same module. The setup dialog boxes selected in this manner are described in more detail in the sections below.

Double-clicking the left mouse button on any of the hotspots on this screen brings up the Analog Outputs Setpoints dialog box (see **Section 10.1.2.**).

Bypassing

Users may bypass the PID output to a fixed percentage by right-clicking the Override cell in the Status screen and selecting "Bypass" from the menu that appears. In the Bypass dialog box that appears, users may specify the bypass value and choose either fixed or timed as the override type. Existing bypasses may also be terminated by selecting the Normal option in the Bypass dialog box.

Analog Inputs, Analog Outputs, and Digital Outputs Buttons

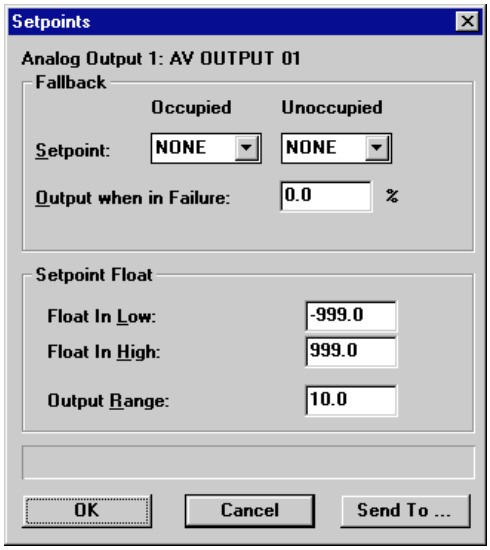
The Other Analog Inputs, Analog Outputs, and Digital Outputs buttons at the bottom of the screen, if left-clicked, bring up dialog boxes where status screens for other modules may be selected. Right-clicking any of these buttons brings up menus where users may view summary screens, add new modules, view module alarms, or print out set points.

Unit Summary Button

Clicking the left mouse button on the Unit Summary button will bring up the Unit Summary Screen.

Clicking the right mouse button on the Unit Summary button will bring up a menu identical to the menu called up by right-clicking a BEC unit at the system tree (see *P/N 026-1002, UltraSite User's Guide,* **Section 1.5,** *Unit Level*).

10.1.2. Analog Outputs Setpoints (Select/Float)



All fields necessary to define the Select and Float cells in an Analog Output Module are in the Setpoints dialog box.

Functional Description

The Select cell, which is defined in this dialog box, chooses either the Occupied Setpoint or the Unoccupied Setpoint inputs (defined in **Section 10.1.5.,** *Analog Output Inputs Setup*) as the PID setpoint based on the state of the Occupied input. When these set point inputs fail (i.e. when they read "NONE"), the Select cell may also substitute fallback values for the corrupted set points.

The set point value selected by the Select cell is altered by the Float cell, which alters the PID set point value based on the Float input value. For a more detailed description of the Select and Float cells, refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.3.,** *Analog Output Module*.

Fallback Setpoints [-999 - 999] [NONE]

When the Occupied Setpoint and Unoccupied Setpoint inputs are defined as anything except fixed analog values, it is possible for the set point values to become corrupted. If this happens, the Analog Output Module will not function correctly, since it needs a PID set point to produce an output.

The BEC is programmed to compensate for corrupted PID set points by substituting the Fallback Setpoints for the set point inputs. These Fallback Setpoints are used as PID set points whenever the BEC receives a set point value it cannot use (such as "OPEN", "SHORT", or "NONE").

To define fallback set points for the Occupied and Unoccupied Setpoint inputs, enter a value in the Fallback Setpoints fields. If no fallback set points are desired, select NONE from the scroll options.

Output When In Failure [0 - 100%] [0%]

When the PID Control cell does not receive both a usable control value from the Control In input and a usable set point from the Select and Float cells, the PID Control cell can not yield an output. When this condition occurs, the module is said to be in failure.

When the Analog Output Module is in failure, the percentage entered in the Output When In Failure field will be used as the output from the PID Control cell.

Float In Low [-999 - 999] [0.0]

The Float In Low field is the low end of the set point float range. When the Float input is equal to this value, one-half of the value in the Output Range field will be subtracted from the PID set point. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.3.,** *Analog Output Module,* for more information about float operation.

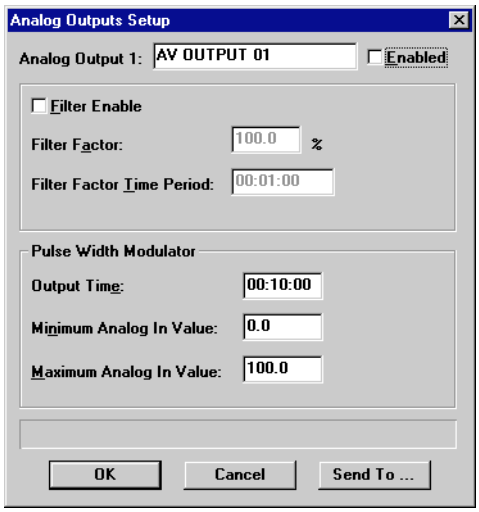
Float In High [-999 - 999] [0.0]

The Float In High field is the high end of the set point float range. When the Float input is equal to this value, one-half of the value in the Output Range field will be added to the PID set point. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.3.,** *Analog Output Module,* for more information about float operation.

Output Range [-999 - 999] [0.0]

The Output Range forms the range of values that may be added to or subtracted from the PID Setpoint based on the value of the Float input. See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.3.,** *Analog Output Module,* for more information about float operation.

10.1.3. Analog Outputs Setup (Filter/PWM)



All fields necessary to set up the Filter and Pulse Width Modulation (PWM) cells are in the Analog Outputs Setup box.

Functional Description

The Filter cell, defined in this dialog box, alters the rate at which the PID output changes over time. A full description of the Filter cell's function is given in **Section 3.7.2.3.,** *Analog Output Module*.

The Pulse Width Modulator (PWM) cell, also defined in this dialog box, converts the PID output percentage to a pulse width modulating output.

Filter Enable [Yes/No] [No]

The Filter Enable box enables the Filter cell. If no filtering is desired, uncheck this box; if filtering is desired, check this box.

Filter Factor [0% - 100%] [10%]

The Filter cell samples the PID output values at regular time intervals (defined in Filter Period below). This allows the Filter cell to compare newly sampled values to the previously sampled values and adjust the cell's output value accordingly. The amount the Filter cell adjusts the cell output is entered in the Filter Factor field.

Simply put, the Filter cell subtracts the output value of the previous sampling period from the newly sampled value, and to this value it applies the Filter Factor percentage. The resulting value is the amount the Filter cell adds to the current Filter cell output. In this manner, the Filter cell slows the output's reaction time to changes in the PID output value.

For example, suppose a PID output value suddenly changes from 50 to 60. If a Filter Factor of 50% is active in this module, only half of that change will be reflected in the Filter cell output during a single sample period. Therefore, when the input change is first detected by the Filter cell, the output would immediately go to 55. Note, however, that as long as the input value remains at 60, the Filter cell's output will eventually climb to 60 after several sampling periods (going from 55 to 57.5 to 58.75 and so on until the output eventually reaches 60).

Filter Time Period [00:00:00 - 24:00:00] [00:00:01]

The Filter Time Period is the amount of time between input samples and output changes. The Filter cell reads the input value, adjusts the output value as described above, and waits an amount of time equal to the Filter Time Period before repeating the process.

PWM Output Time [00:00:00 - 24:00:00] [00:10:00]

The PWM Output Time is the amount of time over which the PID output percentage will be applied to the PWM output. For example, if the Output Time is set for 10 minutes and the PID output is 30%, the PWM output will be ON for 30% of 10 minutes (3 minutes) and OFF for 7 minutes, after which the cycle will begin again.

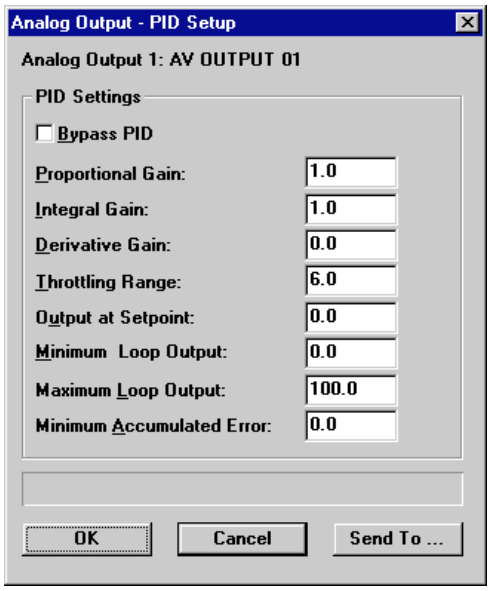
Minimum Analog Value [0.0 - 100.0%] [0.0%]

The Minimum Analog Value is the lowest amount that will be applied to the PWM output. When the PID output is lower than the Minimum Analog Value, the PWM cell substitutes the Minimum Analog Value for the PID output.

Maximum Analog Value [0.0 - 100.0%] [100.0%]

The Maximum Analog Value is the highest amount that will be applied to the PWM output. When the PID output is higher than the Maximum Analog Value, the PWM cell substitutes the Maximum Analog Value for the PID output.

10.1.4. Analog Outputs PID Setup



All set points necessary to set up the PID Control cell are entered in the PID Setup dialog box.

Functional Description

The PID Control cell, defined in this dialog box, produces a 0-100% output based upon the Control In input's proximity to the PID set point. Refer to **Section 3.7.2.3.,** *Analog Output Module*, for more information on the PID Control cell.

Bypass PID

When the Bypass PID box is checked, the PID Control cell passes the Control In value to the cell output without modifying it. In other words, the Control In value completely bypasses PID Control and goes directly to the Filter cell.

Proportional Gain [0.0 - 100.0] [1.0]

The Proportional Gain determines how much the PID output must change in proportion to the difference between the Control In and PID Setpoint values.

Integral Gain [0.0 - 100.0] [1.0]

The Integral Gain affects the PID Control cell's ability to change the PID output based upon previous values of the PID output.

Derivative Gain [0.0 - 25.5] [0.0]

The Derivative Gain is a value used by the PID Control cell to adjust the PID output based on predictions of future error.

Throttling Range [0.1 - 9999] [6.0]

The throttling range is an operating range established around the PID set point that determines when the PID output should be at maximum (100%) or minimum (0%).

Output at Setpoint [0.0 - 100.0%] [50.0%]

The Proportional control mode of the PID Control cell adds the Output at Setpoint value to the difference between the Control In and the PID Setpoint, yielding the Proportional part of the output.

Minimum Loop Output [0.0 - 100.0%] [0.0%]

The Minimum Loop Output is the lowest possible value of the PID Output.

Maximum Loop Output [0.0 - 100.0%] [100.0%]

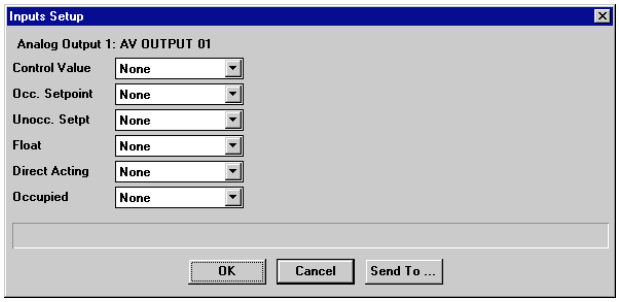
The Maximum Loop Output is the highest possible value of the PID Output.

Minimum Accumulated Error

The Minimum Accumulated Error setting disables error accumulation in the integral mode of the module's PID control when the error is equal to or less than a certain amount. For example, if the PID Setpoint is 30 and the Minimum Accumulated Error is 1, the integral mode will not accumulate error when the Control Input is between 31 and 29 (one degree above and below the set point).

Because the PID control does not accumulate error within the Minimum Accumulated Error range, the Control Input is allowed to settle on a value other than the set point. It is possible in the example given above for the module to settle on any value between 29 and 31 without the "I" mode making any adjustment.

10.1.5. Analog Output Inputs Setup



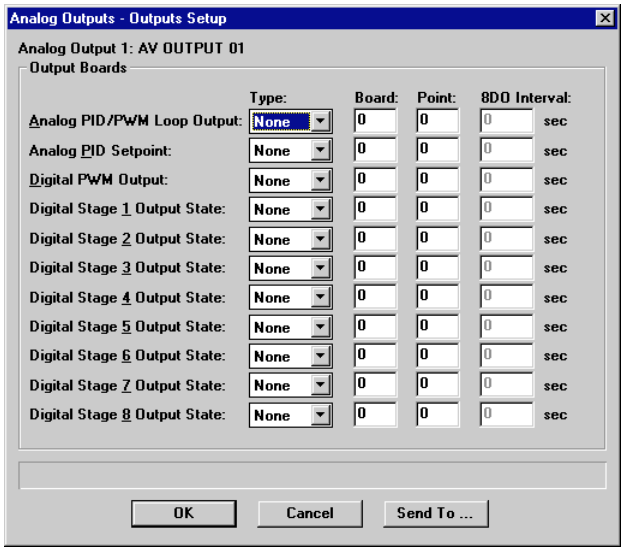
All Analog Output Module inputs are defined in this dialog box.

Functional Description

Refer to *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.10.2.3.,** *Analog Output Module*, for a complete description of the module inputs.

A complete list of the possible input sources is given in Appendix A.

10.1.6. Analog Output Outputs Setup



All of the Analog Output Module outputs are defined in this dialog box.

Functional Description

Refer to *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.10.2.3.,** *Analog Output Module*, for more information about these outputs.

Type [8RO, 4AO, 8DO, None] [None]

The Type field is where the type of output board is defined. Users may select the 8RO Relay Board, the 4AO Analog Output Board, the 8DO Digital Output Board, or None if the output is not going to be given a board and point address.

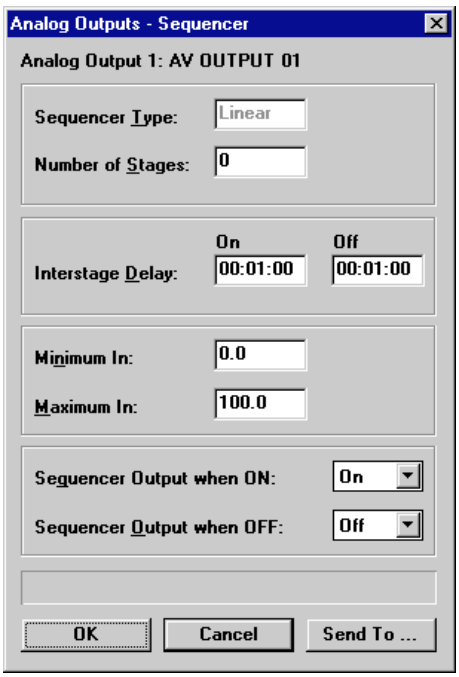
Board and Point

The desired board and point address for the output is entered in the Board and Point fields.

8DO Interval

If 8DO is chosen in the Type field, specify an interval in the 8DO Interval field. The interval is the amount of time over which the 8DO's output will be applied; for example, if the output value being sent to the 8DO is 60% and the 8DO Interval is set to 1 second, the 8DO will turn the output on for 0.6 seconds (60% of a second), turn it off for 0.4 seconds, and repeat this cycle every second.

10.1.7. Sequencer Setup



All fields necessary to set up the Analog Output Module's Sequencer cell are in this dialog box.

Functional Description

The Sequencer cell, defined in this dialog box, uses the 0-100% PID output to control up to eight digital stage outputs. Refer to **Section 3.7.2.3.,** *Analog Output Module*, for more information about the Sequencer cell.

Sequencer Type [Linear]

This read-only field simply signifies that the sequencer is a linear-type sequencer. This means that the defined stages activate at equal points between the Minimum In and Maximum In values (see below). For example, in a sequencer with eight stages and a Minimum/Maximum In range of 0-100%, the "set points" for the stages occur at every 12.5%. That is, stage 1 activates when the output is above 12.5%, stage 2 activates when the output is above 25%, and so on up to 100%, when all stages are active. Similarly, as the output goes from 100% to 0%, stages eight through one deactivate in succession.

Number of Stages [0 - 8] [0]

The number of stages to be used by the sequencer is entered in the Number of Stages field. All digital stage outputs not defined will read NONE.

Interstage Delays [00:00:00 - 18:12:15] [00:01:00]

The Interstage Delays are amounts of time the BEC must wait before turning a stage output ON or OFF. The delays are specified in hours:minutes:seconds format (HH:MM:SS).

Minimum/Maximum In [0 - 100%] [Min=0%, Max=100%]

If desired, the Sequencer may be made to operate using only a portion of the possible range of PID Output values. This portion is chosen by defining Minimum In and Maximum In values.

When the PID Output is equal to or below the Minimum In set point, the Sequencer interprets the PID Output as zero for the purposes of controlling digital stages (i.e. no stages will be ON). Likewise, when the PID Output is equal to or above the Maximum In set point, the Sequencer interprets the PID Output as 100% (i.e. all stages will be ON).

If the PID output is between these two values, the Sequencer translates the PID Output to a percentage of the range formed by the Mininum/Maximum values. For example, if the Minimum/Maximum Range is 20-100% and the PID Output is 60%, the Sequencer will interpret this value as 50%, since 60% is halfway between 20% and 100%.

Sequencer Output when ON [ON/OFF/NONE] [ON]

Sequencer Output when OFF [ON/OFF/NONE] [OFF]

The Sequencer Output when ON and Sequencer Output when OFF fields determine the actual digital values of the sequencer's digital state outputs.When the Sequencer cell calls for a digital output stage to be ON, the actual value of the stage output will be the value specified in the Sequencer Output when ON field. Likewise, when a stage is called to be OFF, the actual output value will be the value specified in the Sequencer Output when OFF field.

For example, if the Sequencer Output when ON field is set to NONE and the Sequencer Output when OFF field is set to OFF, all stage outputs will be NONE when the Sequencer cell calls for them to be ON and OFF when called to be OFF.

10.1.8. Setup Instance

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

Functional Description

When Setup Instance is chosen, all dialog boxes related to analog input 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 the module is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Analog Output Module Setup* - see **Section 10.1.3.**
- *Analog Output Inputs* - see **Section 10.1.5.**
- *Analog Output Outputs* - see **Section 10.1.6.**
- *Analog Output PID Setup* - see **Section 10.1.4.**
- *Analog Output Sequencer* - see **Section 10.1.7.**
- *Analog Output Setpoints* - see **Section 10.1.2.**

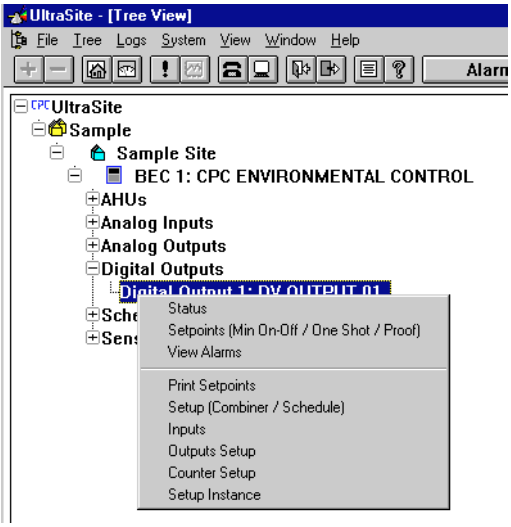
11 Digital Output Modules

11.1. Individual Digital Output Modules Menu

Definition

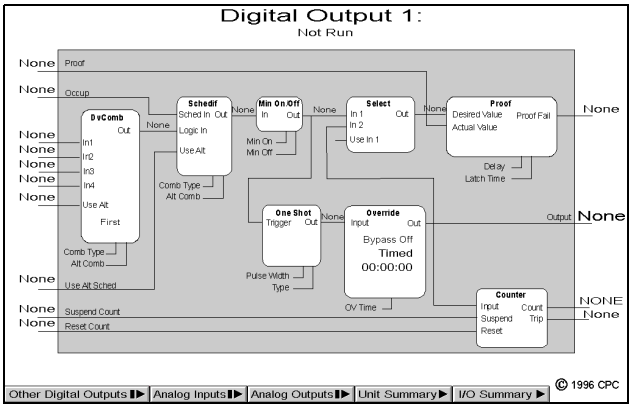
In the Digital Output Modules menu, users may view active diagrams of Digital Output Modules and define cells within modules.

Screen Map



Option	Reference	Page
Status	**Section 11.1.1.,** *Digital Output Module Status*	82
Setpoints (Min On-Off / One Shot / Proof)	**Section 11.1.2.,** *Digital Output Setpoints*	83
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 (Combiner / Schedule Interface)	**Section 11.1.3.,** *Digital Outputs Setup (Combiner / Schedule)*	84
Inputs	**Section 11.1.4.,** *Digital Output Module Inputs*	85
Outputs Setup	**Section 11.1.5.,** *Digital Output Module Outputs*	85
Counter Setup	**Section 11.1.6.,** *Counter Setup*	86
Setup Instance	**Section 11.1.7.,** *Setup Instance*	86

11.1.1. Digital Output Module Status



The current status of an Digital Output Module and all cells within the module are shown in the Digital Output Module Status Screen.

Functional Description

The Digital Output Module Status Screen gives a complete real-time view of the operating status of a Digital Output Module. Data are presented in a cell diagram form that shows not only the module's inputs and outputs, but also the values entering and leaving each cell within the module.

For a complete explanation of each cell's function within the Digital Output Module, refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.2.,** *Digital Output Module*.

Other special operating characteristics are also displayed in the Analog Output Module Status Screen. If the module is in override, the Override cell shows whether the module is being overridden ON or OFF, whether the override is fixed or timed, and, if timed, how many minutes and seconds are left in the override.

Programming I/O Modules

Programming I/O modules may be done simply and quickly from the status screen. To make changes to any cell, input, or output, right-click on the desired element. A pop-up menu will appear, allowing the user to either change the settings in the selected cell, input, or output, or change settings in other cells, inputs, or outputs within the same module. The setup dialog boxes selected in this manner are described in more detail in the sections below.

Double-clicking the left mouse button on any of the hotspots on this screen brings up the Digital Outputs Setpoints dialog box (see **Section 11.1.2.**).

Bypassing

Users may bypass the Output OFF or ON by right-clicking the Override cell in the Status screen and selecting "Bypass" from the menu that appears. In the Bypass dialog box that appears, users may specify the bypass value and choose either fixed or timed as the override type. Existing bypasses may also be terminated by selecting the Normal option in the Bypass dialog box.

Analog Inputs, Analog Outputs, and Digital Outputs Buttons

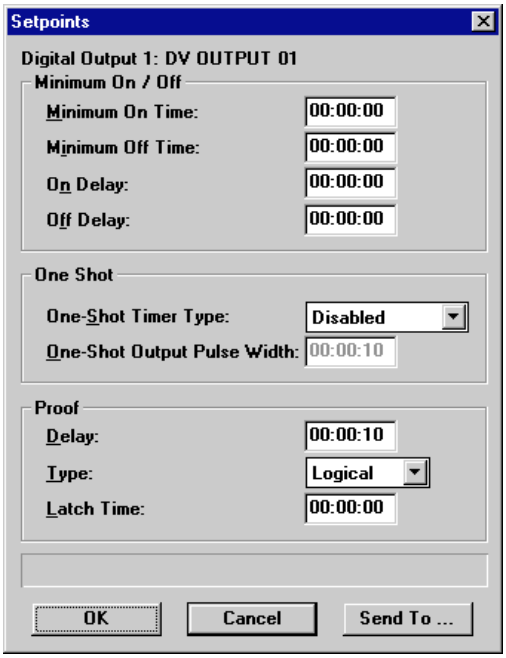
The Other Analog Inputs, Analog Outputs, and Digital Outputs buttons at the bottom of the screen, if left-clicked, bring up dialog boxes where status screens for other modules may be selected. Right-clicking any of these buttons brings up menus where users may view summary screens, add new modules, view module alarms, or print out set points.

Unit Summary Button

Clicking the left mouse button on the Unit Summary button will bring up the Unit Summary Screen.

Clicking the right mouse button on the Unit Summary button will bring up a menu identical to the menu called up by right-clicking a BEC unit at the system tree (see *P/N 026-1002, UltraSite User's Guide,* **Section 1.5,** *Unit Level*).

11.1.2. Digital Output Setpoints



All fields necessary to set up the Min On/Off, One Shot, and Proof cells are in the Setpoints dialog box.

Functional Description

The Minimum On/Off cell, defined in this dialog box, assures that the digital Output (defined in **Section 11.1.5.,** *Digital Output Module Outputs*) remains ON and/or OFF for a specified minimum duration.

The One Shot cell, also defined in this dialog box, converts the logical ON/OFF signal from the digital combiner into a digital pulse signal.

The Proof cell, also defined in this dialog box, turns the Proof input ON whenever the Proof input does not match the digital Output.

Min On/Off Times [00:00:00 - 24:00:00] [00:00:00]

The Minimum On time is the smallest amount of time the digital output must remain ON before an OFF transition is allowed. The Minimum Off time is the smallest amount of time the digital output must remain OFF before an ON transition is allowed.

The Min On/Off Times are specified in hours:minutes:seconds format (HH:MM:SS).

Min On/Off Delay [0 - 240 min.] [0 min.]

The Minimum On Delay is the number of minutes the Min On/Off cell will wait before changing the state of the Command Output from OFF to ON. Likewise, the Minimum Off Delay is the number of minutes the cell will wait before changing the Command Output from ON to OFF.

One Shot Timer Type [Disabled, Momentary ON, Momentary OFF] [Disabled]

The One Shot Timer Type field determines how the logical ON/OFF signal generated by the DVCombiner and Schedif cells (see **Section 11.1.3.**) is interpreted into a digital pulse signal. There are three different timer types to choose from:

- *Disabled* - the One Shot cell is disabled, meaning the logical ON/OFF signal will be sent to the Output without any modification.
- *Momentary ON* - the One Shot cell sends an ON pulse to the Output whenever a transition from OFF to ON transition is detected. At all other times, the Output will be OFF.
- *Momentary OFF* - the One Shot cell sends an ON pulse to the Output whenever a transition from ON to OFF is detected. At all other times, the output will be OFF.
- *Change of State* - the One Shot cell sends an ON pulse to the Output whenever any kind of transition is detected, whether it be from ON to OFF or from OFF to ON.

One Shot Output Pulse Width [00:00:10 - 18:12:15] [00:00:10]

The One Shot Output Pulse Width is the number of hours, minutes, and seconds the ON pulse emitted by the One Shot cell will last. The pulse width must be specified in hours:mintues:seconds (HH:MM:SS).

Proof Delay [00:00:10 - 18:12:15] [00:00:10]

The Proof cell compares the Proof input to the digital Output. If these two values are different for an amount of time larger than the Proof Delay, the Alarm output will be turned ON. The delay must be specified in hours:minutes:seconds (HH:MM:SS).

Proof Type [Logical/Actual] [Logical]

If the Logical proof type is chosen, overrides of the Command Output will not be reflected in the output value sent to the Proof cell. This may result in unneccesary activation of the Proof output.

When the One Shot cell is being used to generate short digital pulses, the Output may not be the best value to use in

proof checking, since Proof inputs are logical (ON/OFF) signals. For this reason, the Proof Type field allows users to select as the comparison value either the actual Output state or the logical Output state before it is modified by the One Shot cell.

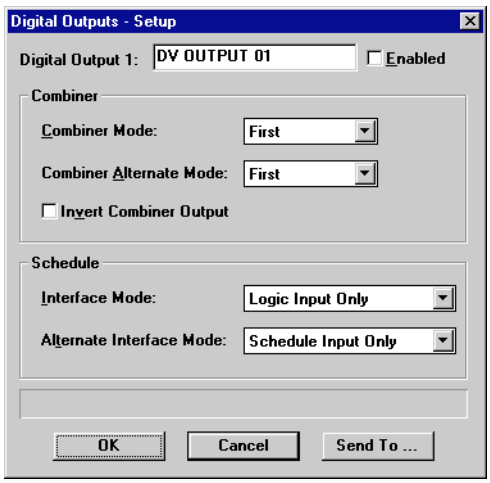
To use the actual Output value for the Proof cell comparison, choose Actual from the scroll options. To use the logical Output value before it is modified by the One Shot and Override cells, choose Logical from the scroll options.

Proof Latch Time [00:00:00 - 18:12:15] [00:00:00]

The Proof Latch Time is the amount of time the Proof output will remain ON after a failed Proof clears. In other words, if the Proof cell detects that a proof failure has cleared, it will not turn the Proof Output OFF until the proof failure has been clear for an amount of time equal to the latch time.

If a proof failure is detected during the Proof Latch Time period, the countdown ceases, and the Proof Output remains ON. Another proof clear would begin a new latch time period.

11.1.3. Digital Outputs Setup (Combiner / Schedule)



All fields necessary to define the DVCombiner and Schedule Interface cells are in the Digital Outputs Setup dialog box.

Functional Description

The DVCombiner cell, defined in this dialog box, combines up to four inputs into a single control value. The Schedule Interface module, also defined in this dialog box, takes the control value from the DVCombiner cell and combines it again with the Occupied input.

Combine Mode/Combine Alternate Mode [options] [First]

The Combine Mode and Combine Alternate Mode are the control strategies used by the DVCombiner cell to combine the digital module inputs into a single control value.

The Use Alternate Combination input (defined in **Section 11.1.4.,** *Digital Output Module Inputs*) determines whether the Combine Mode or the Combine Alternate Mode is used. When the input is OFF or NONE, the Combine Mode is used. When the input is ON, the Combine Alternate Mode is used.

There are five possible Combine Modes:

- *AND* - If all defined inputs are ON, the output will be ON.
- *OR* - If one or more defined inputs are ON, the output will be ON.
- *XOR* - If all inputs are OFF or if all inputs are ON, the output will be OFF; otherwise, the output will be ON.
- *VOTE* - If a majority of the defined inputs are ON, the output will be ON. If the majority of the defined inputs are OFF, or if 50% of the inputs are OFF, the output will be OFF.
- *First* - The first non-NONE input will be used as the control value.

Invert Combiner Output [Yes/No] [No]

When the Invert Combiner Output box is checked, the output determined by the Combiner Mode strategy will be inverted. In other words, ON outputs will be changed to OFF, and OFF outputs will be changed to ON.

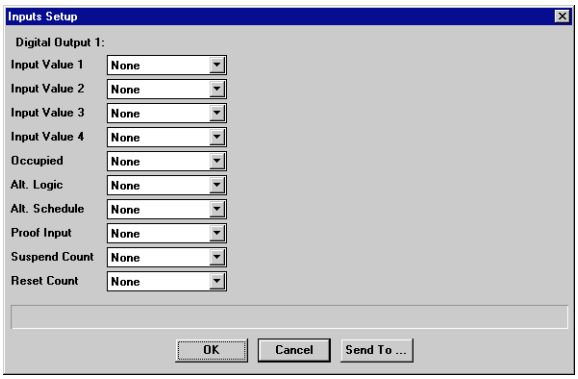
Schedule Interface Mode / Alternate Mode [options] [Logic Input Only / Schedule Input Only]

The Schedule Interface Mode determines the method that will be used to combine the Occupied input value with the combined input value from the DVCombiner cell. Six different combination modes may be used:

- *Logic Input Only* - The combined input value from the DVCombiner cell is used as the output value. (Choosing this option effectively disables the Schedule Interface cell).
- *Schedule Input Only* - The Occupied input value is used as the output value. (Choosing this option effectively disables the DVCombiner cell).

- *Both ON, Both OFF* - When the output is OFF, it will not turn on again until both inputs are ON. When the output is ON, it will not turn off again until both inputs are OFF.
- *Both ON, Schedule OFF* - When the output is OFF, it will not turn on again until both inputs are ON. When the output is ON, it will not turn off again until the Occupied input turns OFF.
- *Schedule ON, Both OFF* - When the output is OFF, it will not turn on again until the Occupied input is ON. When the output is ON, it will not turn off again until both inputs are OFF.
- *Both ON, Either OFF* - When the output is OFF, it will not turn on again until both outputs are ON. When the output is ON, it will not turn off again until either the Occupied input or the combined input from the DVCombiner cell is OFF.

11.1.4. Digital Output Module Inputs



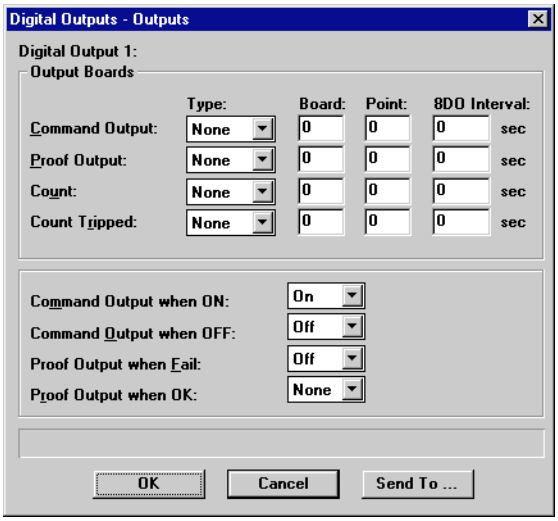
All Analog Output Module inputs are defined in this dialog box.

Functional Description

Refer to *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.10.2.2.,** *Digital Output Module*, for a complete description of the module inputs.

A complete list of the possible input sources is given in Appendix A.

11.1.5. Digital Output Module Outputs



In the Digital Outputs Output Setup dialog box, users may assign board and point addresses to module outputs and define the states of digital outputs.

Functional Description

All outputs in the Digital Output Module are defined in this dialog box. Refer to *P/N 026-1103, BEC Installation and Operation Manual*, **Section 6.10.1.2.,** *Module Inputs and Outputs*, for more information about these outputs.

Type [8RO, 4AO, 8DO, None] [None]

The Type field is where the type of output board is defined. Users may select the 8RO Relay Board, the 4AO Analog Output Board, the 8DO Digital Output Board, or None if the output is not going to be given a board and point address.

Board and Point

The desired board and point address for the output is entered in the Board and Point fields.

8DO Interval

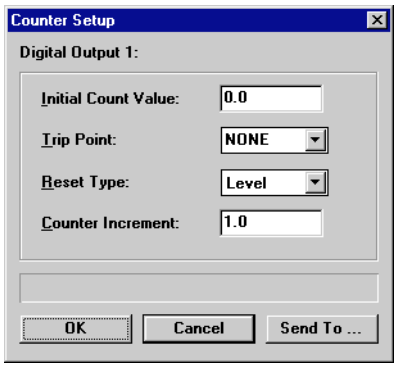
If 8DO is chosen in the Type field, specify an interval in the 8DO Interval field. The interval is the amount of time over which the 8DO's output will be applied; for example, if the output value being sent to the 8DO is 60% and the 8DO Interval is set to 1 second, the 8DO will turn the output on for 0.6 seconds (60% of a second), turn it off for 0.4 seconds, and repeat this cycle every second.

ON/OFF Definitions [ON/OFF/NONE]

When the BEC calls for the Command and Proof outputs to be either ON or OFF, the Digital Output Module uses the digital values specified in the ON/OFF definition fields.

For any of the fields, users may specify OFF, ON, or NONE (for "don't care"). See *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.1.2.,** *Module Inputs and Outputs*, for a definition of the NONE state.

11.1.6. Counter Setup



All fields necessary to set up the Counter cell are in the Counter Setup dialog box.

Functional Description

For a complete definition of how the Counter cell operates, refer to *P/N 026-1103, BEC Installation and Operation Manual,* **Section 6.10.2.2.,** *Digital Output Module*.

Initial Count Value [0 - 32767] [0]

The Initial Count Value is the value at which the counter begins. When the Counter cell is reset, the Count output returns to the Initial Count value.

Trip Point [0 - 32767] [NONE]

If the Initial Count Value reaches a value higher than the defined Trip Point, the Counter cell calls for the Count Tripped output to be ON.

Reset Type [Level, Edge, InvEdge] [Level]

The Counter cell's Count value is reset to the Initial Count Value upon receiving a signal from the Reset input. The type of signal that will reset the Counter cell is specified in the Reset Type field.

There are three different reset types:

- *Level* - the Count will reset whenever the Reset input is ON.
- *Edge* - the Count will reset whenever the Reset input goes from OFF to ON.
- *InvEdge* - the Count will reset whenever the Reset input goes from ON to OFF.

Count Increment [0 - 32767] [0]

Whenever the Command output of the Analog Input Module goes from OFF to ON, the Count Increment value is added to the current value of the Count output.

11.1.7. Setup Instance

Setup Instance allows users to access all Digital Output Module-related dialog boxes in succession.

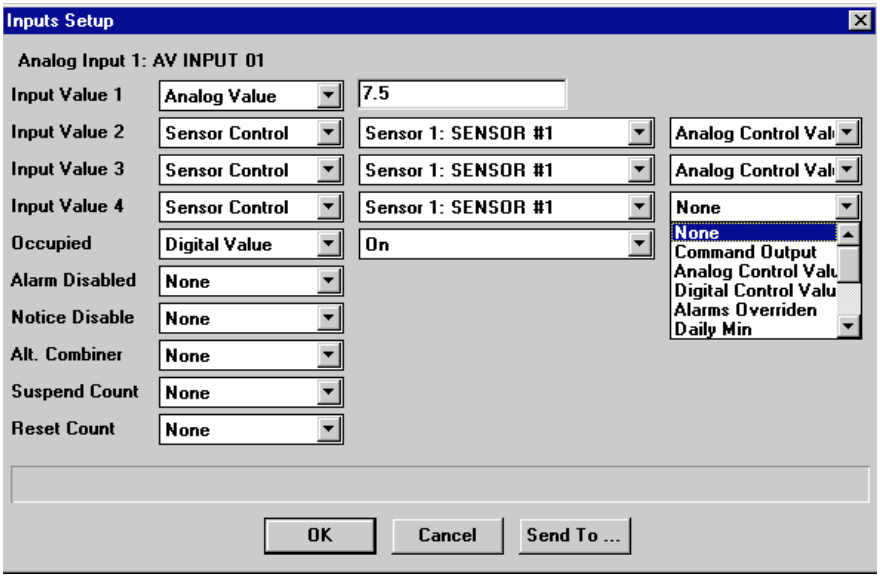
Functional Description

When Setup Instance is chosen, all dialog boxes related to Digital 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 a module is created in UltraSite, the Setup Instance sequence is initiated automatically.

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

- *Digital Output Setup* - see **Section 11.1.3.**
- *Digital Output Inputs Setup* - see **Section 11.1.4.**
- *Digital Output Outputs Setup* - see **Section 11.1.5.**
- *Counter Setup* - see **Section 11.1.6.**
- *Digital Output Setpoints* - see **Section 11.1.2.**

Appendix A: BEC I/O Module Input Sources



The BEC's I/O Control Modules are capable of using fixed analog or digital values, I/O Module Outputs, I/O board points, and/or a number of internal BEC values as control inputs.

The input sources for I/O Modules are chosen in the Inputs dialog boxes, an example of which is shown above. In general, the category to which the input source belongs is chosen in the leftmost field. When this category is chosen, fields appear in the right-hand columns where users may choose the specific device from which the input will be taken and which device characteristic will be used as the input.

Below is a complete list and description of all possible input types.

All inputs that are expressed in bars are multiplied by 10 for the purposes of I/O control. For example, if a I/O module is configured to a pressure transducer reading a value of 5.7 bars, the actual value read by the module will be 57.

Analog Value [-999.9 - 999.9] [0]

When Analog Value is chosen, a field appears where users may specify a fixed numerical value to the selected input.

Digital Value [ON, OFF, NONE] [OFF]

When Digital Value is chosen, a scroll option box appears where users may specify a fixed digital value to the selected input.

Sensor Control

Input	Type of Input	Description
Output	Digital	The value of the sensor control output.
Analog Control Value	Analog	The Analog Control Value is the analog value being used as the Sensor Control Value. This could be the sensor value itself, or it could be a combination of up to four other sensors. When this analog value is a pressure measurement in bars, the value will be multiplied by 10 when pointed to.
Digital Control Value	Digital	The same as the Analog Control Value (above), except Digital Control Value is for digital sensors.
Alarm Ovrd State	Digital	The value of the alarm override input assigned to the sensor.

Demand Control

Input	Type of Input	Description
None	None	Undefined
Status	Digital	The state of demand, either ON or OFF.
Current Power Usage	Analog	The current kW value provided by the kW or Watt-hour transducer
Peak Power Usage	Analog	The highest value of kW measured by the kW or Watt-hour transducer during a specified period of time.
Hour kW Usage	Analog	The kW value for the previous hour.
Day kWH Usage	Analog	The total kW usage for the day.

AHU Control

Input	Type of Input	Description
None	None	Undefined
Room Temp	Analog	The current value of an individual temperature sensor.
Humidity/Dewpt	Analog	The current value of the Humidity or Dewpt sensor.
Supply Temp	Analog	The current value of the Supply Air Temperature sensor for the selected AHU.
Return Temp	Analog	The current value of the Return Air Temperature sensor.
Dehum Setpoint	Analog	The value of the dehumidification setpoint.
Dehum Active	Digital	The status of dehumidification either ON or OFF.
Curr Heat Setpoint	Analog	The value of the heat setpoint.
Curr Heat Control Temp	Analog	The value of the heat control temperature.
Curr Heat Season	Analog	The temperature value at which heat stages will be allowed to activate (setpoint that defines winter).
Curr Cool Setpoint	Analog	The value of the cool setpoint.
Curr Cool Control Temp	Analog	The value of the cool control temperature.
Curr. Cool Season	Analog	The temperature value at which cool stages will be allowed to activate (setpoint that defines summer).
Cool Active	Digital	On value if any cooling stage is active.
Heat Active	Digital	On value if any heating stage is active.
Cool Active/No Dehum.	Digital	On value if any cooling stage and dehumidification is not active.
Recl Heat Active	Digital	On if any reclaim heat stage is active.
Aux Heat Active	Digital	On if any auxilary heat stage is active.

Boiler Control

Input	Type of Input	Description
None	None	Undefined
Temp. Control Val.	Analog	The current value of the temperature sensor located on the boiler.
Calc. Temp. Setpt.	Analog	The value of the boiler's temperature setpoint in relation to the outside air temperature.
Press. Control Val.	Analog	The current value of the pressure transducer located on the boiler.
Calc. Pres. Setpt	Analog	The value of the boiler's pressure setpoint in relation to the outside air temperature.

Dimmer Control

Input	Type of Input	Description
None	None	Undefined
Outside Light Level	Analog	The current value of the outside Light Level sensor.
Ins. Lght Lvl/Dim. Out	Analog	The inside light level value or the dimmer output based upon whether the light zone is setup as light level or dimmer output control type.
Calc. Lght Lvl/Dim. Out	Analog	The calculated light level set point or the dimmer output set point based upon the control type.

Anti-Sweat

Input	Type of Input	Description
None	None	Undefined
Humidity	Analog % (0-100%)	The current anti-sweat humidity sensor value.
Temperature	Analog	The current anti-sweat temperature sensor value.
Dewpoint	Analog	The current anti-sweat dewpoint value.

System Control

Input	Type of Input	Description
None	None	Undefined
Outside Temp	Analog	The current value of the outside temperature sensor.
Sched Lght. Sens. Val	Analog	The value of the outside light level sensor

Analog Inputs [options] [NONE]

For a description of the available Analog Input Module outputs, see *BEC Installation and Operation Manual*, **Section 6.10.2.1.,** *Analog Input Module*.

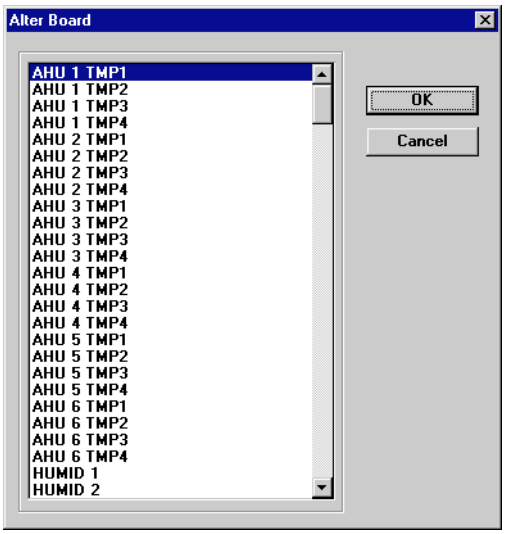
Analog Outputs [options] [NONE]

For a description of the avaliable Analog Output Module outputs, see *BEC Installation and Operation Manual*, **Section 6.10.2.3.,** *Analog Output Module*.

Digital Outputs [options] [NONE]

For a description of the available Digital Output Module outputs, see **Section 11,** *Digital Output Modules*.

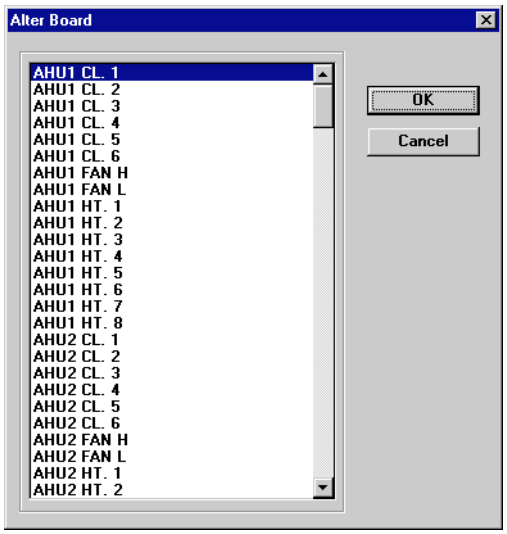
Input Board]



The Input Board option allows a user to choose an input from any input board point on the BEC Input/Output Network.When the Input Board option is selected as an Input Value, a field appears beside the input along with a button labeled “Select.” Left clicking the Select button brings up the Alter Board dialog box, shown to the left. The Alter Board box lists all possible BEC inputs. To select an input, simply left-click it and press OK. The appropriate index number is automatically entered into the input field.

For simplicity, the Alter Board dialog box splits the BEC inputs into two categories: the Normal Inputs, which contain all non-circuit-related inputs, and Circuit Inputs, which contain all circuit-related inputs. To select a Circuit Input, users must first select the desired circuit in the scroll options.

The inputs in the Alter Board dialog box are listed in the same order as the Input Definitions screens accessed from the BEC front panel. Refer to *P/N 026-1103 BEC Installation and Operation Manual*, **Section 8.9.1.,** *Input Definition* for descriptions of these inputs.



Output Board.

The Output Board option allows a user to choose an output from any output board point on the BEC Input/Output Network

When the Output Board option is selected, a field appears beside the input along with a button labeled “Select.” Left clicking the Select button brings up the Alter Board dialog box, shown above. The Alter Board box lists all possible BEC outputs. To select an output, simply left-click it and press OK. The appropriate index number is automatically entered into the input field.

For simplicity, the Alter Board dialog box splits the BEC outputs into two categories: the Normal Outputs, which contain all non-circuit-related outputs, and Circuit Outputs, which contain all circuit-related outputs. To select a Circuit Output, users must first select the desired circuit in the scroll options.

The outputs in the Alter Board dialog box are listed in the same order as the Output Definitions screens accessed from the BEC front panel. Refer to *P/N 026-1103 BEC Installation and Operation Manual*, **Section 8.9.2.,** *Output Definition* for descriptions of these outputs.

Schedules Control

Input	Type of Input	Description
None	None	Undefined
Status	Digital	The state of the selected lighting schedule (either ON or OFF)

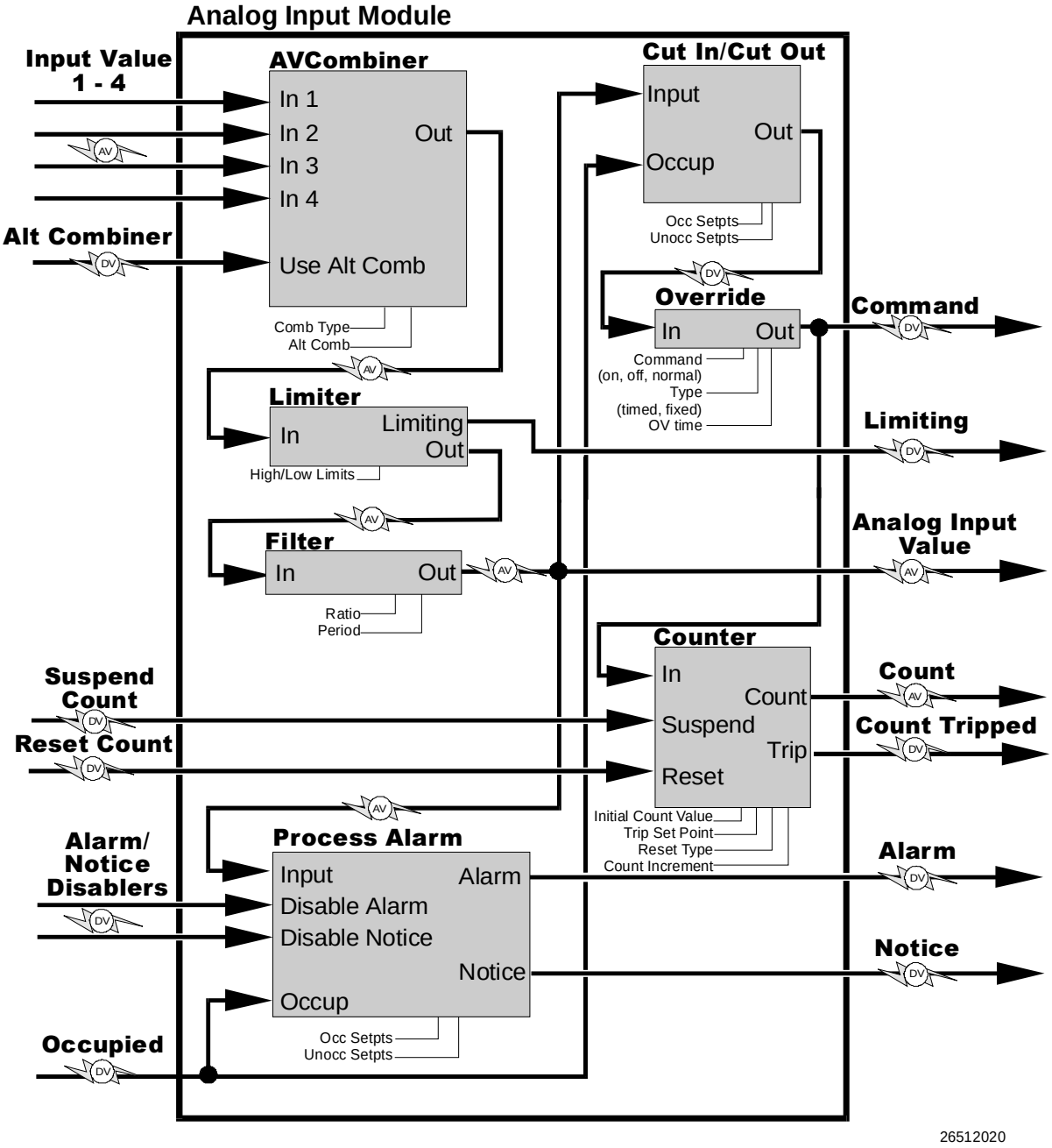
Appendix B: I/O Module Quick Reference

.Analog Input Module

Input Name	Input Type	Description
Input Value 1-4	Analog	Values that will be combined by the AVcombiner cell.
Alt Combiner	Digital	When ON, the alternate combination strategy will be used. When OFF or NONE, the primary will be used.
Suspend Count	Digital	When ON, the module will cease counting the Command output's ON transitions.
Reset Count	Digital	Sends signal to Counter cell to reset the count. Signal type must be defined in UltraSite.
Alarm Disable	Digital	When ON, the Process Alarm cell will not generate a signal from the Alarm output.
Notice Disable	Digital	When ON, the Process Alarm cell will not generate a signal from the Notice output.
Occupied	Digital	Occupancy state (ON or NONE=Occupied, OFF=Unoccupied)

Output Name	Output Type	Description
Command	Digital	Generated by the Cut In/Cut Out cell based on comparison between combined value and cut in/ cut out set points.
Limiting	Digital	ON=Limiter cell is enabled, OFF=Limiter cell is disabled.
Analog Input Value	Analog	Combined value of Input Values 1-4, after limiting and filtering.
Count	Analog	Number of Command output ON transitions since the last reset.
Count Tripped	Digital	Turns ON when the Count output value exceeds the Count Trip set point.
Alarm	Digital	When Analog Input Value output exceeds the Alarm set point limits, the Alarm output turns ON.
Notice	Digital	When Analog Input Value output exceeds the Notice set point limits, the Notice output turns ON.

Cell Name	Functional Description
AVCombiner	Combines Input Values 1-4 using either a primary or alternate combination strategy.
Limiter	Keeps the combined value from the AVCombiner within a set of user-defined high/low limits.
Filter	Limits the rate of change over time for the combined value determined by the AVCombiner.
Process Alarm	Turns ON the Alarm or Notice outputs if the Analog Input Value output falls outside the user-defined alarm or notice set point range.
Cut In/Cut Out	Changes the Command output state when the Analog Input Value output falls outside the user-defined cut-in/cut-out set point ranges.
Override	Overrides the Command output to a user-defined value for a user-defined amount of time.
Counter	Increments the Count output when the Command output transitions ON. Turns on the Count Tripped output when the Count output exceeds the Count Trip set point.

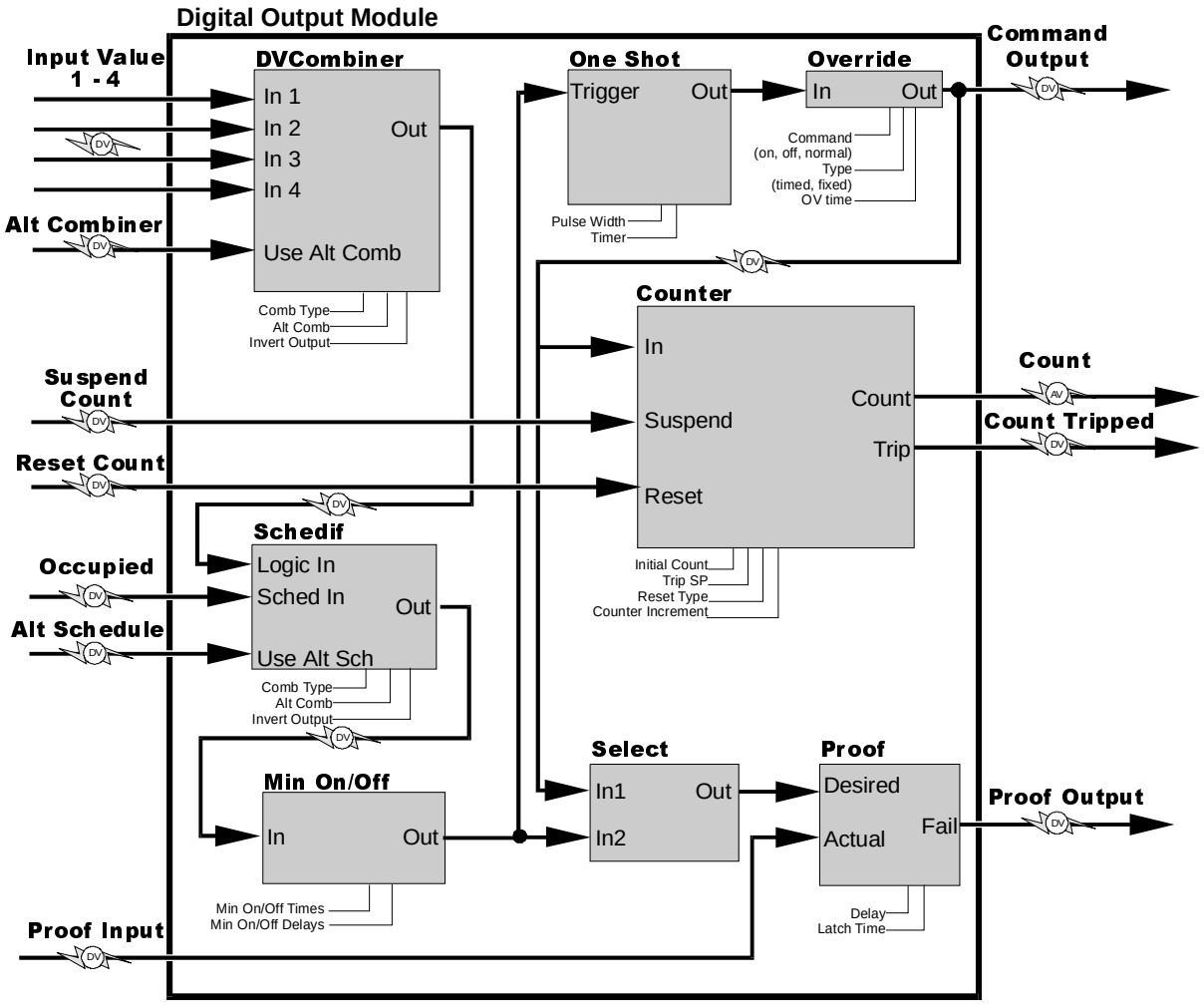

Analog Input Module
Input Value 1 - 4
AVCombiner
In 1
In 2
In 3
In 4
Out
Alt Combiner
Use Alt Comb
Comb Type
Alt Comb
Cut In/Cut Out
Input
Out
Occup
Occ Setpts
Unocc Setpts
Override
In
Out
Command
(on, off, normal)
Type
(timed, fixed)
OV time
Command
Limiter
In
Limiting
Out
High/Low Limits
Limiting
Filter
In
Out
Ratio
Period
Analog Input Value
Counter
In
Count
Suspend
Trip
Reset
Initial Count Value
Trip Set Point
Reset Type
Count Increment
Suspend Count
Reset Count
Count
Count Tripped
Alarm/ Notice Disablers
Process Alarm
Input
Alarm
Disable Alarm
Disable Notice
Notice
Occup
Occ Setpts
Unocc Setpts
Alarm
Notice
Occupied
AV
DV
26512020

.Digital Ouput Module

Input Name	Input Type	Description
Input Value 1-4	Digital	Values that will be combined by the DVCombiner cell.
Alt Logic	Digital	When ON, the alternate combination strategy will be used. When OFF or NONE, the primary will be used.
Suspend Count	Digital	When ON, the module will cease counting the Command Output's ON transitions.
Reset Count	Digital	Sends signal to Counter cell to reset the count. Signal type must be defined in UltraSite.
Occupied	Digital	Occupancy state (ON or NONE=Occupied, OFF=Unoccupied)
Alt Schedule	Digital	When ON, the alternate schedule combination strategy will be used. When OFF or NONE, the primary will be used.
Proof Input	Digital	Proof contact from the device being driven by the Command Output.

Output Name	Output Type	Description
Command Output	Digital	The final combined digital signal, after combination by the DVCombiner and Schedif cells, and alteration by the Min On/Off and One Shot cells.
Count	Analog	Number of Command output ON transitions since the last reset.
Count Tripped	Digital	Turns ON when the Count output value exceeds the Count Trip set point.
Proof Output	Digital	Generated by the Proof cell when the Proof input and the Command Output do not match. (ON=proof failed, OFF=proof OK).

Cell Name	Functional Description
DVCombiner	Combines Input Values 1-4 using either a primary or alternate combination strategy.
Schedif	Combines the value from the DVCombiner with the Occupied input using either a primary or alternate combination strategy.
Min On/Off	Keeps the Command Output ON and OFF for a minimum amount of time.
One Shot	Converts the combined input value from a logical signal to a momentary-on or momentary-off digital pulse.
Override	Overrides the Command Output to a user-defined value for a user-defined amount of time.
Counter	Increments the Count output when the Command output transitions ON. Turns on the Count Tripped output when the Count output exceeds the Count Trip set point.
Select	Selects either the logical Command Output signal (from the Min On/Off cell) or the pulse Command Output signal (from the One Shot cell) for use in proof comparisons.
Proof	Compares the Command Output to the Proof Input, and turns on the Proof Output when a proof failure is detected.

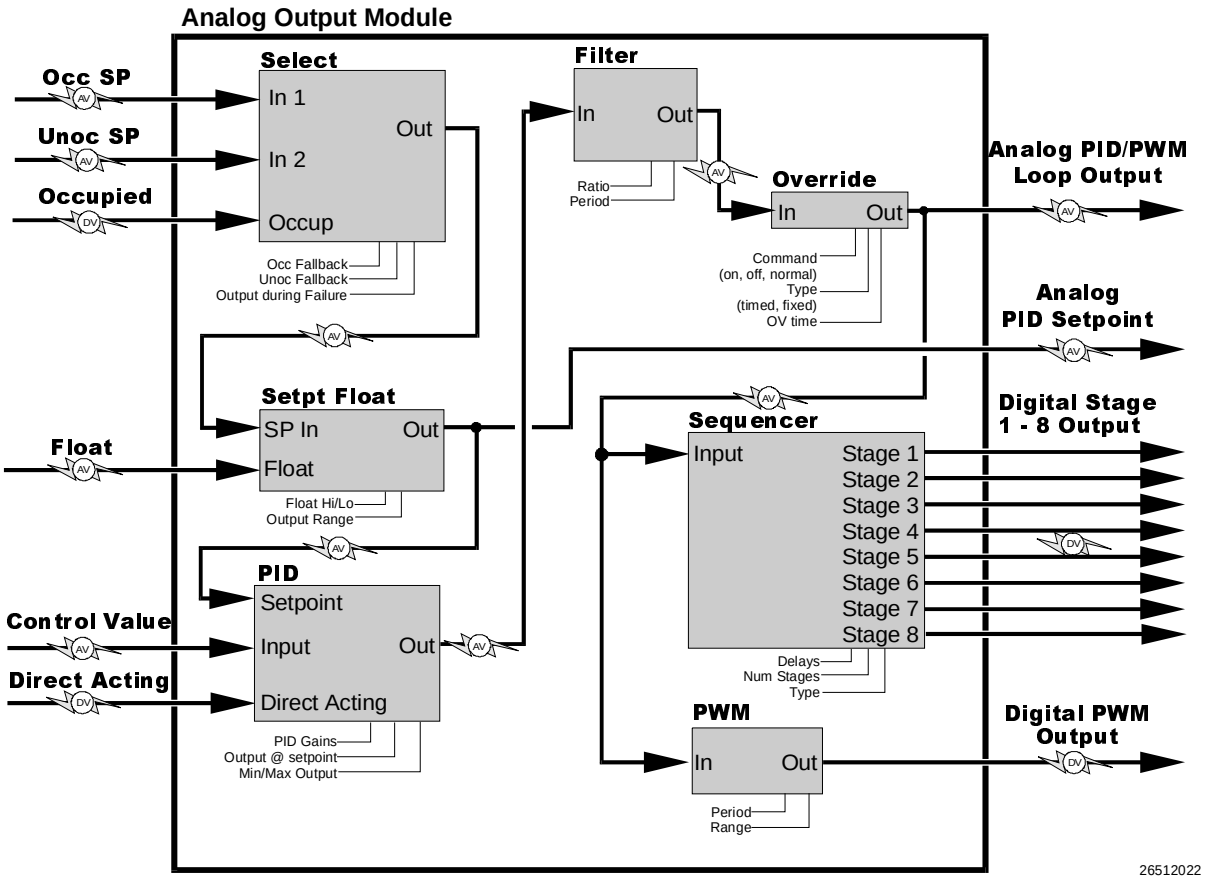


.Analog Output Module

Input Name	Input Type	Description
Occ SP	Analog	Input that will be used as the occupied set point.
Unoc SP	Analog	Input that will be used as the unoccupied set point.
Occupied	Digital	Used by the Select cell to determine which set point input to use (ON or NONE=Occ SP, OFF=Unoc SP).
Float	Analog	Input used by the Float cell to float the set point value.
Control Value	Analog	The control input that is compared to the PID setpoint to determine the PID output value.
Direct Acting	Digital	Determines the direction the PID output changes in relation to the Control Value input. ON or NONE=Direct Acting (PID output goes from 0-100% as Control Value increases), OFF=Reverse Acting (PID output goes from 0-100% as Control Value decreases).

Output Name	Output Type	Description
Analog PID/ PWM Loop Output	Analog	The analog PID percentage from the PID cell, after filtering from the Filter cell.
Analog PID Setpoint	Analog	The current PID setpoint value being used by the PID cell.
Digital Stage 1-8 Outputs	Digital	Stages turn ON proportionately as the PID output rises from 0% to 100%. Stages must be defined in UltraSite (see **Section 10.1.7.**).
Digital PWM Output	Digital	The Analog PID/PWM Loop Output value converted to a pulse width modulation signal).

Cell Name	Functional Description
Select	Selects either the Occ SP or Unoc SP for use as the PID set point based on the value of the Occupied input.
Setpt Float	Floats the PID set point within a certain range based on the value of the Float input.
PID	Determines a PID output percentage depending upon the Control Value and its relation to the PID set point. Output may be either direct or reverse acting.
Filter	Limits the rate of change over time for the PID output value.
Override	Overrides the Analog PID/PWM Loop Output to a user-defined value for a user-defined amount of time.
Sequencer	Turns ON a number of defined stages as the PID output increases from 0-100%. Zero percent=no stages ON, 100%=all defined stages ON.
PWM	Converts the Analog PID/PWM Loop Output percentage to a digital PWM signal. A 30% percentage = ON for 30% of pulse width, etc.



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