

SENSOR

Control Electronics Module

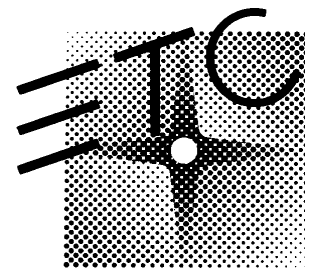
USER MANUAL

Software version 2.14

Contents

System monitoring	3	Backup Looks	17
LED beacon	3	Recording backup looks	17
Error messages	3	Deleting backup looks	17
Monitoring your system	4	Playing backup looks	18
System information	4	Loading backup look data	18
Rack information	5	Multiplex dimming	19
Dimmer information	7	Configuring a CEM	21
Monitoring dimmer loads	9	Setting ETCLink address	21
Recording loads	9	Setting start address	21
Using CEM to control dimmer outputs	11	Setting input port addresses	22
Viewing dimmer levels	11	Dimmer configuration	23
Multiplex mode	11	Setting dimmer firing mode	23
Setting dimmer levels	12	Setting dimmer boost value	24
Clearing dimmer levels	12	Appendix A CEM displays	25
Selecting multiplexed dimmers	12	Appendix B LCD error messages	26
Dimmer check	13	Appendix C Disabling error messages	27
Setting data loss fade time	13	Appendix D CEM face panel controls	30
Replacing a CEM	15	Sensor CEM menu structure	32
In a multi-rack system	15		
In a stand-alone rack	15		
" Config Mismatch" warning	15		
Loading configuration data	16		

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US patent number 5,352,958.
7050M1001

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sensor

Control Electronics Module (CEM)

USER MANUAL

The Control Electronics Module (CEM) is one of two user interfaces designed for use with ETC Sensor dimming systems. The second is the Multi-Protocol Electronics (MPE) module. The CEM may be installed in Sensor Portable Packs, Sensor Touring Racks or Sensor Installation Racks. In the Portable Pack, the CEM is installed in the top slot; in the SR6, SR12 and SR24 it is installed in the bottom slot; in the SR48 it is installed in the middle slot.

The CEM accepts DMX512 control signals and responds by setting dimmer output levels. In addition, it performs a wide range of other functions including allowing you to monitor system status, change system configuration, save backup looks, run dimmer checks, and enable or disable ETC's Multiplex dimming feature.

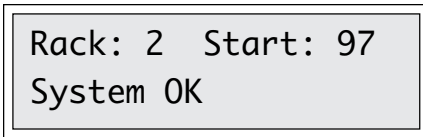
This manual is divided into six chapters.

- *Chapter 1, System Monitoring*, describes how the CEM monitors the dimming system and identifies problems.
- *Chapter 2, Controlling Dimmers*, describes how to set the output levels of Sensor dimmers.
- *Chapter 3, Replacing a CEM*, describes how to replace the CEM.
- *Chapter 4, Backup Looks*, describes how to record, use and erase backup looks from CEM memory.
- *Chapter 5, Multiplex Dimming*, describes how to enable or disable ETC's Multiplex dimming option.
- *Chapter 6, Configuring a CEM*, describes how to reconfigure a CEM.

If you have questions about Sensor dimming equipment that are not addressed in this manual, please call ETC Technical Services at 800/775-4382. The Technical Services department hours are 8:00 am to 5:00 pm, CST. After hours and weekend calls are forwarded immediately to a technician on call.

Chapter 1

System monitoring



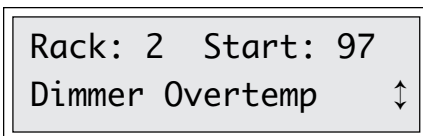
Status display

Sensor electronics automatically alert you to lighting system problems. The CEM in each pack or rack monitors incoming line voltage and the status of the dimming equipment itself. (Advanced Features electronics also monitor individual dimmers.) In dimming systems that utilize ETCLink communications technology, you can access information about any rack or dimmer in the system from any CEM (or ETCLink-compatible console).

When a CEM detects a problem with its rack or dimmers, it flashes the red LED beacon on the front of the pack or rack and displays more specific information about the problem on the LCD display. A CEM only monitors components in its own rack.

LED beacon

All Sensor dimming packs and racks are equipped with an LED warning beacon. On Installation Racks and Portable Packs, the beacon is located over the door, in the upper left corner. On Touring Racks, it is located either between the door and the patch bay (SP24) or between the two rows of dimmer modules (SP48). When the Sensor system is operating normally, the LED beacon is lit. When the CEM detects a problem, the beacon begins to flash. It continues to flash until you correct the problem. For more detailed information about the problem, open the rack door and look at the CEM's LCD for error messages.



Status display

Error messages

The CEM displays error messages on the LCD. These error messages provide critical information about the status of your dimming system, including input voltages, air flow and the status of the CEM itself. If there is more than one error message, press [↑] or [↓] to scroll through them.

In multiple rack, ETCLink dimming systems, you can view system error messages for all racks in the system from any CEM. You can only view rack and dimmer error messages on the CEM in the affected rack.

For a complete list of CEM error messages, see *Appendix B, LCD Error Messages*.

Monitoring your system

About	1-Dimmer
2-Rack	3-System

About menu

The CEM's About displays provide a wide range of dimming system information. In addition to information about individual racks and dimmers, it also provides overall system information.

Note: About displays provide information only. For information on how to make changes, see [Configuring a CEM on page 21](#).

Press [About] [1] to display dimmer information, [About] [2] to display rack information, or [About] [3] to display system information.

After you select dimmer, rack or system, press [→] to move from one information screen to the next. Each screen displays different information about the rack or selected dimmer, or about the system.

When you are finished, press [Exit] to return to the [About] menu, or press [Exit] twice to return to the Status display.

Note: To return to a previous display screen, press [←] until the desired screen is displayed.

System information

Each of the four About System displays is described below. Press [About] [3], to access the first, then press [→] to move through the screens. When you are finished, press [Exit] once to return to the About menu, or twice to return to the Status display.

About System Multiplex:DISABLED →

Multiplex

Multiplex enabled?

Multiplex is the first display screen you see when you select About System. It shows whether the system is enabled for Multiplex dimming. Multiplex must be enabled and dimmer(s) must be in Multiplex firing mode to allow Multiplex operation with ETC Source Four 77 volt ellipsoidal spotlights. See [Multiplex dimming on page 19](#) for information.

About System Panic: INACTIVE →

Panic status

Panic circuits enabled?

Panic status is the second About System display. It displays whether panic light circuits are active or inactive. Panic light circuits are assigned when the CEM is installed and configured. They cannot be changed by the user.

About System Backup 3 ACTIVE →

Backup status

Backup looks active?

Backup status is the third About System display. It displays whether backup looks are active. See [page 17](#) for information on working with backup looks.

About System Name Toad Hall Playhouse→

System name

System name?

System name is the fourth About System display. It displays the customized system name assigned to your system by ETC Technical Services. It cannot be changed by the user.

Rack information

Each of the six About Rack displays is described below. Press [About] [2], then use the number keys to select the desired rack number. Or, if you prefer, you can use [↑] and [↓] to scroll through rack numbers. (If you enter a non-existent rack number, the message **No Rack Info** is displayed.) Press [Enter] when the desired rack is displayed. (Until you press [Enter], the CEM will not update the information displayed in About Rack screens.)

Once you have selected the desired rack, press [→] to move through the display screens. Depending on the size of the system, it may take up to ten seconds for the CEM to display information about networked racks.

Note: If you wish to return to a screen, continue to press [→] until it is displayed again. When you are finished, press [Exit] once to return to the About menu, or twice to return to the Status display.

Input voltage and frequency?

Voltage is the first screen you see when you select About Rack. The top line of the display shows the rack number and the input frequency in hertz (Hz). The bottom line shows the input voltage for each of the three phases (A, B and C). The CEM constantly updates this information as it changes.

```

About Rack 2* 60Hz ↑↓
Va:120 b:120 c:120 →
    
```

Voltage

```

About Rack 2*      ↑↓
Start Addr: 1     →
    
```

Start address

```

About Rack 2*      ↑↓
DMX PortA: OK     →
    
```

DMX512 Port A status

```

About Rack 2*      ↑↓
DMX PortB:No Input →
    
```

DMX512 Port B status

Starting address?

Start address is the second About Rack screen. It displays the lowest dimmer number in the rack or system, depending on how the system is configured.

DMX512 input port A status?

DMX512 Port A status is the third About Rack screen. It displays status information for DMX512 input port A as explained in the following table.

DMX512 input port B status?

DMX512 Port B status is the fourth About Rack screen. It displays status information for DMX512 input port B as explained in the following table.

Message	Means
OK	Port functioning normally.
No Input	No DMX512 signal is being received, but port is enabled.
Disabled	DMX512 port is disabled at CEM.
Error	CEM has received invalid data.



Ambient temperature



Rack type

Ambient temperature?

Ambient temperature is the fifth About Rack display screen. It displays the temperature (in degrees Fahrenheit) of the air drawn into the rack by the rack's fan. If the fan is not running, ambient temperature information is not available.

Rack type?

Rack Type is the sixth About Rack display screen. It displays the type of Sensor dimmer rack in which the CEM is installed. Possible installation rack types include: SR6, SR12, SR24, SR24B, and SR48. Possible pack and touring rack types include SP6, SP12, SP24 and SP48. If the system is equipped with Advanced Features, the type will be followed by AF.

Dimmer information

Each of the six About Dimmer displays is described below. Press [About] [1], then use the number keys to select the desired dimmer number. Or, if you prefer, use [↑] and [↓] to scroll through rack numbers. (If you enter a nonexistent dimmer number, the message **No Such Dimmer** is displayed. If you enter the number of a dimmer in a rack that is disconnected from the ETCLink network, the message **No Dimmer Info** is displayed.) Press [Enter] when the desired dimmer is displayed. (Until you press [Enter], the CEM will not update the information displayed in About Dimmer screens.)

Once you have selected the desired dimmer, press [→] to move through the display screens. Depending on the size of the system, it may take up to ten seconds for the CEM to display information about dimmers in networked racks.

Note: If you wish to return to a screen, continue to press [→] until it is displayed again.

When you are finished, press [Exit] once to return to the About menu, or twice to return to the Status display.

Size and type

Size and type is the first display screen you see when you initially select a dimmer. The information displayed includes the dimmer's amperage, if it is dimmer or fluorescent load (**Dimmer** or **Fluor**), whether the dimmer is normal, enhanced or high-rise (blank, **E** or **HR**), and whether the dimmer is standard or Advanced Features (blank or **AF**).

Note: Enhanced Sensor dimmer modules feature 500µs rise time without the Advanced Features option.

Rack and slot

Rack and slot is the second About Dimmer screen. It displays where in the rack the selected dimmer is located.

Recorded load

Recorded load is the third About Dimmer screen. It displays the load at which the selected dimmer was recorded. See *Monitoring dimmer loads* on page 9 for information about working with dimmer loads.

Actual load

Actual load is the fourth About Dimmer screen. It displays the load being drawn by the selected dimmer. Load information is live and is updated as the load changes. See *Monitoring dimmer output voltages* on page 9 for information about working with dimmer loads.

Note: Because only Sensor AF systems record and sense actual dimmer output, recorded and actual loads display as "--" on standard Sensor systems.

```
About Dimmer 125* ↑ ↓
20A Dimmer HR AF →
```

Size and type

```
About Dimmer 125* ↑ ↓
Rack: 1 Slot: 1 →
```

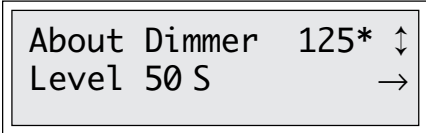
Rack and slot

```
About Dimmer 125* ↑ ↓
Rec. Load:750 W →
```

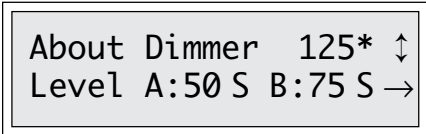
Recorded load

```
About Dimmer 125* ↑ ↓
Act. Load:750 W →
```

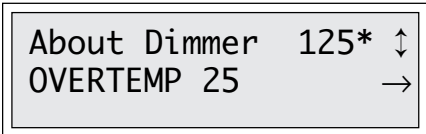
Actual load



Output level display (non-multiplexed)



Output level display (multiplexed)



Dimmer status
(In this example, dimmer 25 is shut down due to overtemperature.)

Output levels?

Level is the fifth About Dimmer screen. It displays dimmer output settings as set by the control signal.

Note: Output levels monitors the control signal, NOT the actual dimmer output!

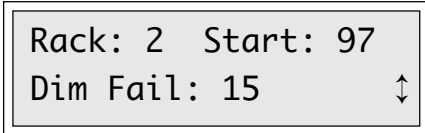
If the output level displayed is not followed by a letter, the source of the level is either the main control console or some other DMX512 source. If it is followed by the letter **S**, **B** or **P**, the level was set at the CEM. The following table explains what these letters mean.

<i>Letter after output level</i>	<i>Output source</i>
S	Dimmer output level set at CEM face panel keypad or at Hand Held
B	Dimmer output level set by backup look
P	Dimmer output level set by Panic circuit

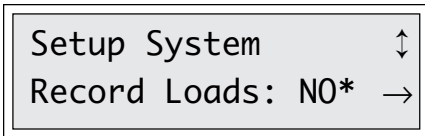
Output levels preceded by the letters **A** and **B** indicate that the dimmer currently displayed is multiplexed. An example of this is shown in the illustration to the left. In this example, dimmer 125 is multiplexed. The A output is set at 50 percent; B is set at 75 percent.

Dimmer status?

Dimmer status is the sixth About Dimmer screen. If there is a problem with the selected dimmer, the CEM displays an error message describing the problem.



Status display



Record loads

Monitoring dimmer loads

Sensor AF systems allow you to monitor the loads on the system's dimmers. This can enable you to identify burned out lamps, fixtures lamped incorrectly and fixtures that have been disconnected, among other problems. This can often isolate the source of a problem, thus helping you avoid time-consuming troubleshooting.

Note: This feature is only available on Sensor AF systems.

The first step in monitoring dimmer loads is to record the normal load range for the desired dimmers. By doing this, the CEM *memorizes* what the correct dimmer load range should be. During normal operation, if the CEM detects a discrepancy of more than 20 percent between the recorded and actual load, it displays an error message, identifying the dimmer that is the source of the problem.

You should run Record Loads anytime you relamp your fixtures, change the type of fixtures you are using, change the dimmer numbering scheme, or make any other significant changes to your system.

Note: The monitoring and recording load feature is not presently available for multiplexed dimmers.

Recording loads

When you Record Loads, the CEM records load information for dimmers you select. Select dimmers by setting their level above zero with the CEM or the main control console. Then run Record Loads.

Recording loads for multiple dimmers

Follow these steps to record loads for multiple dimmers:

1. Press [Dimmer] to access the Dimmer display.
2. Set the dimmers you want to record at a level above zero. (See page 12 for instructions on setting dimmer levels.)
3. Press [Setup] [3] [→] to access the Record Loads display screen.
4. The message **Record Loads: NO*** appears. Press [↑] [Enter] to record loads.

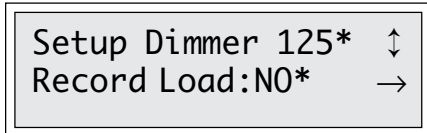
During recording, the CEM sets a maximum of 24 selected dimmers to full and gradually fades them. To record more than 24 dimmers, the CEM repeats the process.

Note: In single phase racks the CEM fades a maximum of 16 dimmers per recording cycle.

As Record Loads proceeds the LCD counts down from 100 to 1, indicating the progress of the record operation. (Press any key to stop recording.)

5. When the record is complete, press [Exit] to return to the Setup display or press [Exit] [Exit] to return to the Status display.

Note: In step 2, you may set levels at the CEM or at a console.



Record load

Recording load information for a single dimmer

If you prefer, you can record load information for a single dimmer. This can be helpful if you have changed a lamp in one fixture, but have not changed the rest of your system since the last time you recorded loads. If you record a single dimmer, you do not need to set it at a level.

Follow these steps to record loads for a single dimmer:

1. Press [Setup] [1] to access the Setup Dimmer display.
2. Press [→] twice to access the Record Load display screen.
3. Use the keypad to enter the number of the dimmer whose load you want to record, then press [Enter].
4. The message **Record Load: NO*** appears. Press [↑] [Enter] to record the load. As Record Load proceeds, the selected dimmer rises to full output, then slowly fades out. While it fades, the LCD counts down from 100 to 1, indicating the progress of the record operation.
5. When the record is complete, press [Exit] once to return to the Setup display or press [Exit] twice to return to the Status display.

Note: To disable load error messages for a single dimmer, see page 29.

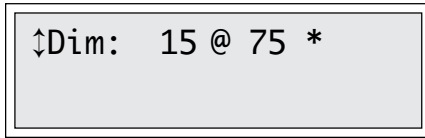
Chapter 2

Using the CEM to control dimmer outputs

During some installation, maintenance and troubleshooting procedures you will want to view and control dimmer output directly from the CEM. *Sensor* allows you to do this. In multiple rack, ETCLink systems, you may set *any* dimmer on *any* rack from *any* CEM.

*Note: Because CEM dimmer levels override **all** other sources you must clear them to restore normal control.*

Viewing dimmer levels

A rectangular box representing a dimmer display. Inside the box, the text reads "↑Dim: 15 @ 75 *".

Dimmer display

The Dimmer display shows dimmer output levels set at the CEM. For example, if the CEM sets dimmer 250 at 50 percent, the display shows: **Dim: 250 @ 50***. If a dimmer has not been set from the CEM, the display shows: **Dim: 250 NOT SET***. If the dimmer does not exist, the display shows: **Dim: 251 NO DIMMER**.

*Note: Dimmer levels set by other devices (control consoles, stage manager's panels, etc.) do not appear on the CEM's Dimmer display. For example, a control console cue might set dimmer 250 at 80 percent, but the Dimmer display will still read **Dim: 250 NOT SET***.*

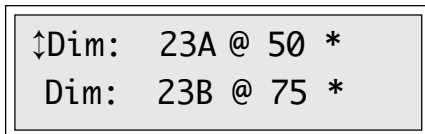
To display dimmer levels, follow these steps:

1. Press [Dimmer] to enter the Dimmer display.
2. Use the number keys to enter dimmer number.
3. Press [Enter].

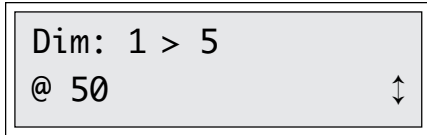
Note: Press [↑] or [↓] to scroll through dimmers.

Multiplex mode

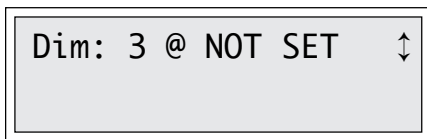
If the dimmer is operating in ETC Multiplex mode, the LCD displays two lines, one for each half of the multiplexed dimmer. An **A** or **B** is displayed after the dimmer number to distinguish between the two.

A rectangular box representing a dimmer display in multiplex mode. It contains two lines of text: "↑Dim: 23A @ 50 *" on the top line and "Dim: 23B @ 75 *" on the bottom line.

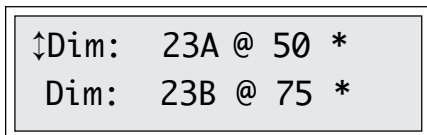
Dimmer display



Dimmer display



Dimmer display



Multiplexed Dimmer display

Setting dimmer levels at the CEM

To set dimmer levels, follow these steps:

1. Press [Dimmer] to enter the Dimmer display.
2. Use the number keys to enter dimmer number (use [Thru] to enter a range of dimmers).

Shortcut: To set dimmer output(s) to full, press [↑] after entering the dimmer number to replace [At] [1] [0] [0] [Enter]. Skip steps 3-4.

3. Press [At].
4. Use the number keys or [↑] and [↓] to select the level. Output levels increase or decrease as you change the level. Press [Enter] to set the level.

*Note: CEM dimmer levels override **all** other level inputs and must be cleared to restore normal dimmer control from stage manager's panels, consoles or other controls.*

Clearing dimmer levels set at the CEM

Clearing CEM dimmer levels returns control to the main console or other input devices. In multiple rack, ETCLink systems, any CEM can clear any dimmer on any rack.

To clear dimmer levels set at the CEM, follow these steps:

1. Press [Dimmer] to enter the Dimmer display.
2. Enter dimmer number to select dimmer (use [Thru] to enter a range of dimmers).

Shortcut: Press [↓] after you enter the dimmer number to clear dimmer (instead of [At] [Clear] [Enter]). Skip steps 3-4.

3. Press [At]. The display shows the current level of the dimmer or of the last dimmer in the range.
4. If the display shows a level, press [Clear] [Enter]

Note: Setting a dimmer level to zero holds the level at zero. It does not restore normal control. You must clear the level to restore control.

Selecting Multiplexed dimmers

In Multiplex mode, the LCD displays two lines labeled **A** and **B**, one for each half of the multiplexed dimmer. You can select either **A** or **B** before setting or clearing levels.

To select between **A** or **B**:

1. Enter the dimmer number on the numeric keypad. The LCD will display the number and flash a box.
 - To select **B** press [A/B] once.
 - To select **A** press [A/B] twice.
2. Set or clear the dimmer level in the same way as a non-multiplexed dimmer.

*Shortcut: To select a range of multiplexed dimmers, enter one dimmer number and letter, press [Thru] and enter a second dimmer number and letter. This selects all the **A** and **B** channel dimmers between the two numbers.*

Dimmer check

To check dimmers by bringing one up at a time, follow these steps:

1. Press [Dimmer] to enter the Dimmer display.
2. Set dimmer 1 at the desired level. (If you wish to start the dimmer check with a different dimmer, set that dimmer at the desired level.)
3. Press [Next]. This clears dimmer 1 and sets dimmer 2 at the same level.

Note: To skip one or more dimmers, enter the number of the next dimmer you want to check and press [Next].

4. Repeat step 3 until you have checked all your dimmers.
5. Press [At] [Clear] [Enter] to clear the level on the last checked dimmer.

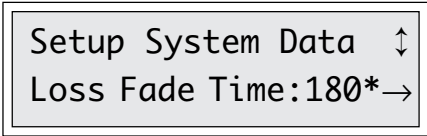
Setting data loss fade time

If Sensor loses DMX512 data from a DMX512 port, it fades all dimmers on that port to zero after a user-chosen length of time. The default setting is 180 seconds, meaning that dimmers fade to zero three minutes after data input is lost.

To adjust the number of seconds between data loss and dimmer fade, follow these steps.

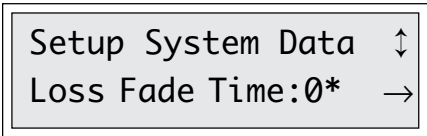
1. Press [Setup] [3].
2. Press [→] four times.
3. Use the numeric keypad to enter the number of seconds desired, from 1 to 999. Enter 0 to hold levels indefinitely after data loss.
4. Press [Enter].

Note: Changing the data loss fade time changes the value for all racks.



Setup System Data ↑
Loss Fade Time:180*→

Data loss fade time



Setup System Data ↑
Loss Fade Time:0*→

Data loss fade disabled

Chapter 3

Replacing a CEM

The procedure for replacing a CEM is different depending on whether you are working with a single, stand-alone rack or multiple racks.

Replacing a CEM in a multiple rack system

In a multiple-rack Sensor dimming system, each CEM contains complete configuration information for the entire system. Each CEM also shares recorded backup looks with the CEM above and below its ETCLink address. If you replace a CEM, you can download complete system configuration and backup data to the replacement module from one of these CEMs.

IMPORTANT: In virtually all cases, the racks in a multiple-rack Sensor dimming system are connected with ETC's ETCLink network. System configuration data is downloaded and shared through ETCLink. Without ETCLink, configuration downloading and sharing in multiple-rack systems does not work. If you are attempting to replace a CEM in a multiple-rack system that is not connected with ETCLink, contact ETC Technical Services at 800/775-4382.

“ Config Mismatch ” warning

The CEM displays this message when configuration data in a new CEM differs from the saved data in the installed CEMs.

IMPORTANT: This message means you must download configuration data to the new CEM immediately. If you run CEMs with mismatched configuration data you risk corrupting configuration data for the entire system. Follow the procedures in Loading Configuration Data on the next page to update the data in the new CEM. DO NOT attempt to manually change configuration settings on the new CEM. This will corrupt data.

Replacing a CEM in a stand-alone Sensor dimmer rack

If you need to replace a CEM in a single Sensor rack, and do not have a spare CEM on hand, you will need to order a replacement from your ETC dealer. ETC will ship your replacement CEM programmed with proper configuration data. If you do not know who your local dealer is, contact ETC at 800/688-4116.

Loading configuration data

When a Sensor system is shipped, each CEM in the system contains complete configuration data for the entire system. Therefore, you can download configuration from any CEM in the system to the new module. The rack begins dimming using the downloaded rack configuration within three seconds of starting the transfer, although complete transfer of the configuration data takes a little longer depending on the complexity of the system.

Follow these steps to load configuration data to a replacement CEM.

1. Remove the old CEM and replace it with the new unit.
2. Press [Setup] [2].
3. Press [↑] or [↓] to select a rack that contains the correct configuration data. *Note: Any CEM except the one you are replacing contains the correct data.*
4. Press [Enter]. The message **Setup Rack ETCLink Address:** appears on the LCD. Use the keypad to enter the rack number for the rack the new CEM is in.
5. Press [Enter].
6. The LCD reads **Data will be lost. Transfer? NO.** Press [↑] or [↓] to change **NO** to **YES**.
7. Press [Enter]. A series of status messages appear on the LCD as the configuration is installed in your new CEM.

Note: Backup look data for this rack is automatically updated.

Note: To disable configuration checking, see page 28.

```
Setup Rack Load  ↑↓
Config from: 4*  →
```

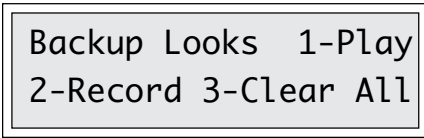
Load configuration

```
Setup Rack
EtcLink Addr: 3  ↑↓
```

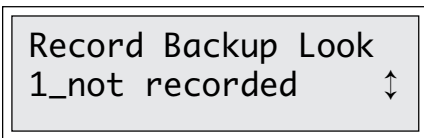
ETCLink address

Chapter 4

Backup looks



Backup menu



Record backup

Record Looks allows you to save any look on stage as a backup look in CEM memory. Once you record a backup look, you can use the CEM to bring it back up on stage at any time. The CEM allows you to save and play back as many as 32 backup looks.

Recording backup looks

You may use the main control console to create the desired stage look, then record it in the CEM, or you can use the CEM to both create and record the look. In either case, once the look is stored in the CEM, it can only be played back from the CEM or an ETCLink device.

To record a backup look, follow these steps:

1. Use the console or the CEM to create the desired look on stage. (See *Setting dimmer levels* on page 12.)
2. Press [Backup] [2]. The first unrecorded backup look number appears on the LCD.
3. Use the number keys to enter the desired backup look number and press [Enter].
4. If a backup look with that number is already recorded, the message **Overwrite? NO** appears on the LCD. Press [↑] or [↓]. The message changes to **Overwrite? YES**.
5. Press [Enter] to confirm that you want to record over the look.

Note: If you used the CEM to set the dimmer levels in the look you just recorded, you MUST also use it to clear those levels. The dimmers will remain set at those levels until you clear them.

Deleting backup looks

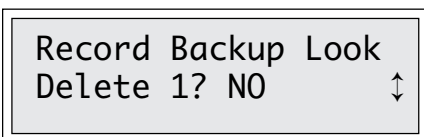
Deleting a backup look erases it from the CEM's memory. You may delete either individual or all backup looks.

Deleting a single backup look

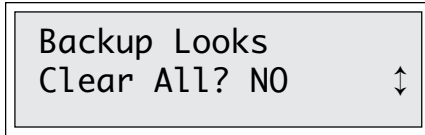
To delete a backup look, follow these steps:

1. Press [Backup] [2].
2. Use the number keys to enter the number of the desired backup look and press [Clear].
3. The message **Delete? NO** appears. Press [↑] or [↓] to change **NO** to **YES**, then press [Enter].

Note: Dimmer levels set by active backup looks remain on stage even after you delete the backup look from CEM memory. To fade out the look on stage, press [Backup] [1] [0] [Enter].



Delete backup



Clear All

Deleting all backup looks

To delete all of your backup looks, follow these steps.

1. Press [Backup] [3].
2. The LCD reads **Clear All? NO**. Press [↑] or [↓] to change **NO** to **YES**.
3. Press [Enter] to delete all backup looks from the system.

Playing backup looks

Backup looks allows you to bring up a recorded look up on stage. Only one backup look may be on stage at a time. If there is a backup look on stage when you bring up a new one, the second look replaces the first. Up and downfade times for backup looks are five seconds. After playback, the last selected backup look remains on the display.

Note: Backup looks override all dimmer levels set by other devices. A backup look forces all dimmers not set at a level to zero. Dimmer levels set by the CEM override levels set by backup looks.

Press [Backup] [1] to access the Play Backup display. The currently selected backup look number, if any, is displayed on the CEM, along with one of the following status notes:

- Active** Look is currently playing
- Recorded** Look is recorded but not playing
- Not Recorded** Look is not recorded
- Unset Look** No look is selected (0 is shown)



Play backup

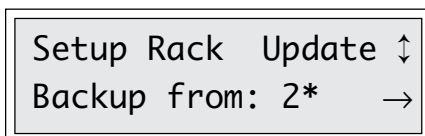
To play a recorded backup look, follow these steps:

1. Press [Backup] [1].
2. Use the number keys to enter the backup look number, or press [↑] or [↓] to select the next or previous recorded backup look.
3. Press [Enter] to play selected look.
4. Press [Next] to play the next backup look.
5. To fade out a backup look, select backup look 0, then press [Enter].

Loading backup look data

You may want to download backup looks without downloading configuration information. A CEM using ETCLink shares backup looks with the CEMs one address above and below its own. To download backup data, follow these steps:

1. Press [Setup] [2].
2. Press [→] ten times until the Update Backup screen appears.
3. Press [↑] or [↓] until desired rack number is displayed.
4. Press [Enter] to download backup looks.



Update backup

Chapter 5

Multiplex dimming

Multiplex dimming allows you to control two ETC Source Four 77 volt fixtures using one Sensor dimmer and an ETC Multiplexer. In this mode, the output of a dimmer is split into two halves labeled A and B, each of which can be controlled separately. For example, if dimmer 1 is multiplexed, it controls two outputs; 1A and 1B.

Note: Contact your ETC dealer for more information on Multiplex dimming.

Enabling Multiplex dimming

To control Source Four fixtures in Multiplex mode from a Sensor system, you must do **ALL** of the following:

- Enable the system for Multiplex dimming
- Enable the DMX512 input port that will receive multiplexed input
- Enable the specific dimmers that will operate in Multiplex mode

Note: You must enable Multiplex mode at all three levels for multiplexing to function properly. Call ETC Technical Services if you have any questions about setting up or using multiplexing.

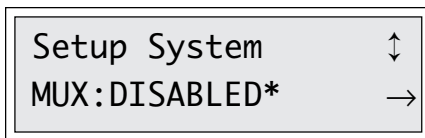
Follow these steps to use dimmers in Multiplex dimming mode:

Enable system for Multiplex operation

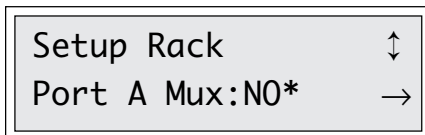
1. Press [Setup] [3] [→] [→].
2. If the message **MUX: ENABLED*** appears, go to step 3; if the message **MUX: DISABLED*** appears press [↑] [Enter].
3. Press [Exit] twice to return to the Status display.

Enable input port for Multiplex operation

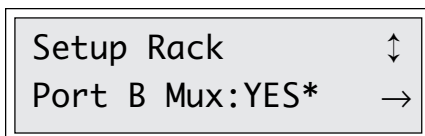
1. Press [Setup] [2].
2. Press [→] three times (until the Port A Multiplex screen appears) to set DMX512 input port A for Multiplex operation.
Or...
Press [→] six times (until the Port B Multiplex screen appears) to set DMX512 input port B for Multiplex operation. Only ports containing multiplexed dimmers need to be enabled.
3. If the message **Port A (B) MUX: YES** appears, go to step 4; if the message **Port A (B) MUX: NO** appears press [↑] [Enter].
4. Press [Exit] twice.



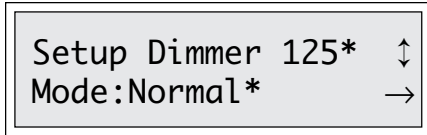
Multiplex mode



Port A Multiplex



Port B Multiplex



Dimmer firing mode

Enable dimmer for Multiplex operation

1. Press [Setup] [1].
2. Use the number keys to enter the number of the dimmer you want to put in Multiplex mode. Press [Enter].
3. Press [↑] or [↓] to select Multiplex mode, then press [Enter].
4. Press [Exit] once to return to the Setup display screen, or twice to return to the Status display.

Chapter 6

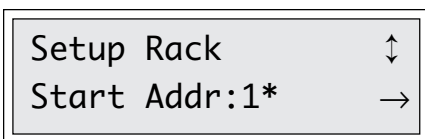
Configuring a CEM



Setup display



ETCLink address



Start address

The CEMs in Sensor dimming systems are factory-programmed to customer specifications. Some of these settings may be changed. This section will explain how to change the factory configuration.

*Caution: When a CEM displays **Config Mismatch**, changing settings may corrupt configuration data on all linked CEMs. Refer to “Loading configuration data” on page 16 for instructions on updating CEM configuration data. If you have other concerns or questions about reprogramming the system, please contact ETC Technical Services.*

The CEM’s eight Setup Rack display screens allow you to change the ETCLink address (rack number) and input port settings for the rack in which the CEM is located.

Setting ETCLink address

Racks must always be numbered, even when there is only one. In a single rack system, the rack is assigned the number 1. In multiple rack systems, the first rack is number 1 and additional racks are numbered consecutively. If you move a CEM to a new rack, you need to change the rack number in the CEM to match the new rack. The CEM can then access the new rack’s configuration and backup look information.

Follow these steps to set the rack number:

1. Press [Setup] [2]
2. Press [→], then use the keypad to enter the desired start address.
3. Press [Exit] twice.

Note: For multi-rack systems, backup look data is automatically updated.

Setting start address

Start addresses may be any number between 1 and 8,192. The starting address is the lowest dimmer number in the rack. Contact ETC Technical Services at 800/688-4116 if you have questions about your system’s start address numbering.

Follow these steps to change the rack start address:

1. Press [Setup] [2]
2. Press [→] twice, then use the keypad to enter the desired start address.
3. Press [Enter] [Reset].

Setting starting and ending addresses for DMX512 input ports

Control devices communicate to the CEM using the DMX512 standard. DMX512 employs 512 control levels on a single cable, which can control 512 different dimmers.

CEMs have two DMX512 input ports, **A** and **B**. Each port is assigned a DMX512 starting address which can be any number between 0 and 8,192.

Note: Set the input port starting address to zero to disable the port.

Each input port also has an ending address. The ending address defaults to the starting address number plus 511, creating a range of 512 addresses for that input port. You can manually reset the ending address to a lower number within this range, which excludes some DMX512 control levels.

If you reset a starting address to a number higher than the existing ending address or more than 511 lower, the CEM resets the ending address to the default value (or 8,192, whichever is lower).

Multiplexed ports work the same way, but since multiplexing uses two DMX512 channels per dimmer, offset numbers are divided by two. A multiplexed ending address would default to a number 255 higher than the starting address.

Input ports can be set with overlapping or even identical DMX512 addresses. This creates double control levels for some or all dimmer circuits. The CEM resolves doubled control levels by sending only the higher level to the dimmer.

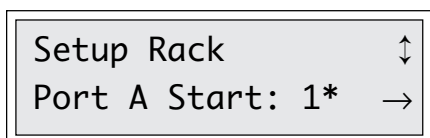
Follow these steps to set starting and ending numbers for an input port.

1. Press [Setup] [2].
2. Press [→] four times, until the Port A Starting Address screen appears, then use the keypad to enter the starting dimmer number for port A.

Or...

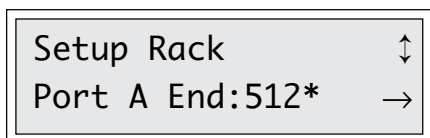
Press [→] seven times, until the Port B Starting Address screen appears, then use the keypad to enter the starting dimmer number for port B.

3. Press [Enter].
4. Press [→] then use the keypad to enter the ending dimmer number for that input port.
5. Press [Enter].



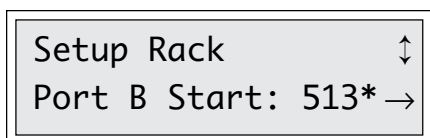
Setup Rack ↑↓
Port A Start: 1* →

Port A starting address



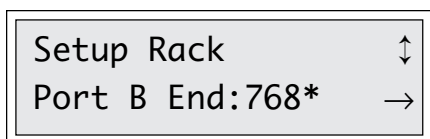
Setup Rack ↑↓
Port A End: 512* →

Port A ending address



Setup Rack ↑↓
Port B Start: 513* →

Port B starting address



Setup Rack ↑↓
Port B End: 768* →

Port B ending address

Multiplex Mode

Dimmer configuration

The CEM allows you to set the firing mode and boost value of individual dimmers. Firing mode determines how the dimmer interprets the control signal it receives. Boost value lets you control the actual voltage output of the dimmer, allowing you to fine-tune output levels.

Setting dimmer firing mode

Sensor's dimmer firing mode options allow you to select from three firing modes. You may also turn the dimmer off.

A dimmer in **Normal** mode controls a single output, providing control levels from zero to 100 percent.

A dimmer in **Multiplex** mode is split into two halves. The output level of each half can be controlled separately by ETC control consoles with appropriate software.

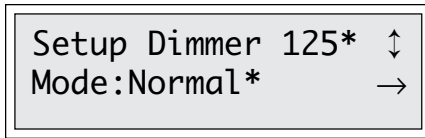
Note: The dimmer, the input port that receives the DMX512 control signal AND the Sensor system must each be configured for Multiplex mode. See page 19 for complete information on configuring your rack for Multiplex dimming.

A dimmer in **Switched** mode does not have an output curve. It changes from off directly to maximum output as soon as the control signal reaches a user-specified level; it does not fade. A switched dimmer's output is unregulated, therefore its output voltage is equal to its input voltage.

A dimmer that is **Off** does not generate output.

Follow these steps to set a dimmer's firing mode.

1. Press [Setup] [1].
2. Use the keypad to enter the dimmer to change. Press [Enter].
3. Press [↑] or [↓] until the appropriate firing mode appears on the display.
4. Press [Enter].
5. Press [Exit] twice.



Dimmer firing mode

Setting dimmer boost value

Boost value allows you to set the percentage of standard voltage the dimmer can use. For a normal dimmer, standard voltage is 120V. For a multiplexed dimmer, standard voltage is 77V. Since the *Sensor* rack can accept voltages up to 140V, boost allows you to set dimmers with a boost value from 0 to 117 percent of standard. This allows you to adjust dimmers to account for differing cable lengths or lower "full" voltage to lengthen lamp life.

The Boost display also allows you to select the level at which a switched dimmer turns on. If a dimmer is switched, the Boost display reads **Level** instead of **Boost** and indicates the current switch level. Enter the level you desire (0-100) and press [Enter]. If you set the level to zero, the dimmer remains on all the time.

Follow these steps to set boost or switch level.

1. Press [Setup] [1].
2. Press [→].
3. Use the keypad to enter the dimmer to change. Press [Enter].
4. Use the keypad or [↑] or [↓] to enter the boost percentage for the dimmer. If you use the arrow keys, the boost will change as you press them. Hold keys down to auto-scroll.

Or...

If the dimmer is switched, use the keypad to enter the level (0-100) at which the dimmer turns on.

5. Press [Enter].
6. Press [Exit] twice.

```
Setup Dimmer 125*  ↑↓
Boost:100*         →
```

Boost value

```
Setup Dimmer 126*  ↑↓
Level: 80*         →
```

Switch level

Appendix A

CEM displays

The CEM's backlit LCD provides you with important information about the status and configuration of your system. There are five display modes, each of which contains display screens that provide you with system status information and allow you to enter configuration information. The backlight dims if no entries are made.

Some display modes contain series of display screens. To move from one CEM display screen to the next in the series, press [→]. You cannot move backwards through the displays. To return to a previous display screen, press [←] until the desired screen reappears.

Status display

The Status display is the default CEM display. It shows rack and dimmer status and error information. If no buttons are pressed for five minutes, the LCD always reverts to Status display. Press [Exit] twice from any display screen to return to the Status display.

The first line of the Status display provides the rack number (also called the ETCLink address) and the starting dimmer number for the rack. The second line of the Status display indicates rack or system errors.

Dimmer display

The Dimmer display shows dimmer output levels set at the CEM. For example, if you have set dimmer 25 at 50 percent, the display reads: **Dim: 25 @ 50***. If the dimmer you select is multiplexed, both A and B outputs are displayed. The A output is displayed on the first line, the B output on the second. The Dimmer display also tells you if the dimmer you select is not set at a level. For example, if you select dimmer 25 and it is not set at a level, the display reads: **Dim: 25 NOT SET***.

About display

The Sensor CEM's About display provides information about Sensor dimmers and racks, as well as overall system information. You cannot make changes from the About display; it provides information only. Use the Setup display to make changes.

Backup display

The CEM allows you to save and play back as many as 32 stage looks. You may use the main control console to create the desired stage look, or set dimmer levels at the CEM. Once the look, known as a backup look, is stored in the CEM, it can be played back from the CEM, the Sensor Hand Held or the Sensor Backup Station.

Setup display

In most cases, the CEM is factory-programmed, but in some cases you may need to make changes in its configuration. Setup allows you to change dimmer firing mode, rack address information and input mode configuration, as well as enable or disable Multiplex dimming.

Note: The Unison Setup menu in the setup display is for CEMs with the Unison Architectural Processor. This menu does not function on standard Sensor CEMs and can be ignored.

Appendix B

LCD error messages

Standard error messages

The status and error messages listed below may appear on the Status display.

<i>Message</i>	<i>Condition</i>	<i>Possible action</i>
AMBIENT OVERTEMP	Ambient temperature higher than 114°F.	Adjust dimmer room temperature.
AMBIENT TEMP HIGH	Ambient temperature higher than 104°F.	Adjust dimmer room temperature.
AMBIENT TEMP LOW	Ambient temperature lower than 32°F.	Adjust dimmer room temperature.
BACKUP MISMATCH	Backup look error	Transfer correct backup look data from another rack, or update to current looks.
CONFIG MISMATCH *	Configuration error	Transfer correct configuration data from another rack.
DIMMER ERROR	A dimmer in this rack has an error.	Use About Dimmers to check the specific error. See next page.
DATA ERROR PORT (A,B) **	Data transfer error on DMX512 port.	Check DMX512 port input cable and connector.
DIMMER OVERTEMP	One or more dimmers are overheated.	Check fans, intake and exhaust for obstructions or adjust dimmer room temperature.
ETLINK FAILED	ETLink interface enabled but not responding.	Check all ETLink cable and connectors.
FREQUENCY ERR	Feed power frequency is not 50±1 Hz or 60±1 Hz.	Check input frequency.
NO AIRFLOW	Insufficient airflow detected.	Check fans; check intake and exhaust for obstructions.
NO DATA PORT (A,B)	DMX512 port enabled, but no data received.	Confirm that DMX512 source device is turned on; check DMX512 port input cable and connector.
OVERTEMP #	Dimmer has overheated, shut down.	Press [Clear] to reset dimmer. If problem repeats, check airflow or replace dimmer module.
PHASE (A,B,C) ERROR	Phase voltage below 90V or above 140V.	Check line feed
PHASE (A,B,C) OFF	All dimmers on phase off due to voltage error.	Check line feed
PHASE DETECT FAIL	CEM couldn't read phasing of incoming feed.	Replace CEM or check input power service.
PROCESSOR FAIL	CEM input/output processor not responding.	Replace CEM.
SYSTEM ERROR	System configuration data wrong or corrupted.	Replace CEM or check setup configuration.
TEMP SENSOR STUCK	Ambient temperature sensor is stuck.	Replace CEM.
ZERO CROSSING ERR	CEM hardware failure.	Replace CEM.

Note: # indicates that the number of the affected dimmer appears here.

* This message may be disabled. See page 28 for details.

** This error does not cause the beacon to flash.

AF error messages

The status and error messages listed below may appear on the Status display of Sensor AF systems.

<i>Message</i>	<i>Condition</i>	<i>Possible action</i>
DC OUTPUT #	DC component sent to load on dimmer.	Check devices on dimmer.
DIM FAIL #	Control signal sent to dimmer; no output detected.	Check dimmer's circuit breaker. Replace power cube (SCR).
*LOAD CHANGE #	Load has changed from recorded load.	Correct load or re-record.
MOD. REMOVED #	Dimmer removed from rack.	Reinstall dimmer module.
*NO LOAD DIM #	Dimmer on, but no load on line.	Replace lamp.
SCR FAIL #	SCR stuck on or off, or output stuck on.	Replace power cube (SCR).

Note: # indicates that the number of the affected dimmer appears here.

*These messages may be disabled and do not cause the beacon to flash. See Appendix C for details.

Appendix C

Disabling error messages

Some of the CEM's LCD error messages can be disabled.

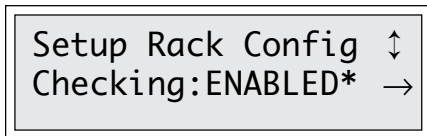
Disabling configuration checking (CONFIG MISMATCH)

In some cases you may want to disable Sensor's configuration checking. This can be helpful if you are using rental dimmer racks to supplement your system and don't want to reconfigure your entire system to accommodate the additional equipment. In some cases it may be easier to simply turn off configuration checking for the rented rack. Doing so will prevent the beacon from flashing and prevent the **CONFIG MISMATCH** message from appearing on the LCD.

Follow these steps to disable configuration checking for rack :

1. Press [Setup] [2].
2. Press [→] nine times, until the Setup Rack Config Checking screen appears.
3. Press [↑] until **DISABLED** appears
4. Press [Enter].

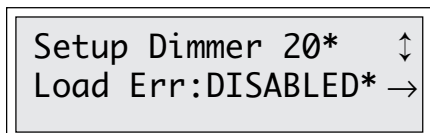
*Note: To enable configuration checking, select **ENABLED** in step 3.*



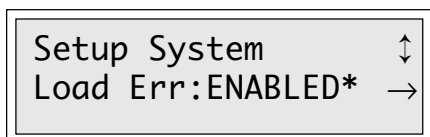
Setup Rack Config Checking

Disabling load error messages (LOAD CHANGE or NO LOAD DIM)

On Advanced Features (AF) systems, any changes you make that affect dimmer loads will cause the **LOAD CHANGE** or **NO LOAD DIM** error messages to appear on the CEM LCD. This can be annoying if you are rehangng a show or relamping fixtures. To avoid getting these error messages, you can disable these messages either for individual dimmers or for your entire Sensor system.



Setup Dimmer Load Error



Setup System Load Error

Single dimmer

Follow these steps to enable or disable the Load error messages for one dimmer:

1. Press [Setup] [1].
2. Press [→] three times, until the Setup Dimmer Load Error screen appears, then use the keypad to enter the desired dimmer number.
3. Press [Enter].
4. Use [↑] or [↓] to select **ENABLED** or **DISABLED** and press [Enter].

Note: This will erase the recorded load, if any, for this dimmer.

All dimmers

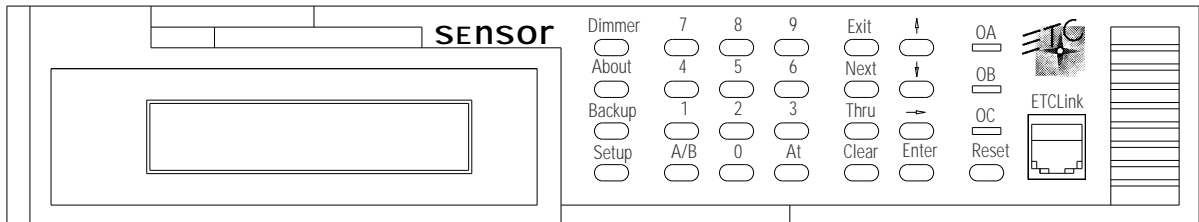
Follow these steps to enable or disable the Load error messages for all dimmers in your system:

1. Press [Setup] [3].
2. Press [→] three times, until the Setup System Load Error screen appears.
3. Use [↑] or [↓] to select **ENABLED** or **DISABLED** and press [Enter].

Appendix D

CEM face panel controls

Sensor dimming control systems provide information and control through the Sensor Control Electronics Module (CEM). The CEM includes a control panel for user input, and an LCD screen for information display.



Dimmer, Backup, About, and Setup

Press [Dimmer], [Backup], [About], and [Setup] to enter the corresponding display.

0 through 9

Press number keys to select menu options, dimmers, levels, backup looks, and attributes.

A/B

Press [A/B] to select the **A** or **B** half of a multiplexed dimmer.

At

Press [At] and then the number keys to enter a level setting.

Exit

Press [Exit] once to return to the current display's first screen.
Press [Exit] twice to return to the Status display.

Next

Press [Next] in Dimmer or Backup display to deselect the current selection and automatically select the next available item (either dimmer or backup look).

Thru

Press [Thru] between the first and last dimmer numbers in a range to select that range of dimmers.

Clear

Press [Clear] to clear the current entry field.

↑ and ↓

Press the arrow keys to change the entry in the edited field. Number entries increase or decrease, and list entries go through all possible legal entries. The display shows ↑ or ↓ when one key is active, or ↓↑ when both keys are active.

→

Press the right arrow to leave one screen and advance to the next. The screen shows → when this key is active.

Enter

Press [Enter] to complete whatever change you have input. * appears at the end of the line to confirm entry. If the screen has multiple entry fields, [Enter] switches between them.

Sensor CEM menu structure

Version 2.14

