# sensor CE

## Sensor CE Dimming System

# User/Service Manual

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# Introduction

Welcome to the User Manual for the Sensor CE dimming system. This manual contains operating instructions for Sensor CE dimming systems, including the three installation racks: the 24-slot ESR24, the 36-slot ESR36, and the 48-slot ESR48.

## How to use this manual

### Manual organization

This manual has separate sections to tell you how to use, maintain and trouble shoot your Sensor CE dimming system:

- *System components* on page 6 details the main parts of a Sensor CE system
- *Sensor CE dimming overview* on page 8 provides descriptions of Sensor dimming functions
- *Sensor CE dimming system features* on page 12 describes features in your Sensor system that enhance system usability
- *Operation* on page 15, gives step-by-step operating instructions
- *Glossary* on page 50 contain technical specifications
- *Glossary* on page 50 defines technical terms used in this document
- *Service* on page 41 tells you how to maintain and service your system and how to contact ETC to get technical assistance
-

### Warnings and notice conventions

These symbols alert you to danger or important information:

***Warning!*** Warns you when electricity may cause injury

***Warning!*** Warns you when there is a possibility of other types of injury

***Caution*** Alerts you to important information relating to equipment performance or reliability

### Contacting ETC

For questions about Sensor CE systems, contact:

ETC Europe
5 Victoria Industrial Estate, Victoria Road
London, W3 6UU, United Kingdom
Tel: +44 (0)20 8896 1000 Fax: +44 (0)20 8896 2000
mail@etceurope.com

# System components

## Installation Racks

The dimmer rack contains your dimmer modules, Control Electronics Module (CEM) and associated electrical connections. The rack enclosure protects dimming components with a key locking door. The door contains the air filter and should not be left open during operation.

There are three sizes of Sensor CE Installation Racks.

- The ESR 24 rack has 24 dimmer slots and dual CEM slots
- The ESR 36 rack has 36 dimmer slots and dual CEM slots
- The ESR 48 rack has 48 dimmer slots and dual CEM slots

There are also several configuration options available for Sensor CE Installation racks:

- Advanced Features (AF) dimmer reporting
- Redundant tracking CEMs
- Neutral Disconnect (ND) busing

For specific information on rack configuration options, see *Sensor CE dimming system features* on page 12.

***Warning!*** ***Do not operate Sensor dimming systems with empty module slots. Open slots expose dangerous voltages on interior power bus bars and interfere with rack ventilation, causing rack overheating.***

## The Sensor Control Electronics Module

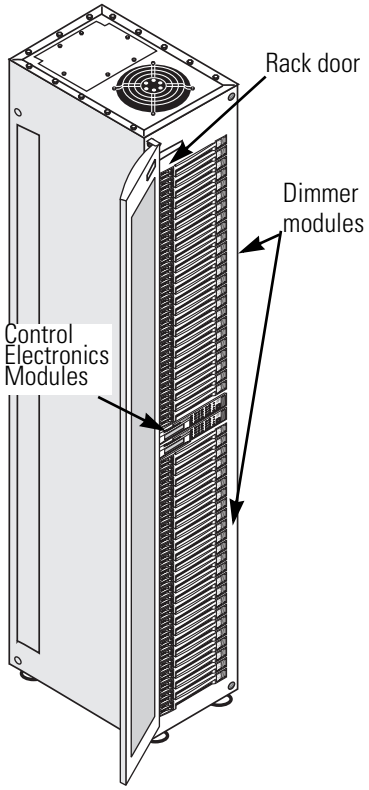



*Figure 1: Sensor CE ESR48 rack components*

Sensor systems designed for the technical specification of the Common Europe market require installation of the European Control Electronics Module (ECEM) in installation rack's Control Electronics Module (CEM) slot(s). For brevity, the European Control Electronics Module is referred to as a Control Electronics Module (CEM) in this manual.

The Control Electronics Module (CEM) is required for Sensor systems. The CEM sets dimmer levels, monitors system status and enters changes to system configuration settings. A Sensor dimming system will not function without a properly installed CEM.

Dual-slot dimmer racks do not require two CEMs to operate. If desired, the lower slot can be filled with a Electronic Filler Module (EFM).

There are four different CEM models available for Sensor CE systems:

- The ECEM-48 controls up to 48 channels using 240 volt power
- The ECEM-96 controls up to 96 channels using 240 volt power

All CEMs have two DMX512 input ports, port A and port B. You can use them individually or make them work together.

### CEM location varies by cabinet type.

- An ESR24 rack has one CEM slot on the bottom of the rack
- An ESR36 rack has two CEM slots 12 slots from the top of the rack
- An ESR48 rack has two CEM slots 24 slots from the top of the rack

# Sensor dimmer modules

Sensor dimmer modules are installed into rack slots. Modules may hold one or two dimmers (single or dual density), depending on current rating and rise time. All dimmer modules are protected by circuit breakers.

Sensor CE dimmer modules are available with 15, 25 or 50 amp dimmers in a variety of configuration types to support Sensor CE dimming options:

### 3kW dimmer modules

- **ECC15** – constant current modules
- **ED15** – dual 3 kW dimmers with 225 µS risetimes
- **ED15AF** – dual 3 kW AF dimmers with 400 µS risetimes
- **ED15N** – dual 3 kW ND dimmers with 225 µS risetimes
- **ER15AF** – relay modules
- **ED15AFN** – dual 3 kW ND AF dimmers with 400 µS risetimes
- **ED15AFR** – dual 3 kW ND/RCD AF dimmers with 400 µS risetimes

### 5kW dimmer modules

- **ECC25** – constant current modules
- **ED25** – dual 5 kW dimmers with 225 µS risetimes
- **ED25AF** – dual 5 kW AF dimmers with 350 µS risetimes
- **ER25AF** – relay modules
- **ED25N** – dual 5 kW ND dimmers with 350 µS risetimes
- **ED25AFN** – dual 5 kW ND AF dimmers with 350 µS risetimes
- **ED25AFR** – dual 5 kW ND/RCD AF dimmers with 350 µS risetimes
- **ED25HRR** –single 5 kW ND/RCD AF dimmer with 650 µS risetime
- **ED25HR** – single 5 kW AF dimmer with 650 µS risetime

### 10kW dimmer modules

- **ED50AF** – single 10 kW AF dimmer with 350 µS risetimes
- **ED50AFR** – single 10 kW ND/RCD AF dimmer with 350 µS risetime

Unused dimmer slots are filled by Airflow (AFM) modules to cover internal wire connections and maintain proper internal air circulation.

Modules with the **AF** suffix support the Advanced Features (AF) dimmer reporting in dimmer racks with the AF option installed.

Modules with the **HR** suffix are high rise time AF modules.

Modules with the **N** suffix are Neutral Disconnect (ND) modules. They can only be used in racks with the Neutral Disconnect option.

Modules with the **R** suffix are ND modules equipped with Residual Current Device (RCD) circuit breakers (30 mA). These modules also require ND equipped racks.

Dimmer modules should only be removed by qualified personnel, and must be replaced by modules of the same type, or with airflow modules, before restoring system power.

***Warning!*** ***Do not operate Sensor dimming systems with empty module slots. Open slots expose dangerous voltages on interior power bus bars and interfere with rack ventilation, causing rack overheating.***

# Sensor CE dimming overview

A Sensor CE dimming system controls lighting using DMX512 control levels from a lighting control system (usually a lighting console or architectural controller).

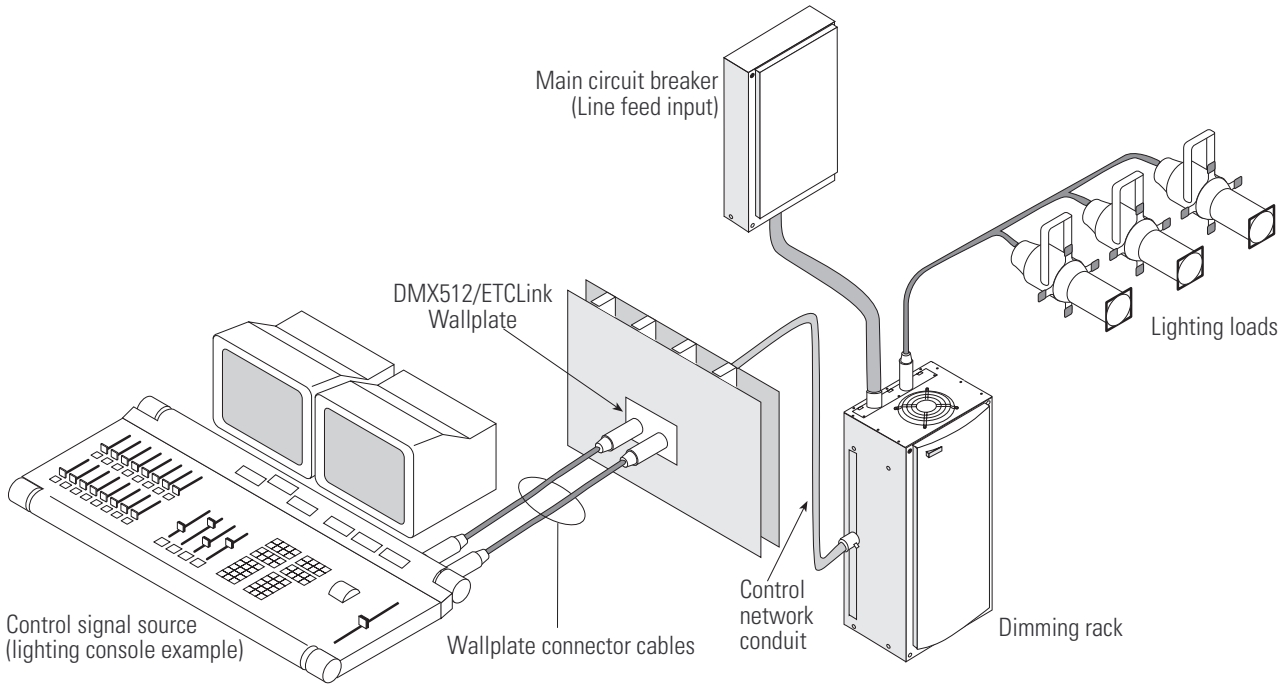



*Figure 2: A typical CEM lighting system*

## How Sensor CE uses DMX512 signals

DMX512 is the standard digital signal used in lighting control. DMX signals are normally generated by a lighting console and transmitted to the dimmer rack by a DMX data network.

Each DMX512 signal contains up to 512 separate channels, each containing a single output level. The Control Electronics Module (CEM) matches DMX channel levels to the correct dimmer.

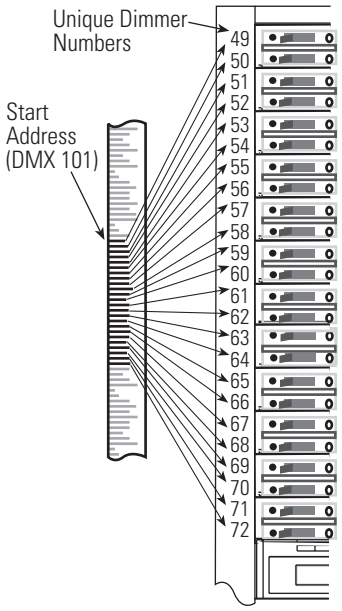



*Figure 3: Applying DMX channels to dimmers*

### Applying DMX channels to individual dimmers

Each dimmer in a Sensor CE system is identified by a Unique Dimmer Number (UD#) between 1 and 8192. UD#s are assigned according to dimmer position and rack address. See *Unique Dimmer Numbers (UD#s)* on page 9 for details.

To apply DMX levels to dimmers, the CEM matches a DMX channel to each dimmer's UD#, starting with the Start Address (the first DMX channel used in the rack). For example, if the Start Address is 101, and the first UD# in the rack is 49, the CEM sends the level from channel 101 to dimmer 49, channel 102 to dimmer 50, etc., until all dimmer levels are set.

***Note:*** *For specific information on setting DMX starting addresses and configuring DMX inputs, see DMX addressing modes on page 10.*

# Unique Dimmer Numbers (UD#s)

Unique Dimmer Numbers identify each dimmer in a Sensor CE system individually (up to 8192 dimmers per system). UD#s are assigned by the Control Electronics Module (CEM) according to rack address and dimmer position.

The lowest UD# for each rack is the First Unique Dimmer Number (shown on the CEM status display as **1st UD#**). By default, the dimmer in a rack's top slot is assigned the 1st UD#.

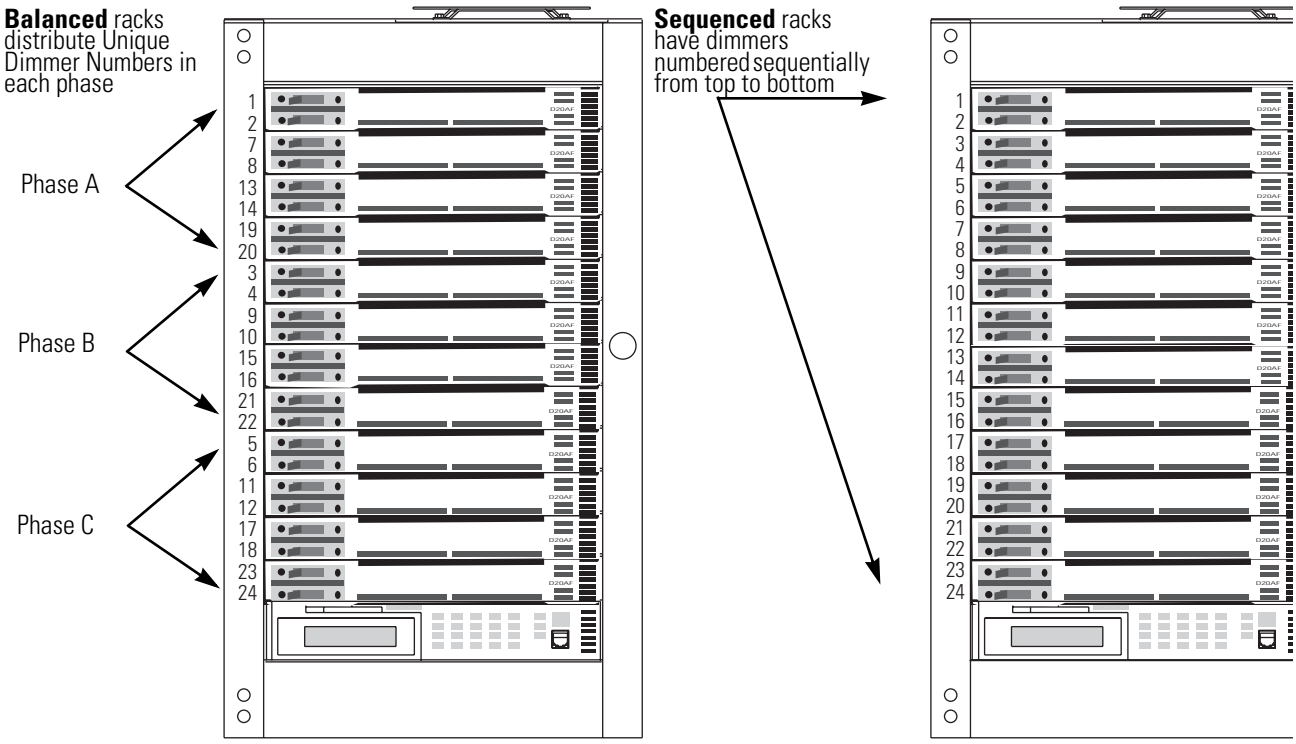



*Figure 4: Balanced and sequenced dimmer numbering*

In "balanced" racks, the numbers are distributed on each electrical phase. In "sequenced" racks, dimmers are numbered sequentially from top to bottom.

When dimmers are balanced, DMX channels are still applied in order of the UD#. This causes DMX channel assignments to skip down through the dimmers in the rack.

In systems with multiple dimmer racks, each rack is assigned an ETCLink address. This rack address determines the UD#s assigned to dimmers in each rack. For example, in a system with three 24-dimmer racks, rack number one would hold dimmers 1 through 24, rack two would have dimmers 25 through 48 and rack three would have dimmers 49 through 72.

Rack addresses and dimmer distribution are set at the factory before racks are shipped and dimmer slots are numbered with one or two UD# labels.

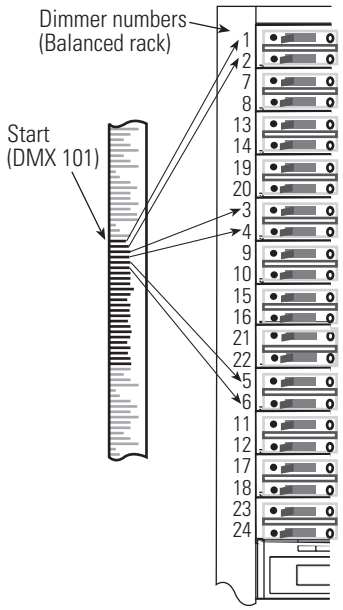



*Figure 5: Applying DMX in a balanced dimmer rack*

# DMX addressing modes

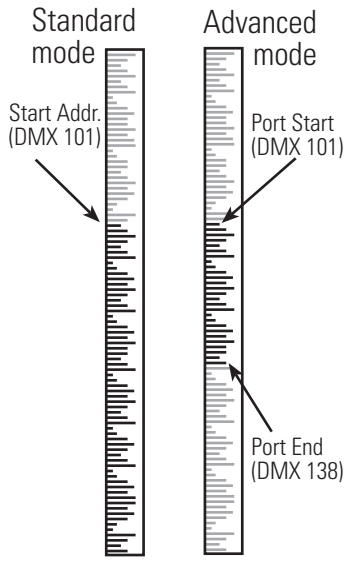



*Figure 6: Standard and Advanced DMX addressing*

The Control Electronics Module (CEM) DMX address settings select the desired range of DMX channels. DMX addressing also controls input from both of the CEMs DMX input ports, A and B. Sensor CE systems can use either Standard or Advanced DMX addressing mode.

**Standard Mode** uses a Start Address to set the first DMX512 channel number used. Beginning with the Start address, the CEM applies one DMX channel per Unique Dimmer Number (UD#) until all the dimmers in the rack have levels.

**Advanced Mode** has a Start and End address for each DMX port. Only DMX channel levels between the Start and End addresses are used. Each DMX port can control a separate dimmer set using the First Dimmer Affected setting.

Advanced mode also enables you to set priority levels for input ports and backup looks. See *Advanced DMX addressing mode* on page 11 for details.

## Standard DMX addressing mode

Standard mode is the normal DMX512 addressing method. For systems that use one source of lighting signals at a time, or apply multiple control signals to the same set of dimmers, Standard mode is usually the best choice.

Standard mode allows you to enable both DMX512 port A and port B together, or to disable one or both as needed. Both ports share a single Start Address you set and apply their control channels by UD#, starting with the racks First Unique Dimmer number (1st UD#).

If both ports are sending levels at the same time, the system applies the highest level from each port on a channel-by-channel basis (Pile-on mode).

Channel levels from Backup looks have higher priority than input from either DMX port. However, Backup look channels recorded with "unset" levels continue to respond to DMX input. See *Backup looks for specific dimmers* on page 12 for details.

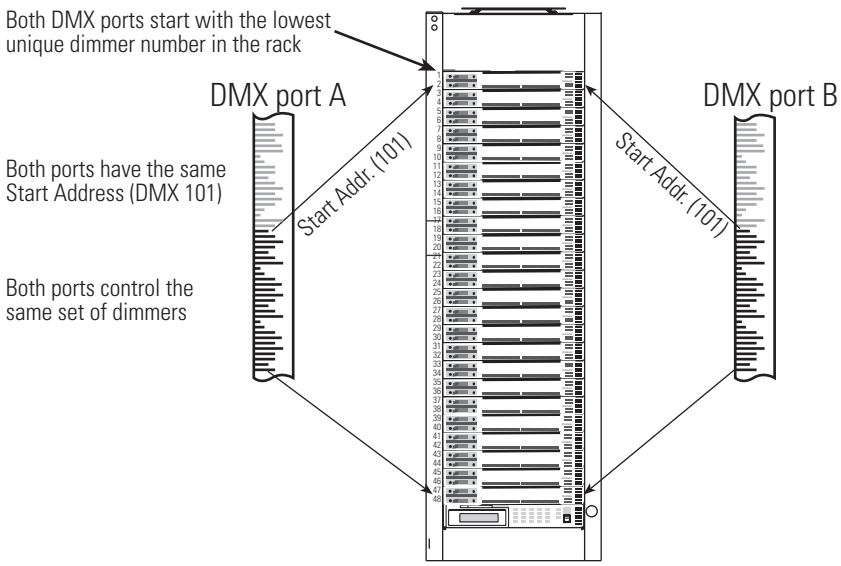



*Figure 7: Standard DMX512 addressing mode*

***Note:*** *See Setting up a rack in Standard mode on page 29* *for step by step programming instructions.*

## Advanced DMX addressing mode

Advanced mode enables complex lighting control systems to use multiple control sources with overlapping or split dimmer assignments.

### DMX512 port start and end addresses and First Dimmer Affected numbers

In Advanced mode you can set separate DMX start and end addresses for port A and B. You also set separate First Dimmer Affected numbers for each input port. These settings allow you to apply a specific portion of each DMX port's 512 channels to a specific set of dimmers in a rack. Each port can control a separate set of dimmers, or overlap dimmer control assignments.

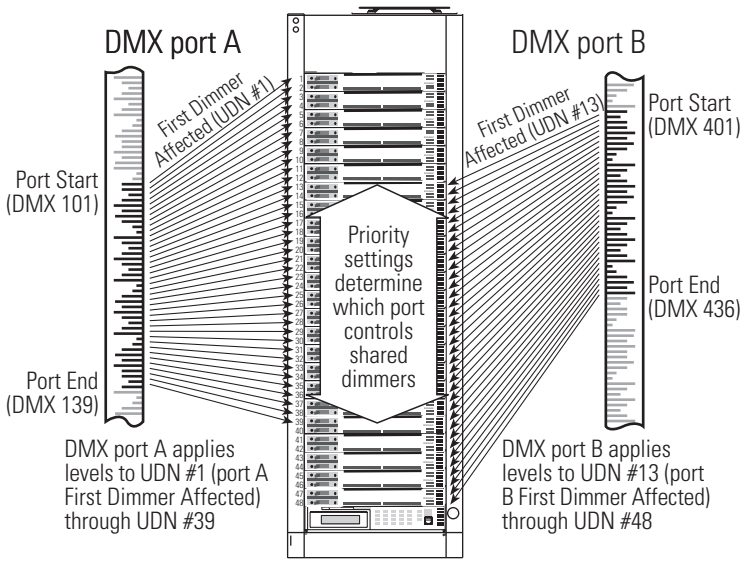



*Figure 8: Advanced DMX port addressing modes*

### Using input priorities

***Note:*** *Levels from Panic circuit activation or direct dimmer input from the CEM or other ETCLink devices override levels from DMX and Backup looks. DMX port and Backup look priority settings have no effect on the built-in override priority of Panic circuit or direct dimmer level input.*

When both ports are sending levels to the same dimmers, control is decided by port priorities set in the Setup Rack submenu. Input priorities can be applied to DMX input ports A and B, and to Backup looks. There are four levels of Input priority:

- **High** priority channel levels are used first. **High** priority levels disable levels from **Low** or **Pile-on** priority inputs.
- **Pile-on** priority signals are used if there are no **High** priority control signals present. **Pile-on** priority disables **Low** priority signals. When signals from multiple **Pile-on** priority sources are present, the highest level takes control on a channel by channel basis.
- **Low** priority levels are used if no **High** or **Pile-on** priority control signals are present.
- **Off** shuts off input from DMX input ports. **Off** is not used for Backup looks.

***Note:*** ***High*** *and* ***Low*** *priority can only be assigned to a single input source. If one of these priorities is assigned to a second input, the first input will be reset to* ***Pile-on*** *priority.*

***Note:*** *See Setting up a rack in Advanced mode on page 32 for step by step programming instructions for Advanced mode.*

# Sensor CE dimming system features

The Sensor CE dimming system features improve set up and operation

- Smart Menus only display settings used by your system
- Set direct dimmer levels at the Control Electronics Module (CEM)
- 32 Backup looks controlled by dimmer rack electronics
- Built-in Panic circuit configuration
- ETCLink allows remote system monitoring and configuration
- Advanced Features provides individual dimmer circuit data
- Any-phase power keeps the system working until all power phases fail
- Redundant tracking CEMs provide the highest reliability possible
- Neutral Disconnect (ND) modules (require an ND rack)
- Residual Current Device (RCD) modules (require an ND rack)

## Smart Menus

Smart Menus simplify navigating all CEM menus by suppressing display of unneeded configuration windows. When a feature is disabled, Smart Menus will skip its setting window(s). If the feature is activated, its window(s) reappear. This reduces the complexity of the menu structure, because you only see the windows needed for your system.

*Table 1: Smart Menus affected windows*

| Feature | Menu location |
|---|---|
| Advanced features | Setup Rack menu |
| ETCLink menus | Multi-rack systems only |
| DMX512 start address | Setup rack (Standard mode only) |

## Set direct dimmer levels from the CEM

You can set levels directly for any dimmer in the system with the CEM display and keypad. You can use direct levels to light an area as a temporary substitute for your main control system, to test new lighting loads or dimmer installations, or to set Backup looks or Panic circuits. See *Setting direct dimmer levels* on page 16 for details.

***Caution*** ***Direct dimmer levels disable DMX512 and Backup control level inputs from your normal lighting control system. Only Panic circuit activation overrides direct levels.***

## Backup looks

You can record and activate up to 32 Backup looks using the CEM Backup menu. Backup looks can be used as a temporary substitute for your main control system, or for static lighting control during area setups or construction. Backup looks can also function as a cost-effective architectural control system, house lighting controller, or stage manager backup. See *Controlling Backup looks* on page 23 for details

### Backup looks for specific dimmers

You can record Backup looks that only affect selected dimmers. Setting levels directly at the CEM enables you to give dimmers an “unset” level. Unset dimmers are not affected by the Backup look and continue to respond to DMX control levels sent by your facility lighting control system. See *Using direct dimmer levels with Backup looks* on page 17 for details.

# Adding dimmers in a Panic circuit

If your system includes an external Panic circuit, you can easily create a set of dimmers which will drive to full when the circuit is activated. See *Assigning dimmers to the Panic circuit* on page 25 for details.

***Note:*** *Panic activation only affects dimmers included in the panic set. Other dimmers not included in the set continue to dim normally.*

***Caution*** ***Panic activation automatically drives the output levels of the selected dimmer set to full, overriding all other level inputs to those dimmers.***

# ETCLink

ETCLink is a feedback and configuration network for your dimmer racks and ETCLink-capable peripherals. Sensor CE systems monitor their operation and provide operator feedback over the ETCLink network. This allows you to monitor system performance at the CEM, with optional ETCLink peripheral devices, or from the displays of an ETCLink-compatible lighting control console.

ETCLink peripherals can report information and edit configuration settings on any rack or dimmer in your system. Peripherals include dimmer rack CEM displays, ETCLink-compatible consoles and ETCLink peripherals which duplicate many CEM functions.

## Automatic Unique Dimmer Number (UD#) addressing

Your Sensor CE dimming system assigns a Unique Dimmer Number (UD#) to each dimmer in your system. ETCLink uses UD#s to identify dimmers for error reporting and dimmer setup. Each dimmer slot in a Sensor CE rack has a sticker on the left side showing its UD#(s).

# Advanced Features

Using Sensor's Advanced Features (AF) option, ETCLink can report output and signal data from individual dimmers. AF systems can report load changes in individual circuits that indicate problems like burned-out lamps or tripped dimmer circuit breakers.

Sensor's Advanced Features (AF) option allows recording and monitoring of individual dimmer output loads. Constant comparison of a dimmer's actual load against the recorded value lets the system signal you when a load value changes. A change usually means a lamp has burned out or failed, allowing you to make an immediate replacement.

# Any-phase power operation

Any-phase power operation means the CEM and cooling fan will continue to function even when one or two input power phases fail, due to a circuit breaker trip, wiring failure or blown fuse.

Although the CEM will continue to operate and indicate the source of the error, dimmer circuits powered by the missing phase(s) will lose power until the phase(s) is restored. Dimmer circuits connected to the remaining phases will continue to dim normally.

## Redundant Tracking CEMs

Redundant tracking CEMs duplicate dimming functions of the primary Control Electronics Module (CEM) with a spare tracking CEM. If the primary CEM fails or reports internal errors, the spare CEM takes over to prevent an interruption in lighting performance.

***Note:*** *If both the primary and tracking CEMs report internal errors, the CEM with the fewest errors will control dimming functions.*

Redundant tracking provides the highest possible degree of reliability for critical performance environments like live television broadcasts. See *Appendix 2: Redundant Tracking operation* on page 53 for details.

## Neutral Disconnect (ND) operation

Neutral Disconnect dimmer modules' circuit breakers disconnect a dimmer circuit's neutral inputs along with phase power when tripped. This removes the possibility of current reaching loads through the neutral wiring, providing an increased level of safety.

***Note:*** *Neutral Disconnect (ND) dimmers can only be installed in racks with the Neutral Disconnect busing option. Racks with the ND busing option can be configured for any desired combination of ND, RCD and standard dimmers.*

## Residual Current Device (RCD) operation

RCD dimmer modules combine the protection of Neutral Disconnect dimmers with the added protection of residual current sensing. If current leakage to earth reaches 30mA, the RCD circuit breaker will trip and disconnect the circuit's phase and neutral inputs. An **RCD Trip** ETCLink error message will be displayed by system CEMs, ETCLink consoles and ETCLink peripherals.

***Note:*** *Residual Current Device dimmers can only be installed in racks with the Neutral Disconnect (ND) busing option. ND, RCD and standard modules can be used together in ND bused racks in any desired combination.*

## Line power indicator neons

Sensor CE racks may be equipped with amber neons that illuminate when line power is applied to the rack. Line power neons are visible on the upper right corner of the rack when the door is opened. Neons alert users and service persons to the power-applied status of a dimmer rack.

***Warning!*** ***Neons are only intended to illuminate as an alert to a rack's power-applied status. Neons and their associated fuses are subject to failure and may be dark even when line power is present. Power-off status can only be confirmed by an ETC technician or other qualified electrical technician as defined by IEV195-04-01/02.***

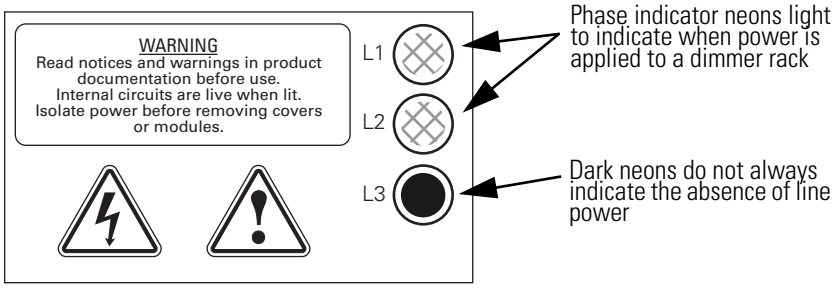



*Figure 9: Line power indicator neons*

# Operation

## Using the Control Electronics Module

Open the dimmer rack door to access the Control Electronics Module (CEM).

### CEM front panel LCD display

The CEM has a keypad for control input and a two line by 20-character LCD display.

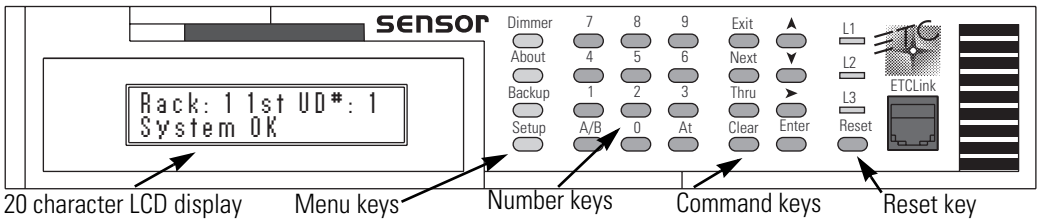



*Figure 10: CEM face panel components*

The normal status display shows the rack's number and the first Unique Dimmer Number (1st UD#) on the first line, and a status message on the second line. The normal status message is System OK. *See Appendix 1: CEM error messages* on page 52 for a list of error messages and their causes.

#### CEM keypad controls

| Button label | Button function |
|---|---|
| **[Dimmer]** | Opens Dimmer menu |
| **[About]** | Opens About menu |
| **[Backup]** | Opens Backup menu |
| **[Setup]** | Opens Setup menu |
| **[0] through [9]** | Enter numbers |
| **[At]** | Enables dimmer level input in the Dimmer menu |
| **[Exit]** | Returns to the current display's first screen if pressed once |
| | Returns to the Status display if pressed twice |
| **[Next]** | Selects the next dimmer or backup look in the Dimmer or Backup display |
| **[Thru]** | Permits selection of a range of Unique Dimmer Numbers |
| **[Clear]** | Clears the current entry |
| [▲] or [▼] | Increase or decrease levels or scroll up or down through lists |
| **[➤]** | Advances to the next screen in a sub-menu |
| **[Enter]** | Executes selected actions or records value changes |
| **[A/B]** | No function in Sensor CE systems |
| **[Reset]** | Restarts system electronics |

### Redundant tracking CEM operation

Redundant tracking CEMs use the same commands as single CEM systems. For a detailed description of redundant tracking operation see *Appendix 2: Redundant Tracking operation* on page 53.

# Setting direct dimmer levels from the CEM

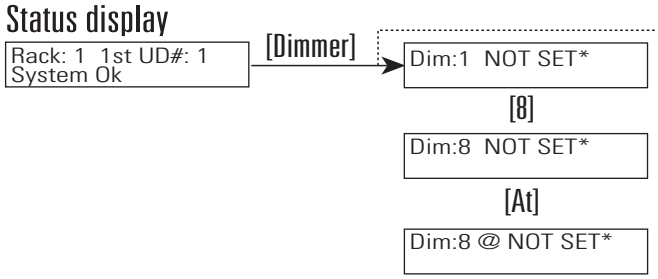
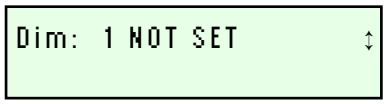



*Figure 11: CEM Dimmer menu structure*

The Dimmer menu sets and displays dimmer levels set directly by Sensor CE control electronics at the CEM keypad.




*Selecting a single dimmer*

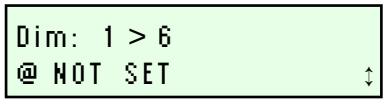
***Note:*** *Some other ETCLink peripherals can also set direct dimmer levels. Levels set by these devices function like levels set at the CEM.*

1. Press [Dimmer] to enter the dimmer menu. The CEM LCD displays a dimmer's Unique Dimmer Number (UD#) and level. **NOT SET** indicates dimmers without set levels.

***Note:*** *Dimmer levels set by DMX512, Backup looks or Panic circuits are not displayed by the Dimmer menu.*

2. Press [▲] or [▼] to scroll to the desired dimmer, or enter UD#s with the number keys and press [Enter].

## Dimmer menu Shortcuts

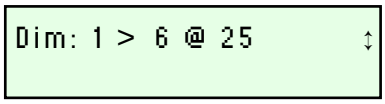



*Selecting a range of dimmers*

- To select a range of dimmers enter the first UD# with the number keys, press [Thru] and enter the last UD#. Press [Enter]. All the dimmers between the two numbers are selected.
- You can select one or more dimmers directly from the Status display by entering the numbers on the keypad.
- Press [▲] after entering the UD#(s) to "bump" dimmer levels to **100**.

# Setting direct dimmer levels

***Caution*** ***Direct dimmer levels override normal dimming. Only use direct levels when normal facility lighting is not needed. To restore normal dimming, clear direct dimmer levels.***

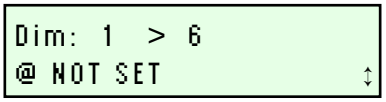



*Setting dimmer levels*

1. After entering your UD#(s), press [At]. An **@** appears between the UD#(s) and the dimmer level.
2. Press [▲] or [▼] to increase or decrease dimmer levels or use the number keys to enter a percentage between **0** and **100**.
3. Press [Enter] to set the level.

# Clearing direct dimmer levels

Clearing dimmer levels restores control to DMX port inputs from your DMX lighting control system.




*Clearing dimmer levels*

***Note:*** *Dimmers with levels of **0** must be cleared before they will respond to DMX or Backup look control input.*

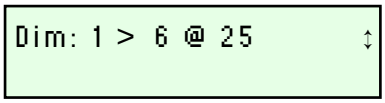
1. After entering your UD#(s), press [At]. An **@** appears between the UD#(s) and the dimmer level.
2. Press [Clear], [Enter]. The dimmer level changes to **NOT SET**.

## Using direct dimmer levels with Backup looks

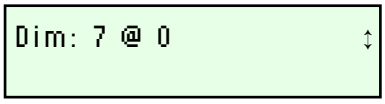
Backup looks recorded from direct dimmer levels can set levels for designated dimmers while other dimmers continue to respond to DMX lighting control.

***Note:*** *In Standard mode, levels from Backup looks always take control from DMX input levels. In Advanced mode, Backup look priority must be set to "High" before Backup levels can override DMX input. See Using input priorities on page 11 for details.*

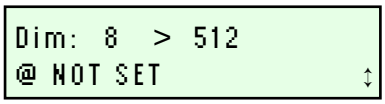
Follow these steps to create a Backup look for specific dimmers.




*Setting dimmer levels to 25*




*Setting a dimmer level to 0*




*Clearing dimmer levels*

1. Set levels for the dimmers you want the Backup look to control using instructions from *Setting direct dimmer levels* on the previous page. In the example, dimmer 1–6 are set to 25 and dimmer 7 is set to 0.
2. Clear levels from dimmers you wish to remain under DMX control so their levels are **NOT SET**. In the example, dimmers 8–512 are cleared.

***Note:*** *Until a level is set for them, dimmers default to "**NOT SET**" and do not need to be cleared.*

3. Record the Backup look from these levels. See *Recording Backup looks* on page 24 for details.

***Note:*** *You must select **Set Levels** as the input type to use the direct level features.*

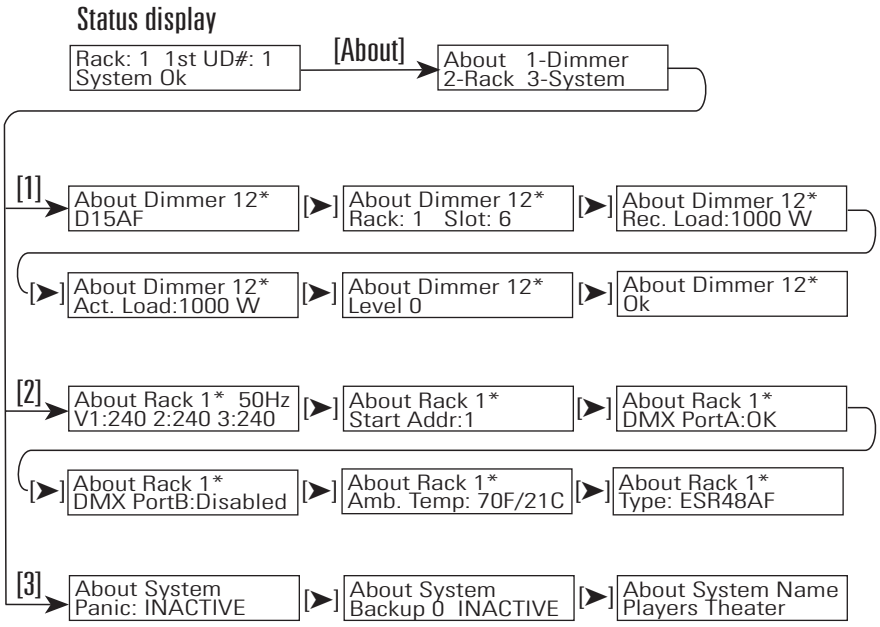
4. After recording the Backup look, clear all direct dimmer levels to restore control to your facility lighting control system.

When the Backup look from the example is activated, dimmers 1–6 will go to 25 percent and dimmer 7 will go to 0 percent (off), while other dimmers remain under normal DMX port control.

## Exiting the Dimmer menu

To exit the Dimmer menu, press [Exit]. The LCD returns to the Status display.

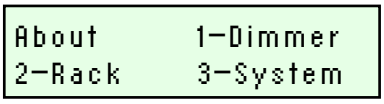
# Getting dimmer, rack and system information at the CEM




The About menu lets you view dimmer, rack and system information. Since you cannot make setting changes in the About menu, it is a safe way to monitor your system during operation.

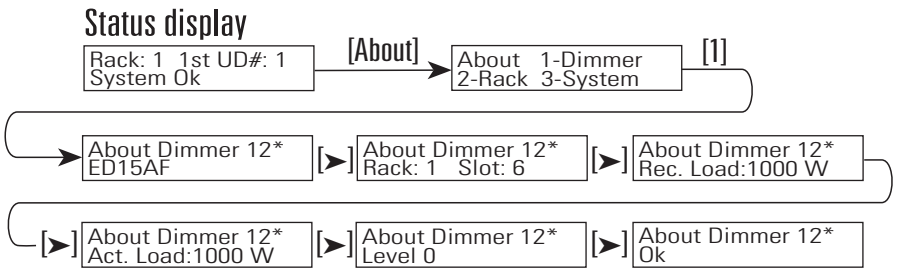
The About menu is divided into three submenus:

- **Dimmer** – lets you view individual dimmer's type, address, location, load, level, and error messages
- **Rack** – lets you view your installation rack's line voltage and frequency, starting address, DMX port A status, DMX port B status, temperature, and rack type
- **System** – lets you check your system for active Panic states or backup looks, and displays your system's configuration name



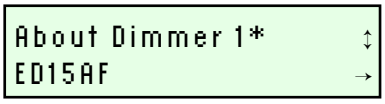

*The About menu*

# Getting dimmer information from the About menu




The About Dimmer submenu lets you view dimmer types, addresses, levels, and dimmer errors.

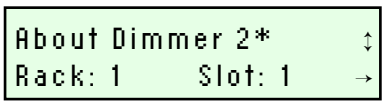
1. Enter the submenu by pressing [About] [1].
2. The first line of the display shows the Unique Dimmer Number (UD#).
3. Move from display to display by pressing [➤].
4. Scroll up or down to view the desired dimmers by pressing [▲] or [▼] or enter a UD# using the number keys and press [Enter].
5. Press [Exit] twice to return to the Status display.




*Dimmer module type*

## Dimmer module type

The first display shows the dimmer type on the second line.

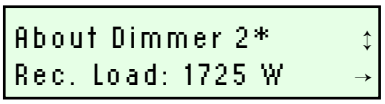



*Dimmer rack and slot number*

## Dimmer rack and slot number

The second display identifies dimmer rack and slot numbers.

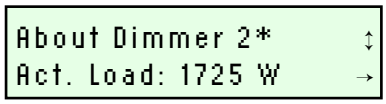
***Note:*** *Dual density dimmer modules share slot numbers.*




*Recorded load (AF systems only)*

## Dimmer recorded load (AF systems only)

The third display shows the last load recorded for the dimmer. Only systems with Advanced Features can record dimmer loads. If no load is recorded, **– – W** displays.

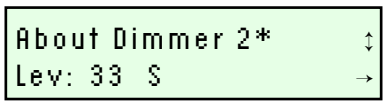



*Actual load (AF systems only)*

## Actual dimmer load (AF systems only)

The fourth display shows the load the system is currently reading on the dimmer. Only systems with Advanced Features can display dimmer loads.

***Note:*** *Load information (display 3 and 4) is only shown for systems equipped with Advanced Features (AF). Non AF systems display two dashes instead of a number.*

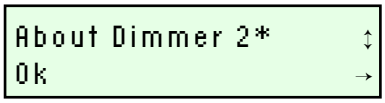



*Dimmer level*

## Dimmer control level

The fifth display identifies dimmer levels by percentage. If the level is set at the keypad, by a Backup look or by a Panic circuit, the level will be followed by an **S**, **B** or **P** respectively. Levels set by DMX512 input port A are followed by **PA,** port B levels are followed by **PB**.

## Dimmer status and error messages



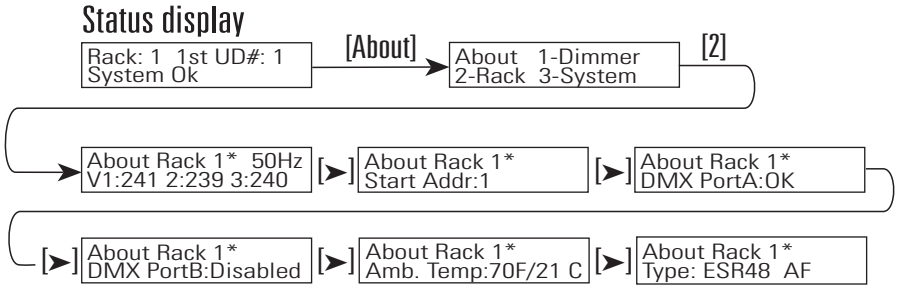

*Dimmer status*

The sixth display shows dimmer status, including any error messages reported by the CEM for that dimmer. If there are no errors, the second line reads **Ok**.

*Table 2: Dimmer error messages*

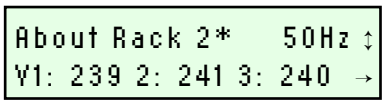
| Message | Error condition | Notes and causes |
|---|---|---|
| **OVERTEMP** | Dimmer module is too warm | Check airflow through dimmer (air filter may be dirty) |
| **MOD> REMOVED** | Dimmer is missing from slot | Dimmer may not be installed |
| **The messages listed below are only displayed by systems with Advanced Features** | | |
| **RCD Tripped** | More than 30mA leakage current to Earth | Reset module circuit breaker, then check load circuit wiring if problem continues |
| **DC OUTPUT** | Dimming is not balanced between the positive and negative peaks of the AC waveform | An SSR power cube may have failed |
| **DIM FAIL** | Dimmer has control signal, but no output | Dimmer circuit breaker is off, or SSR cube has failed |
| **LOAD CHANGE** | Load is different than recorded load | Lamp may have burned out, or lamping has been changed since loads were recorded |
| **NO DIM LOAD** | No load detected | Lamps may be burned out or wiring is defective |
| **SCR FAILED** | Dimmer output does not match control level | The SSR power cube may need to be replaced |

# Getting rack information from the About menu




The About Rack submenu lets you view rack information.

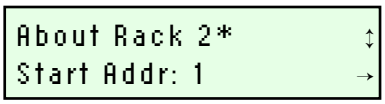
1. Enter the submenu by pressing [About] [2].
2. Move from display to display by pressing [➤].
3. The first line shows the rack number. Scroll up or down to view different racks by pressing [▲] or [▼] or enter a rack number using the number keys and press [Enter].
4. Press [Exit] twice to return to the Status display.




*Phase frequency and voltage*

## Line frequency and phase voltages

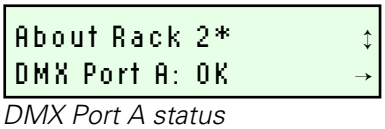
The first **About Rack** display shows the selected rack's input power frequency on the first line. The second line displays line voltage.




*Rack's Start Address*

## Rack starting address (Standard mode only)

**Start Addr** displays the rack's Start Address, the first DMX channel from the input ports applied to dimmers in the rack. Because Start Address is only used in Standard DMX addressing mode, this window does not appear when Advanced DMX addressing mode is selected.

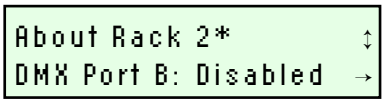



*DMX Port A status*

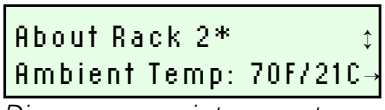
## DMX512 input port A or B status

The third and fourth displays show the status of the CEM's two DMX512 input ports, port A and port B. The second line identifies the port, followed by one of four status messages:

- **OK** means the port is set for, and receiving, DMX512 levels
- **Disabled** means the port is not set to receive signals
- **No Input** means the port is set to receive, but no DMX512 signals are present
- **Data Err** means there are DMX512 data errors



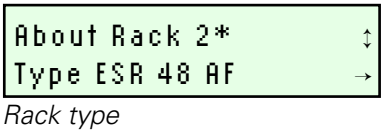

*DMX Port B status*




*Dimmer room air temperature*

## Dimmer room air temperature

**Ambient Temp** displays the dimmer room air temperature in Fahrenheit (F) and Celsius (C) while the rack's cooling fan is running. If the fan is idle, the temperature display is "– –".

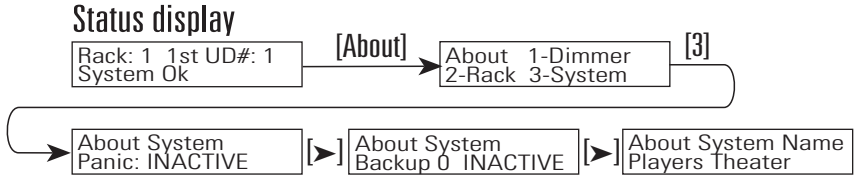



*Rack type*

## Dimmer rack type

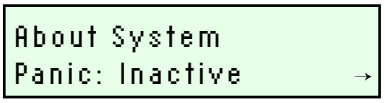
**Type** displays the rack's type. For racks equipped with Advanced Features, an **AF** follows the rack type.

# Getting system information from the About menu




The About System submenu lets you view Panic and Backup look status and the system configuration name.

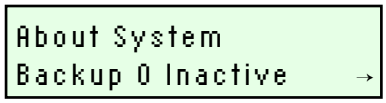
1. Enter the submenu by pressing [About] [3].
2. Move from display to display by pressing [➤].
3. Press [Exit] twice to return to the Status display.




*Panic State*

## Panic circuit status (Active or Inactive)

The **Panic** display shows if a Panic circuit is active or inactive. A Panic circuit is a set of dimmers that drive to full when activated by an external switch.



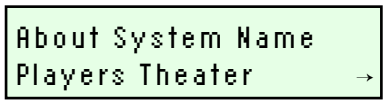

*Backup look status*

## Backup look status

The **Backup** display shows if a Backup look is active. Backup looks are lighting looks recorded by the CEM. They are activated at the CEM face panel or remotely by ETCLink devices.

If a Backup look is active, its number displays on the second line followed by **Active**.

If no Backup looks are active, the Backup look number is **0** followed by **Inactive**.

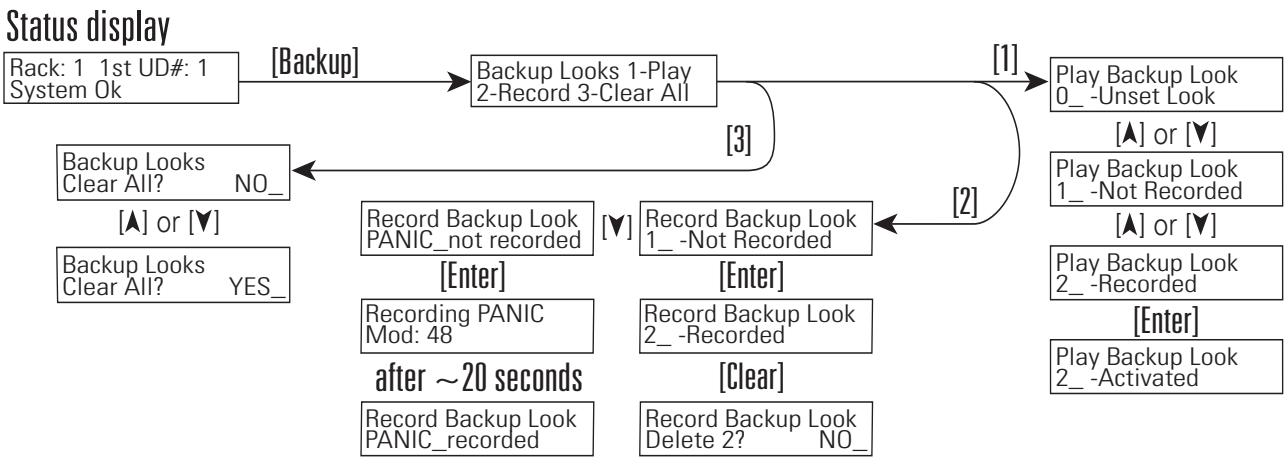


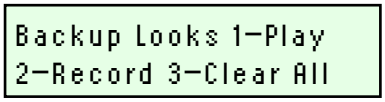

*Configuration name*

## Configuration name

The **System Name** window shows the configuration name. If you need to make a service call, knowing your configuration name helps Technical Services identify your system.

# Controlling Backup looks




*The Backup Looks menu*

The Backup menu lets you play, record and clear Backup looks. Backup looks are dimmer level settings recorded and played by the CEM. They typically set house and stage lights without a console, or work as a backup if DMX512 input fails. You can record up to 32 different Backup looks.

## Playing Backup looks


*Selecting a backup look to play*


*Playing (Active) backup look*

1. Press [Backup], [1]. **Play Backup Look** appears on the first line of the LCD. The second line displays Backup look numbers and their status: **Recorded**, **Not Recorded** or **Activate**.

***Note:*** *You cannot play a Backup look until one has been recorded. See Recording Backup looks on page 24 for recording instructions.*

2. Press [▲] or [▼] to scroll through the Backup looks or enter a number from 1 through 32 with the number keys.
3. When the desired Backup look appears on the LCD, press [Enter] to activate it. The second line of the LCD displays the number of the Backup look followed by **Active**. Dimmers fade to the Backup look's levels.

***Note:*** *Activating a Backup look when another is already playing causes a five second cross-fade from the old look to the new.*

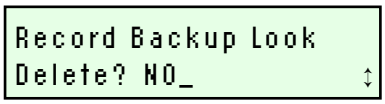
## Unsetting (deactivating) Backup looks


*Unsetting a backup look*

1. Press [Backup] [1]. **Play Backup Look** appears on the first line of the LCD. The second line displays Backup look numbers and their status: **Recorded**, **Not Recorded** or **Activated**.
2. Press [0] or scroll with [▲] or [▼] to **Unset Look**.
3. Press [Enter] to unset the look. It fades out in five seconds.

## Deleting a Backup look

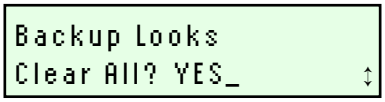

*A recorded backup look*




*Deleting a backup look*

1. Press [Backup] [2]. **Record Backup Look** appears on the first line of the LCD. The second line displays Backup look numbers and their status, either **Recorded** or **Not Recorded**.
2. Press [▲] or [▼] to scroll to the desired Backup look or enter its number with the number keys.
3. Press [Clear]. The second line will display **Delete?** followed by **NO**. Scroll the display from **NO** to **YES** with [▲] or [▼] and press [Enter] to erase the Backup look.

## Clearing (erasing) all Backup looks



*Clearing all backup looks*

1. Press [Backup] [3]. **Backup Looks** appears on the top line of the LCD and **Clear All? NO_** appears on the bottom line.
2. Press [▲] or [▼] to scroll from **NO** to **YES** and press [Enter]. All the Backup looks are erased. When erasing is finished, the LCD returns to the first Backup look display.

***Caution*** ***Clearing all Backup looks permanently erases all 32 system backup looks. Follow the procedure for Deleting a Backup look (previous page) to erase individual backup looks.***

## Recording Backup looks

1. Set the lighting look you want to record:
   - Using a lighting console or other DMX512 device.
   - Directly from the CEM Dimmer menu. See *Using direct dimmer levels with Backup looks* on page 17.
   - By combining DMX512 and CEM levels

*Selecting a look to record*

2. Press [Backup] [2]. **Record Backup Look** appears on the first line of the LCD. The second line displays backup look numbers and their status, either **Recorded** or **Not Recorded**.

***Note:*** *You can replace previously recorded Backup looks by recording new dimmer levels to them. The new levels replace the old ones.*

3. Press [▲] or [▼] to scroll through the Backup looks or enter a number from 1 through 32 with the number keys.
4. When the desired Backup look appears on the LCD, press [Enter]. A window appears asking whether you want to record **Set Levels** or a **Snapshot**:

*A Snapshot look*

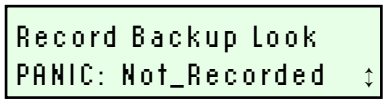
*A direct CEM level look*

5. Select **Set Levels** or **Snapshot** with [▲] or [▼] and press [Enter] to record the Backup look.
   - **Set Levels** records only direct dimmer levels set at the CEM. Direct level Backup looks can interact with DMX512 inputs when activated. See *Using direct dimmer levels with Backup looks* on page 17 for details.
   - **Snapshot** records the current lighting look as a standard Backup look. It will record both DMX512 and direct dimmer levels.
6. **Recording** appears momentarily on the second line of the LCD as current dimmer levels are recorded.
7. When recording is complete, the second line displays the number of the Backup look followed by **Recorded**. The Backup look is recorded and ready to be activated.

*A recorded backup look*

# Assigning dimmers to the Panic circuit

The CEM Panic circuit is a system-wide set of dimmers that drive to full when activated by an external signal. Panic circuits consist of all dimmers set to levels higher than 98 percent when the Panic is recorded.




*Setting panic circuits*

1. Set dimmer channels you want assigned to the Panic circuit higher than 98 percent.

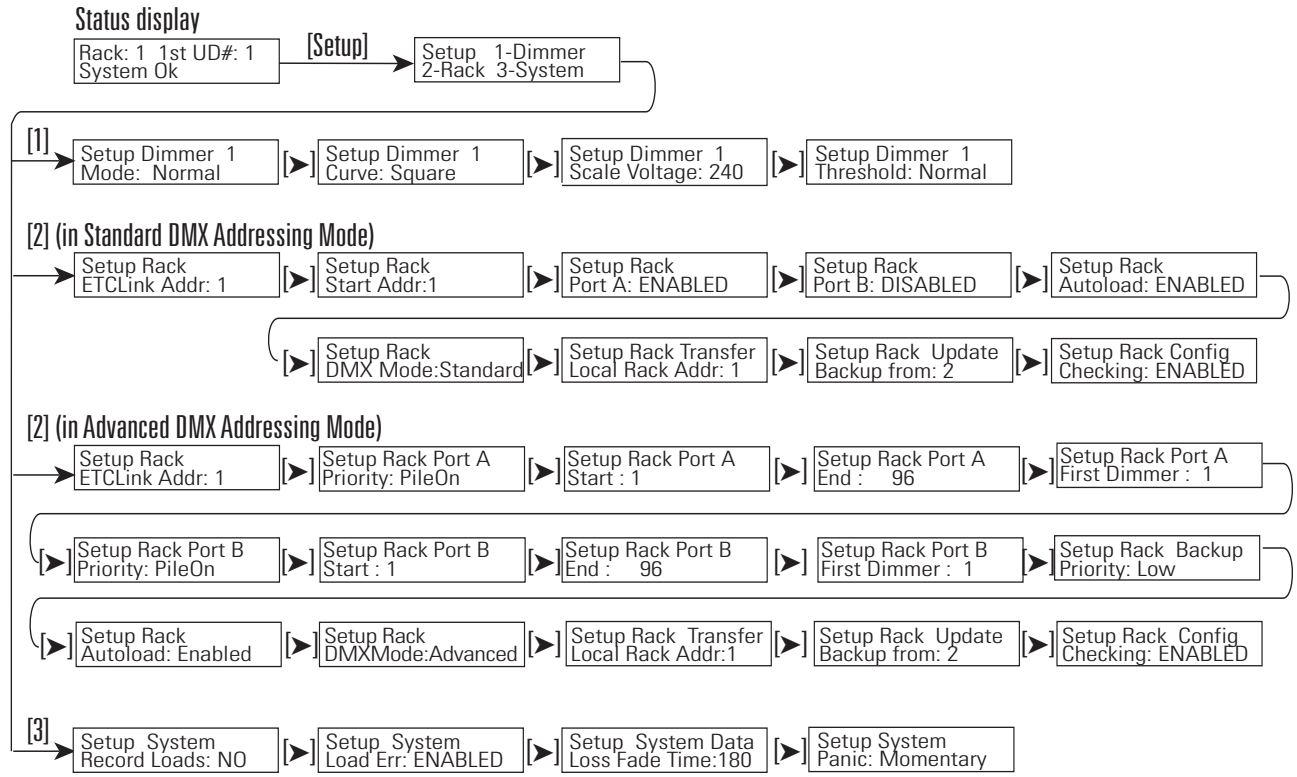
***Note:*** *If your console displays levels in DMX decimal mode (0-255), you need to set dimmers levels above 250 to include them in the Panic set.*

2. Press [Backup], and then [2] to display the **Record Backup Look** window.
3. Press [1] to select **Backup look 1**.
4. Press [▼]. **Panic_Recorded** or **Panic_Not Recorded** displays.
   - ▼ If **Panic_Not Recorded** is displayed, press [Enter] to add all dimmer circuits set higher than 98 percent to the Panic circuit.
   - ▼ If **Panic_Recorded** is displayed, press [Enter] to display **Overwrite Panic?: No**. Change **No** to **Yes** with [▲] or [▼] and press [Enter] to replace the previous Panic circuit assignments.

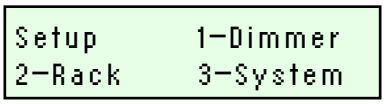

*Overwriting a panic look*

***Note:*** *Recording the Panic set will take approximately 30 seconds per dimmer rack in your system.*

# Changing Setup menu dimmer, rack and system settings




The Setup menu displays and edits dimmer, rack and system operating settings. It is divided into three submenus.




*The Setup menu*

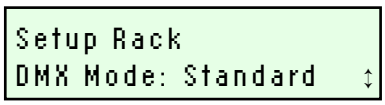
1. **Setup Dimmer** controls dimmer modes, curves and scale voltage. On Advanced Features (AF) equipped systems, Setup Dimmer also controls recording loads, and enables or disables load errors.
2. **Setup Rack** sets the ETCLink address, DMX addressing, configuration checking, and allows you to update Backup looks from other CEMs.

***Note:*** *You have the choice of running Setup Rack in either Standard or Advanced mode. See DMX addressing modes on page 10 for details about DMX addressing options.*

3. **Setup System** permits users with AF systems to record dimmer loads and enable and disable load error reporting. On all systems, Setup system sets the data loss fade time and Panic circuit options.

***Caution*** ***Changes made in the Setup menu take effect immediately, and can alter or even stop normal dimming functions. Use the Setup menu cautiously when the system is in use and record changes in case of problems.***

## Switching between Standard and Advanced addressing mode



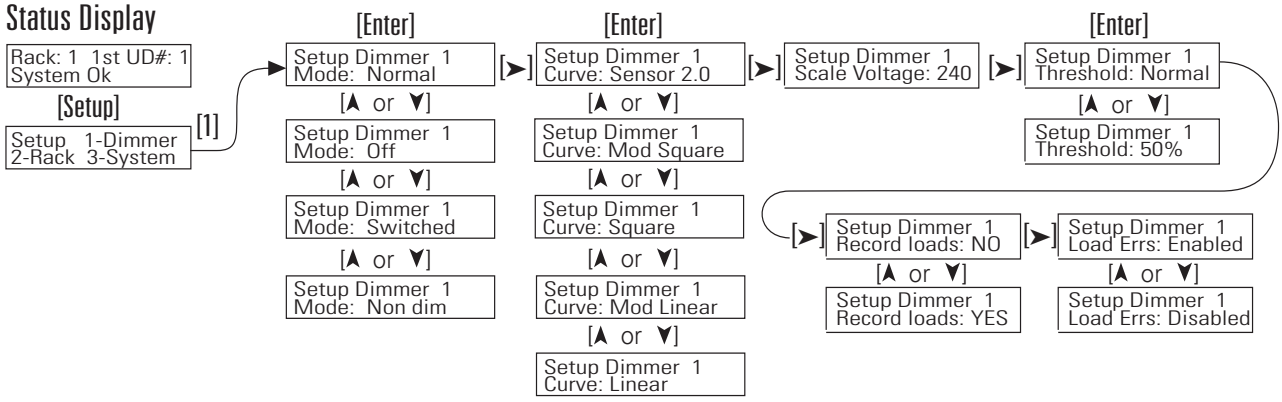

*Switch DMX addressing mode*

1. Press [Setup] and [2] on the CEM keypad to enter the **Setup Rack** menu.
2. Press [➤] until you reach the **DMX Mode:** window.

***Note:*** *It may be necessary to press [➤] up to 12 times. The number will vary depending on the features used in your system.*

3. Press[▲] or [▼] to change DMX mode between **Standard** and **Advanced**.
4. Press [Enter] to make the change.

# Dimmer mode, curve and error reporting settings




The Setup Dimmer submenu lets you view and edit dimmer firing modes, dimming curves and error reporting.

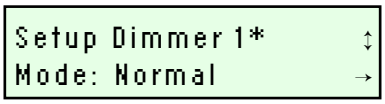
1. Enter the submenu by pressing [Setup] [1].
2. Move from display to display by pressing [➤].
3. Press [Exit] twice to return to the Status display.

***Note:*** *To streamline navigating menus, Smart Menus only displays configuration windows for features used by your system. Therefore, your display may skip unneeded steps in the configuration process.*

## Editing dimmer modes

The first display selects dimmer modes. Dimmer modes determine how dimmers respond to DMX512 level changes.

1. Enter the Unique Dimmer Number with the number keys, or scroll through the dimmers with [▲] or [▼] . Press [Enter].
2. Scroll through the dimmer modes with [▲] or [▼] . There are four dimmer modes available:
   - ▼ **Off** turns the dimmer off.
   - ▼ **Normal** operates as a standard incandescent dimmer.
   - ▼ **Non-dim** dimmers output *regulated AC voltage* when the DMX512 level is higher than the threshold level.
   - ▼ **Switched** dimmers output *unregulated AC voltage* when the DMX512 level is higher than the threshold level.
3. Press [Enter] to select the desired dimmer mode.

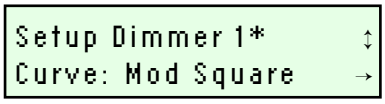



*Selecting dimmer modes*

## Choosing dimmer curves

The second display lets you select the dimmer curve. Dimmer curves adjust the relationship of individual dimmers' control signal input to their power output.

1. Enter the Unique Dimmer Number (UD#) with the number keys or scroll through the dimmers with [▲] or [▼].
2. Press [Enter].
3. Scroll through the curve options with [▲] or [▼]. There are five curves available (See page 57 for graphs of Sensor CE dimmer curves):
   - **Sensor 2.0** – The previous Modified Square law curve for Sensor CE system using Sensor CE configuration software version 2.14 or earlier
   - **Mod Square** – The recommended curve for incandescent lighting using a Sensor CE dimming rack
   - **Square** – Standard square law curve
   - **Mod Linear** – The modified linear (straight) output curve (recommended for low-voltage or ballasted loads)
   - **Linear** – Linear (straight) output curve
4. Press [Enter] to select the desired curve.

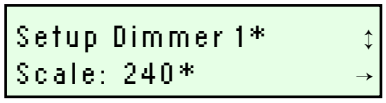


*Selecting dimmer curves*

## Setting dimmer scale voltage ("boost" in software versions 2.x)

The third display lets you set the dimmer scale voltage. Scale voltage sets the maximum effective Root Mean Square (RMS) voltage the dimmer can output to the load. Voltage output regulation can compensate for line power fluctuations or differences in line resistance between loads.

1. Enter the UD# with the number keys or scroll through the dimmers with [▲] or [▼].
2. Press [Enter].
3. Enter a scale voltage with the number keys or scroll to the desired voltage with [▲] or [▼].
4. Press [Enter].



*Setting Scale voltage*

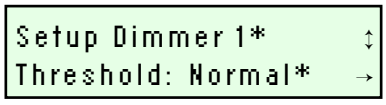
## Setting dimmer threshold levels

The fourth display controls a dimmer's threshold level. The threshold level sets a dimmer shut-off point, expressed as a percentage of (RMS) voltage. When control input sends a dimmer below its threshold level dimmer output goes to zero. You can set threshold to **Normal**, or from **0** to **90** percent by scrolling levels with [▲] or [▼].

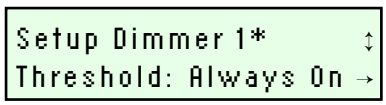
***Note:*** *Since threshold is expressed as a percentage of RMS voltage, the DMX or direct dimmer level where the threshold cutoff occurs will vary depending on your dimmer curve.*

1. Enter the UD# with the number keys or scroll through the dimmers with [▲] or [▼].
2. Press [Enter]. Use [▲] or [▼] to scroll to the desired value between **0** and **90** percent.
3. Press [Enter].

***Note:*** *For dimmers set to Switched or Non-dim firing modes, the **Normal** setting is changed to **Always On**. Dimmers with **Always On** thresholds drive to full output when dimmer rack power is on.*



*Setting dimmer threshold*

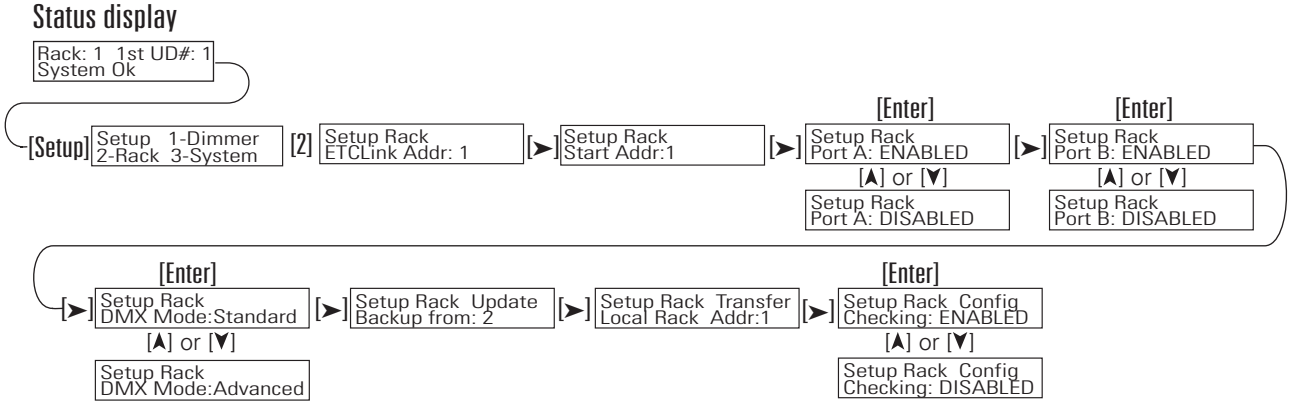


*Switched and Non-dim modes*

# Setting up a rack in Standard mode

Standard DMX mode is used in most single-console systems. It uses a single DMX512 Start address for both DMX input ports. The user selects either port A or B for control, or uses both ports in highest takes precedence mode.

***Note:*** *To streamline navigating menus, Smart Menus only displays configuration windows for features used by your system. Therefore, your display may skip unneeded steps in the configuration process.*

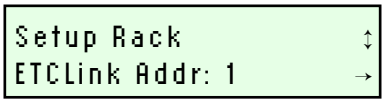



## Entering the Setup Rack menu

The Setup Rack menu sets rack, dimmer and control input addresses, enables and disables ports and turns rack features on and off.

1. Press [Setup], then [2] to enter the **Setup Rack** menu. The first window is **ETCLink Addr:**

## ETCLink Address: (Multi-rack systems only)

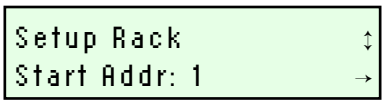



*ETCLink address*

The ETCLink address is a number between 1–32 that determines rack identity in the system configuration.

1. Use [▲] or [▼] or the numeric keypad to enter an ETCLink address number and press [Enter].
2. Press [➤] to go to the next window.

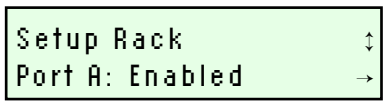
## Start Address




*Start Address*

1. To set the number of the first DMX512 channel you want the DMX ports on your rack to use, scroll through DMX channels with [▲] or [▼] or type in a channel number from 1-512 with the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

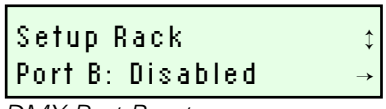
## DMX Port A status




*DMX Port A setup*

1. To set your system to use or ignore control input from DMX port A use [▲] or [▼] to display either **Enabled** or **Disabled** and press [Enter].
2. Press [➤] to go to the next window.

## DMX Port B status




*DMX Port B setup*

1. To set your system to use or ignore control input from DMX port B use [▲] or [▼] to display either **Enabled** or **Disabled** and press [Enter].
2. Press [➤] to go to the next window.

## DMX addressing mode status

Setup Rack ↕
DMX Mode: Standard →

*Setting DMX addressing mode*

**DMX Mode** sets your system to use either DMX addressing mode; Standard, which makes setting up most standard systems easier, or Advanced, to configure complex multi-console systems.

1. Use [▲] or [▼] to display either **Standard** or **Advanced** and press [Enter].

***Note:*** *Switching to Advanced mode will completely change your Setup Rack menu options. Use the instructions from Setting up a rack in Advanced mode on page 32 if you are using Advanced mode.*

2. Press [➤] to go to the next window.

## Transfer (Multi-rack systems only)

***Note:*** *Do not use the **Transfer** function unless you are directed to by an ETC-authorised service representative as part of the process of replacing a Control Electronics Module (CEM).*

Setup Rack Transfer ↕
Local Rack Addr: 1 →

*Rack transfer ETClink address*

**Transfer** downloads a configuration from one rack to another.

1. If desired, you can change the rack's ETCLink address number by scrolling screen numbers with [▲] or [▼] or typing in a number with the numeric keypad. Press [Enter] to select the number or press [➤] to go to the next window.

Checking for Rack
number: 2 →

*Checking number*

2. The CEM will check to see if any other racks in your system have that address. (An ETCLink network rack must have its own ETCLink number.)

3. If the number is OK, the window displays **Download config from Rack:**.

Download config
from Rack: 2 →

*New configuration address*

4. Scroll through ETCLink rack addresses with [▲] or [▼] or type in the rack number you want to download the configuration from and press [Enter].

5. Press [Enter] to download the configuration. After the configuration has downloaded, the **Port A:** window displays.

## Update Backup looks from another rack (Multi-rack systems only)

***Note:*** *Do not use the **Update** function unless you are directed to by an ETC-authorized service representative as part of the process of replacing a Control Electronics Module (CEM).*

Backup looks are lighting looks recorded and played by the CEM. You can update Backup looks from other racks.

Setup Rack Update ↕
Backup from: 2 →

*Setting DMX addressing mode*

1. To update Backup looks from another rack, use [▲] or [▼] or the numeric keypad to enter the desired rack number and press [Enter] (You must select the number just above or below your rack address number).

2. Press [➤] to go to the next window.

## Checking rack configurations (Multi-rack systems only)

All racks in a system must have the same configuration to work properly. Your system can be set to automatically check for mismatched configurations.

Setup Rack Config ↕
Checking: Enabled →

*Configuration checking status*

1. To change Configuration checking status, use [▲] or [▼] to choose either **Enabled** or **Disabled** and press [Enter].

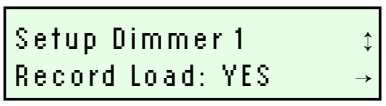
2. To bypass **Config Checking:** and go back to the beginning of the Setup Rack, menu press [➤].

***Note:*** *Do not turn Configuration Checking off unless instructed to do so by an ETC-authorised service representative.*

## Recording a single dimmer load

***Note:*** *Dimmer loads can only be recorded in racks equipped with the Advanced Features (AF) option.*

Recording dimmer loads allows an AF system to monitor dimmer circuits for load changes that indicate a lamp failure.



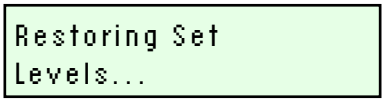

*Preparing to record a load*

1. To record a dimmer load, use [▲] or [▼] or the numeric keypad to enter the desired dimmer number and press [Enter].
2. Use [▲] or [▼] to switch **NO** to **YES** and press [Enter].

***Note:*** *The dimmer is cycled through its output range during recording. It will not respond to normal DMX512 control until recording is complete.*


*Output level status*

3. The CEM will record the dimmer load. During recording, the CEM will display **Recording Loads** and dimmer output level. The time needed will vary depending on rack size:
   - ESR24 racks record loads in approximately 1 minute
   - ESR36 racks record loads in approximately 2 minutes
   - ESR48 racks record loads in approximately 2 minutes and 45 seconds



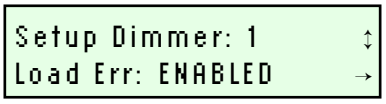

*Finishing the recording process*

4. When recording is finished, the CEM displays **Restoring Set Levels** momentarily, then returns to the normal display.

## Turning a dimmers load error reporting on or off

***Note:*** *Load errors can only be reported in racks equipped with the Advanced Features (AF) option.*

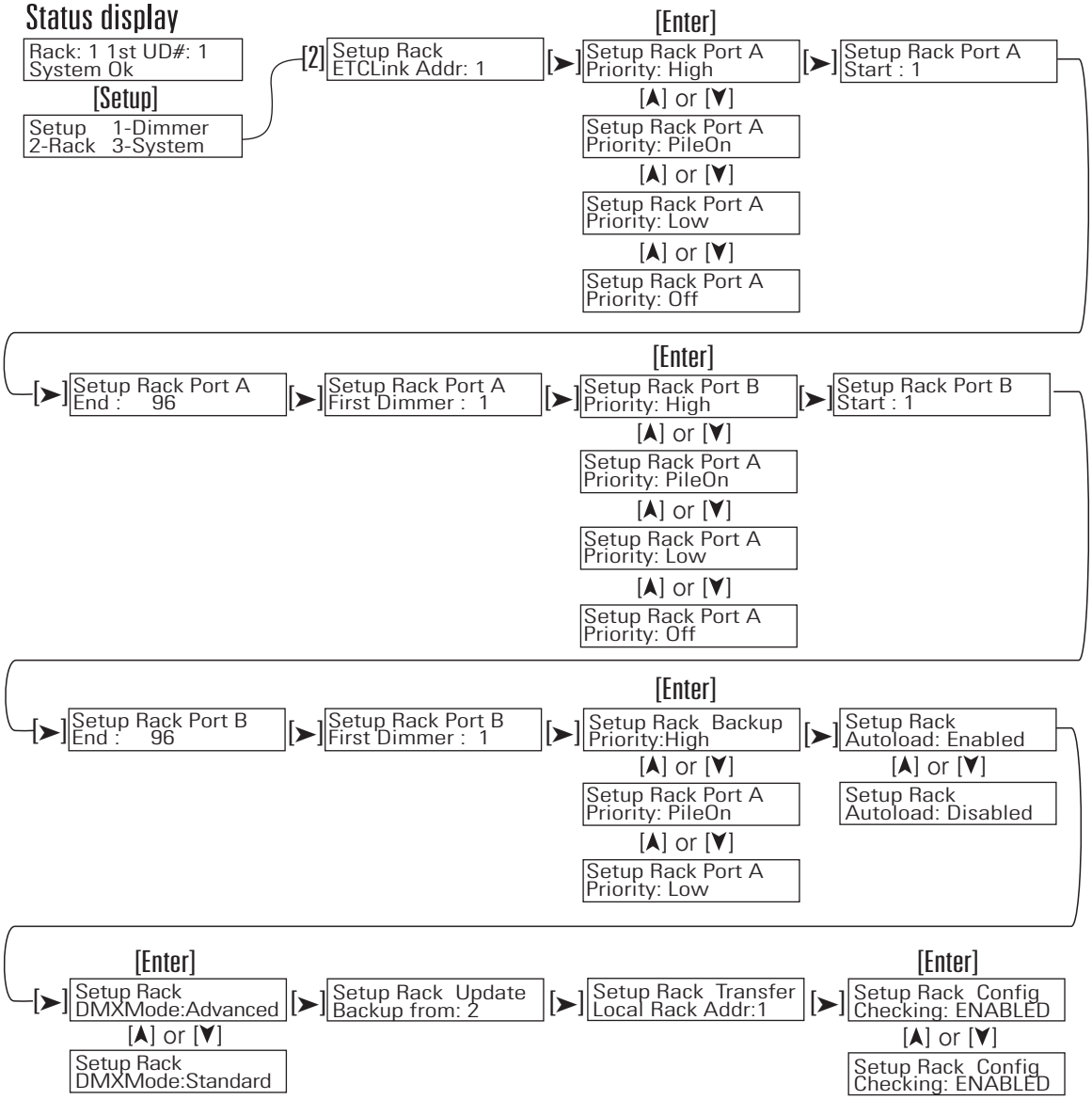
When AF racks detect a load error indicating a lamp failure or tripped dimmer circuit breaker, it sends an error message to other ETCLink devices in the system. You can turn this feature on or off.




*Switching error reporting*

1. To switch load error reporting, use [▲] or [▼] or the numeric keypad to enter the desired dimmer number and press [Enter].
2. Use [▲] or [▼] to switch between **ENABLED** and **DISABLED** and press [Enter].

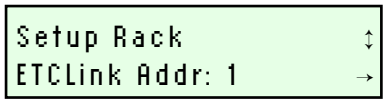
# Setting up a rack in Advanced mode




Advanced DMX mode is used in complex multi-console systems. Advanced mode enables individual port start and end addresses, Input priorities and First dimmer affected for Port A and Port B. You can also assign a priority for Backup looks in Advanced mode.

***Note:*** *To streamline navigating menus, Smart Menus only displays configuration windows for features used by your system. Therefore, your display may skip unneeded steps in the configuration process.*

## Entering the Setup Rack menu

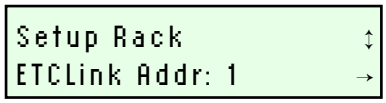



*ETCLink address*

The Setup Rack menu sets rack, dimmer and control input addresses, enables and disables ports and turns other rack features on and off.

1. Press [Setup], then [2] to enter the **Setup Rack** menu. The first window is **ETCLink Addr:**.

## ETCLink Address: (Multi-rack systems only)

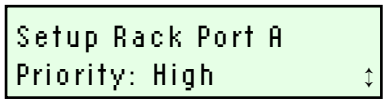


*ETCLink address*

The ETCLink address determines rack identity in the system configuration.

1. Use [▲] or [▼] or the numeric keypad to enter an ETCLink address number and press [Enter].
2. Press [➤] to go to the next window.

## DMX Port A Priority



*Setting DMX port A priority*

1. To determine the priority of DMX port A control levels when other input data is present, use [▲] or [▼] to display either **High**, **Low**, **PileOn**, or **Off** priority options and press [Enter] (See *Using input priorities* on page 11).
2. Press [➤] to go to the next window.

## Port A Start

*Setting port A DMX start*

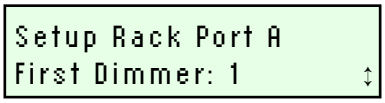
1. To set the number of the first DMX512 channel you want DMX port A to use, scroll through DMX channels with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## Port A End

*Setting port A DMX end*

1. To set the number of the last DMX512 channel you want DMX port A to use, scroll through DMX channels with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## Port A First dimmer



*Setting port A First dimmer*

1. To set the Unique Dimmer Number of the first dimmer you want DMX port A to control, scroll through Unique Dimmer Numbers with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## DMX Port B Priority

*Setting DMX port B priority*

1. To determine the priority of DMX port B control levels when another control input is present, use [▲] or [▼] to display either **High**, **Low**, **PileOn**, or **Off** Priority options and press [Enter] (See *Using input priorities* on page 11).
2. Press [➤] to go to the next window.

## Port B Start

*Setting port B DMX start*

1. To set the number of the first DMX512 channel you want DMX port B to use, scroll through DMX channels with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## Port B End

*Setting port B DMX end*

1. To set the number of the last DMX512 channel you want DMX port B to use, scroll through DMX channels with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## Port B First dimmer

*Setting port B First dimmer*

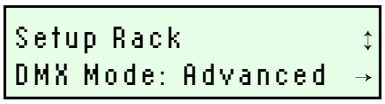
1. To set the Unique Dimmer Number of the first dimmer you want DMX port B to control, scroll through the numbers with [▲] or [▼] or type in the number you want from the numeric keypad and press [Enter].
2. Press [➤] to go to the next window.

## Setting Backup look Priority

*Setting Backup look priority*

1. To change your Backup look Priority use [▲] or [▼] to display either **High**, **Low** or **PileOn** and press [Enter] (See *Using input priorities* on page 11).
2. Press [➤] to go to the next window.

## DMX Mode status



*Setting DMX addressing mode*

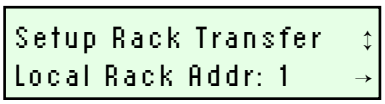
**DMX Mode** sets your system to use either DMX addressing mode; Standard, which makes setting up most standard systems easier, or Advanced, for the power to configure complex multi-console systems.

1. Use [▲] or [▼] to display either **Standard** or **Advanced** and press [Enter].
2. Press [➤] to go to the next window.

## Transfer (Multi-rack systems only)

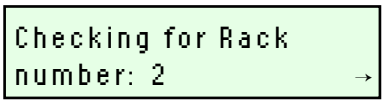
***Note:*** *Do not use the **Transfer** function unless you are directed to by an ETC-authorised service representative as part of the process of replacing a Control Electronics Module (CEM).*

**Transfer** downloads a configuration from one rack to another.



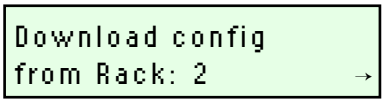
*Rack transfer ETClink address*

1. If desired, you can change the rack's ETCLink address number by scrolling screen numbers with [▲] or [▼] or typing in a number with the numeric keypad. Press [Enter] to select the number or press [➤] to go to the **Port A:** window.



*Checking number*

2. The CEM will check to see if any other racks in your system have that address. (An ETCLink network rack must have its own ETCLink number.)
3. If the number is OK, the window displays **Download config from Rack:**.



*New configuration address*

4. Scroll through ETCLink rack addresses with [▲] or [▼] or type in the rack number you want to download the configuration from and press [Enter].
5. Press [Enter] to download the configuration. After the configuration has downloaded, the **Port A:** window displays.

## Update Backup looks from another rack (Multi-rack systems only)

***Note:*** *Do not use the **Update** function unless you are directed to by an ETC-authorised service representative as part of the process of replacing a Control Electronics Module (CEM).*

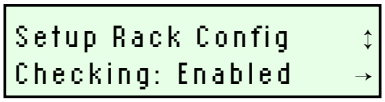
Backup looks are lighting looks recorded and played by the CEM. You can update Backup looks from other racks.

*Selecting config backup source*

1. To update Backup looks from another rack, use [▲] or [▼] or the numeric keypad to enter the desired rack number and press [Enter]. (You must select the number just above or below your rack address number.)
2. Press [➤] to go to the next window.

## Checking rack configurations (Multi-rack systems only)

All racks in a system must have the same configuration to work properly. Your system can be set to automatically check for mismatched configurations.

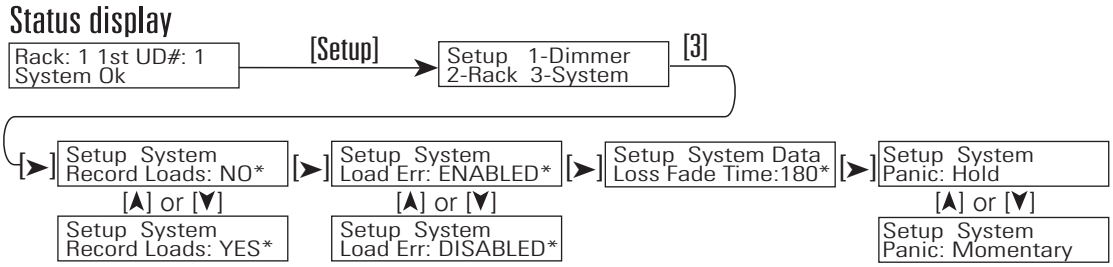



*Configuration checking status*

1. To change Configuration checking status, use [▲] or [▼] to choose either **Enabled** or **Disabled** and press [Enter].
2. To bypass **Config Checking:** and go back to the beginning of the **Setup Rack** menu press [➤].

***Note:*** *Do not turn Configuration Checking off unless instructed to do so by an authorized ETC representative.*

# Viewing and changing system settings




The Setup System submenu lets you change system settings.

1. Enter the submenu by pressing [Setup] [3].
2. Move from display to display by pressing [➤].
3. Press [Exit] twice to return to the Status display.

***Note:*** *To streamline navigating menus, Smart Menus only displays configuration windows for features used by your system. Therefore, your display may skip unneeded steps in the configuration process.*

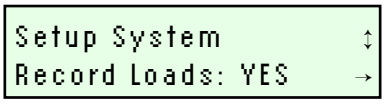
## Recording multiple dimmer loads (AF systems only)

***Note:*** *Dimmer loads can only be recorded in racks equipped with the Advanced Features (AF) option.*

Recording dimmer loads allows an AF system to monitor dimmer circuits for load changes that indicate a lamp failure or dimmer circuit breaker trip.

When you record multiple loads, your system will automatically record all the dimmers you select. To prevent overloading the main circuit breaker, the system limits recording to no more than eight dimmers per phase (up to 24 dimmers per cycle on a 3 phase rack). After finishing the first recording, the system repeats the cycle with the next group of dimmers until all selected dimmers have been recorded.

***Note:*** *Dimmers are cycled through their output range while they are being recorded. They will not respond to normal DMX512 control input until recording is completed.*

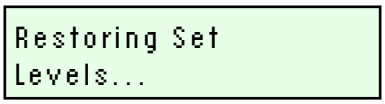



*Preparing to record a load*

1. Set a level of at least 1 percent on all dimmers you want recorded. You can use your lighting console or direct levels from the CEM.
2. To record dimmer loads, use [▲] or [▼] to switch **NO** to **YES** and press [Enter].


*Output level status*

3. The CEM will record the dimmer load. During recording, the CEM will display **Recording Loads** and dimmer output level. The time per recording cycle will vary depending on rack size:
   - ESR24 racks record loads in approximately 1 minute
   - ESR36 racks record loads in approximately 2 minutes
   - ESR48 racks record loads in approximately 2 minutes and 45 seconds

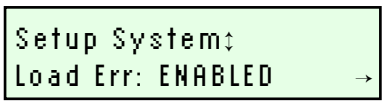



*Finishing the recording process*

4. When recording is finished, the CEM displays **Restoring Set Levels** momentarily, then returns to the normal display.
5. Press [➤] to go to the next window.

## Turning load error reporting On or Off for all dimmers (AF systems only)

The second display lets you turn system load error reporting on and off. When an AF system detects an error in dimmer output, it flashes the error beacon, displays the message on the CEM LCD and transmits an ETCLink error message.

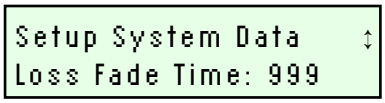



*Setting load error reporting*

1. Press [Enter] and scroll to **ENABLED** or **DISABLED** by pressing[▲] or [▼].
2. Press [Enter] again to complete the change.
3. Press [➤] to go to the next window.

## Setting data loss fade time

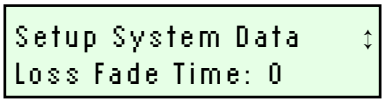
The third display edits your system's data loss fade time. The data loss fade time sets the number of seconds (from 1 to 999) the system will hold the last valid look if DMX512 input is lost. After the set number of seconds pass, dimmer levels begin a five second fade to zero.




*Setting data loss fade time*

***Note:*** *The 999 second maximum value holds levels for 16 minutes and 39 seconds.*

1. Press [Enter] and enter a new data loss fade time number with the number keys or scroll the number of seconds up or down by pressing[▲] or [▼].
2. Press [Enter] again to complete the change.




*Last look held until cancelled*

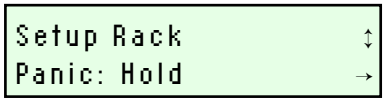
***Note:*** *To hold the last valid look indefinitely after losing DMX512 input, enter **0** as the data loss fade time.*

3. Press [➤] to go to the next window.

## Panic Activation (Panic-enabled systems only)

The Panic circuit drives selected dimmers to full brightness when activated. You can set the CEM for the activation signal used by your system.

- **Hold** runs Panic as long as a steady Panic activation signal is present
- **Momentary** turns Panic on and off in response to a short signal




*Panic circuit status*

1. To change your Panic activation, use[▲] or [▼] to display either **Hold** or **Momentary** and press [Enter].
2. Press [➤] to go to the next window.

# Maintenance

## Cleaning dimmer rack air filters

Clean the air filter on your dimmer cabinet every six months, more often if your system operates in a dusty environment.

1. Open the dimmer rack door. The air filter is mounted on the inside of the door, held in on the bottom by a metal lip.
2. Slide the filter up about 1 cm until the filter base clears the top edge of the lip. Pull the base out far enough to clear the retaining lip and slide the filter down and out.

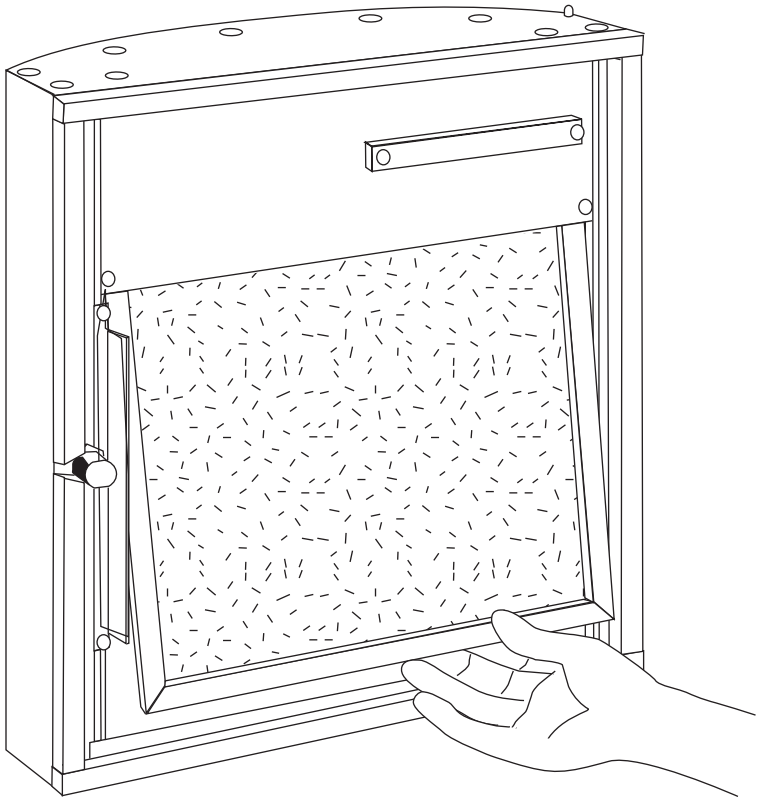


*Figure 12: Removing the air filter*

3. Vacuum or blow dust out of the filter.

***Note:*** *You can wash the filter under clear tap water, but it must be completely dry before you reinstall it. Do not use soap or other chemicals to clean the filter.*

4. Slide the top of the filter back up into the slot at the top of the door until the base clears the metal retaining lip on the bottom of the door.
5. Let the filter drop back into place and close the door.

***Note:*** *When you clean the air filter, you should also check the dimmer module air vents for dust. See Vacuuming dimmer racks on the next page for instructions.*

# Vacuuming dimmer racks

You should inspect your dimmer rack when you clean the air filter and vacuum the front of the dimmer modules if necessary.

***Caution*** ***To avoid the possibility of electrical shock, turn off power at the main breaker before touching the rack with the vacuum nozzle.***

1. Open the door and look at the modules' air vents and SSR power cube air inlets. If a dust buildup is visible, vacuum the front of the modules.
2. Leave the modules inside the rack. Most dust collects on the dimmer choke vents and SSR power cube air inlets of the dimmer modules.

***Warning!*** ***Phase voltages inside the rack can be deadly. Do not remove rack modules when vacuuming dimmer racks. Only qualified technicians should expose the inside of the dimmer cabinet.***

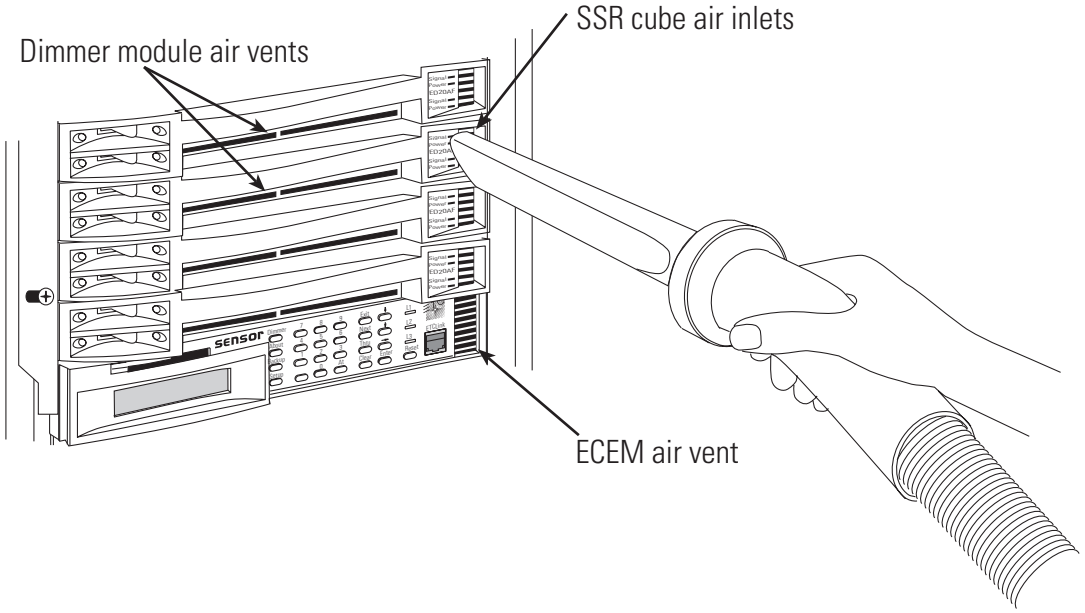



*Figure 13: Vacuuming the CEM and rack modules*

3. Use a narrow vacuum cleaner nozzle to vacuum dimmer module air vents, the SCR power cube air inlets and the CEM air vent. Do not push debris into the modules.
4. Close the door.

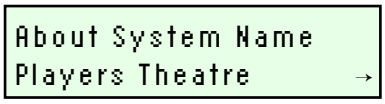
# Service

***Warning!*** ***Servicing Sensor CE dimming equipment exposes high amperage power connections inside the rack. Only ETC technicians or other qualified electrical technicians as defined by IEV195-04-01/02 should service Sensor CE dimming equipment. Always turn off rack power before servicing a Sensor CE system.***

## Contacting ETC about equipment problems

If possible, please have this information available before contacting ETC about an equipment problem:

- Your location and job name
- Your configuration name. (Press [About], [3], [➤], [➤] to display the configuration name on the CEM status display.)
- Any error messages on the CEM status LCD display
- Related system problems or equipment failures



*Displaying the config name*

ETC Europe
5 Victoria Industrial Estate, Victoria Road
London, W3 6UU, United Kingdom
Tel: +44 (0)20 8896 1000 Fax: +44 (0)20 8896 2000
service @etceurope.com

***Note:*** *For the best service results, always tell your service representative you are using the Sensor CE dimming system.*

## Dimmers module circuit breakers

Each dimmer is protected by a built-in circuit breaker on the left side of the module. Circuit breakers are turned On and Off or reset using the switch handles on the left side of the dimmer modules.

***Note:*** *Dual density dimmer modules have two circuit breaker switches.*

1. Open the dimmer rack door.
2. Locate the dimmer module you want to control or reset.

***Note:*** *Handles on tripped circuit breakers will be to the right.*

3. Put the circuit breaker switch in the desired On or Off position.
   - Push the handle **left** to turn the dimmer on or reset a tripped breaker.
   - Push the handle **right** to turn the dimmer off.

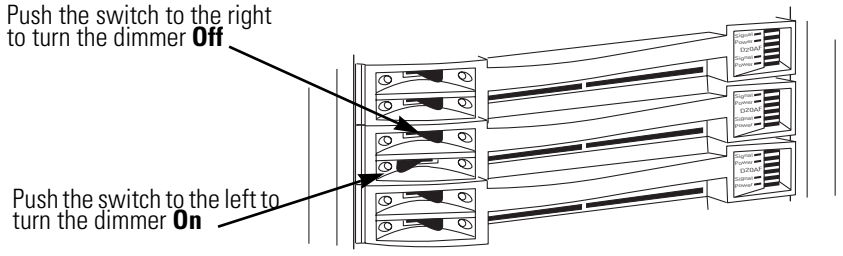


*Figure 14: Dimmer module circuit breakers*

# Changing Installation Rack modules

All Sensor CE rack modules slide in and out of their slots and are ready to start dimming immediately.

Although Sensor modules, including the CEM, can be replaced with power on, always turn rack power off at the main circuit breaker.

***Note:*** *Operating a dimmer rack with open module slots disrupts airflow inside the rack, which can lead to rack overheating.*

## Releasing and securing module safety stops

To prevent unauthorised access to rack modules and interior wiring, Sensor CE Installation Racks are provided with module safety stops that hold modules in place until released by a service technician.

1. Turn off rack power at the main breaker.

***Warning! Rack power must always be turned off at the main circuit breaker before any maintenance or service is performed that exposes the interior of the rack. Do not release the module safety stops until power is turned off.***

2. Open the rack door. The safety stops are along the left side of the dimmer modules. See the illustration in Figure 16.
   - ▼ To release the safety stop, loosen the three safety stop securing screws and slide the stop to the left to release the modules. It is not necessary to remove the stop.
   - ▼ To secure the safety stop, slide it back to the right and tighten the three safety stop screws.
3. Follow the appropriate instructions on the next page to remove or replace the desired dimmer or control modules.

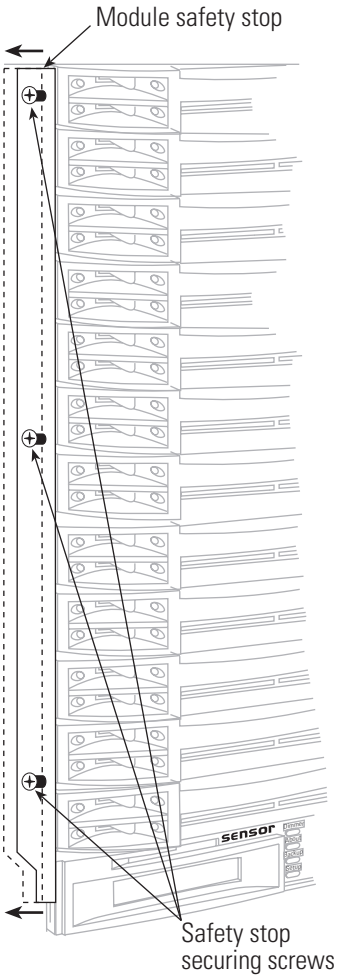



*Figure 15: Setting safety stop position*

## Removing and replacing a dimmer module

1. Grasp the dimmer module by the centre of the main air vent.
2. Pull the dimmer straight out.
3. Firmly press the replacement dimmer or airflow module into the correct slot until you feel the connections seat (the module face will be flush with the other modules).
4. Reset the module safety stops (see previous page).
5. Close and lock the Sensor rack door before applying power.

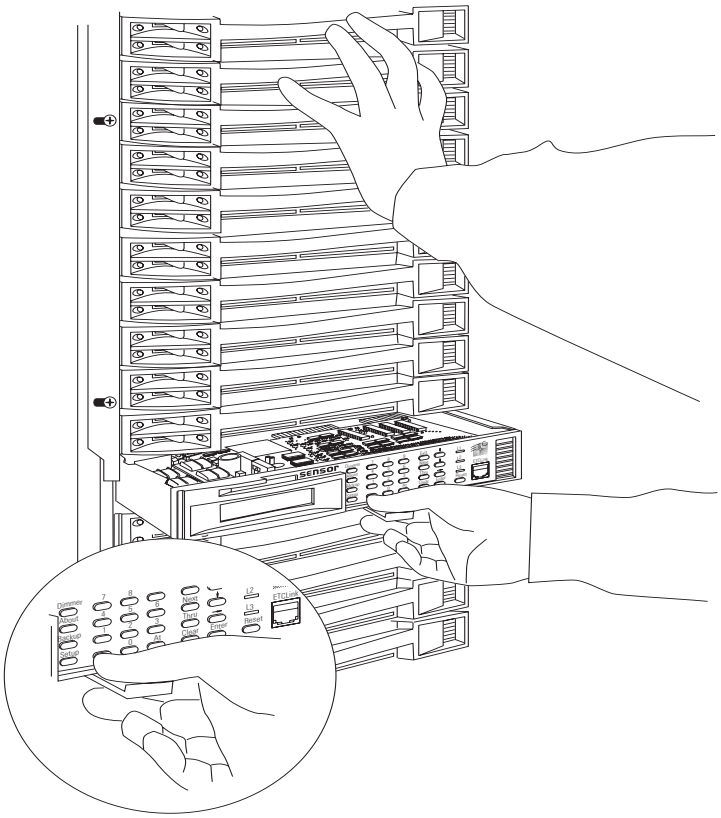


*Figure 16: Removing a CEM module*

## Removing and replacing a CEM module

1. Grasp the pull tab centered on the bottom of the CEM.
2. Pull the CEM straight out.
3. Firmly press the new CEM module into the correct slot until you feel the connections seat (the module face will be flush with the other modules).
4. Reset the module safety stops (see previous page).
5. Close and lock the Sensor rack door before applying power.
6. *ONLY* if directed to do so by an ETC-authorised service representative, transfer configuration and Backup look information to your new CEM. See *Downloading the existing configuration to a new CEM* on page 44 or *Loading a new system configuration from a replacement CEM* on page 45 for details.

# Replacing a Control Electronics Module (CEM)

Replacing a CEM to upgrade your system or correct a defect is a simple process. Replacements CEMs may be provided with a current configuration for your system, or require updating from installed CEMs after installation in the rack.

## Replacing a CEM with a current system configuration

1. Follow the instructions in *Changing Installation Rack modules* on page 42 to replace the CEM in your system.
2. Turn on rack power at the main breaker.
3. Open the rack door and observe the CEMs LCD display:
   - If the second line of your CEMs display reads **System OK**, your new CEM has a current configuration and is functioning properly.
   - The CEM LCD displays a message asking if you want to use the **local** (internal CEM) configuration (See *Downloading the existing configuration to a new CEM*, below, to update your new CEMs configuration)

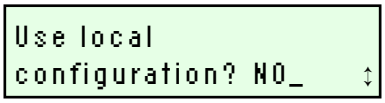
***Caution*** ***Upgraded system configurations are frequently delivered in a replacement CEM. Do not replace the new CEMs configuration unless you are sure you want to continue using the current system configuration.***

   - If the display shows other error messages, consult *Appendix 1: CEM error messages* on page 52 to correct the problems.
4. Close the rack door.

## Downloading the existing configuration to a new CEM

If you install a CEM that doesn't have a current configuration, you will need to download your system's configuration from another CEM in the system.

1. Follow the instructions in *Changing Installation Rack modules* on page 42 to replace the CEM in your system.
2. Turn on rack power at the main breaker.
3. Open the rack door and observe the CEMs LCD display:
4. The CEM LCD displays a message asking if you want to use the **local** (internal) configuration. The default setting is **NO**, which uses the external system configuration.




*Configuration message*

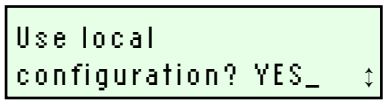
5. Press [Enter] to download your system's configuration to the new CEM. The CEM automatically downloads the configuration. When it is finished, the display will show a normal status screen.
6. Close the rack door.

# Loading a new system configuration from a replacement CEM

If you install a CEM with a new configuration for your site, you must load its internal configuration into your system.

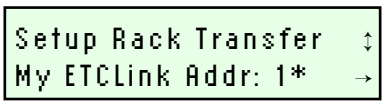
***Caution*** ***Downloading a new configuration can potentially change all system settings. Only download a new configuration when directed to do so by an ETC representative.***

1. Follow the instructions in *Changing Installation Rack modules* on page 42 to replace the CEM in your system.
2. Apply power to the system.
3. Open the door and check the CEM display. It will display a message asking if you want to use the **local** (internal) configuration. The default setting is **NO**, which uses the external system configuration.




*Configuration message*

4. Scroll to **YES** with [▲] or [▼] and press [Enter] to use the new configuration in the replacement CEM.
5. The CEM LCD displays a message asking for an ETCLink address. Press [Enter] to use the rack's current address, displayed on the LCD. Make a record of this address.

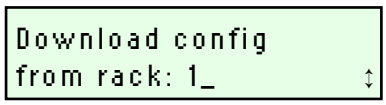



*Preparing to record a load*

6. Close the rack door.

***Caution*** ***Do not change Backup, Dimmer or Setup menu settings before you finish downloading the new configuration to all CEMs to avoid disabling your dimming system.***

7. Go to the next Sensor CE rack in your system and open the rack door.
8. Press [Setup] [2] to enter the Setup Rack submenu.
9. Press [Enter] and use [▲] or [▼] to scroll to the ETCLink address you recorded in step 5.




*Entering the ETCLink address*

10. Press [Enter]. The CEM downloads the new configuration and begins dimming.
11. Close the rack door.Repeat steps 6 – 10 until all the CEM configurations in your system are upgraded.

# Changing CEM phase fuses

The CEM has four fuses:

- Three of the fuses protect the L1, L2 and L3 phase power transformers. If one of these fuses fails, the associated L1, L2 or L3 LED on the CEM face panel will go dark, and load circuits on that phase will lose power. Phase fuses are replaced with 80 mA T 250 VAC TR5 plug in fuses.
- The fourth fuse protects the unregulated 10 Vdc supplied to the CEM backplane. If this fuse fails, the Sensor beacon will be dark and Panic circuit activation will not work. The unregulated 10 Vdc fuse is replaced with a 125 mA T 250 VAC TR5 plug in fuse.

## Replacing a phase fuse

1. Turn off rack power at the main breaker.
2. Open the door and release the module safety stops. See *Releasing and securing module safety stops* on page 42.
3. Remove the CEM module (See *Removing and replacing a CEM module* on page 43).
4. Locate and replace the defective fuse.

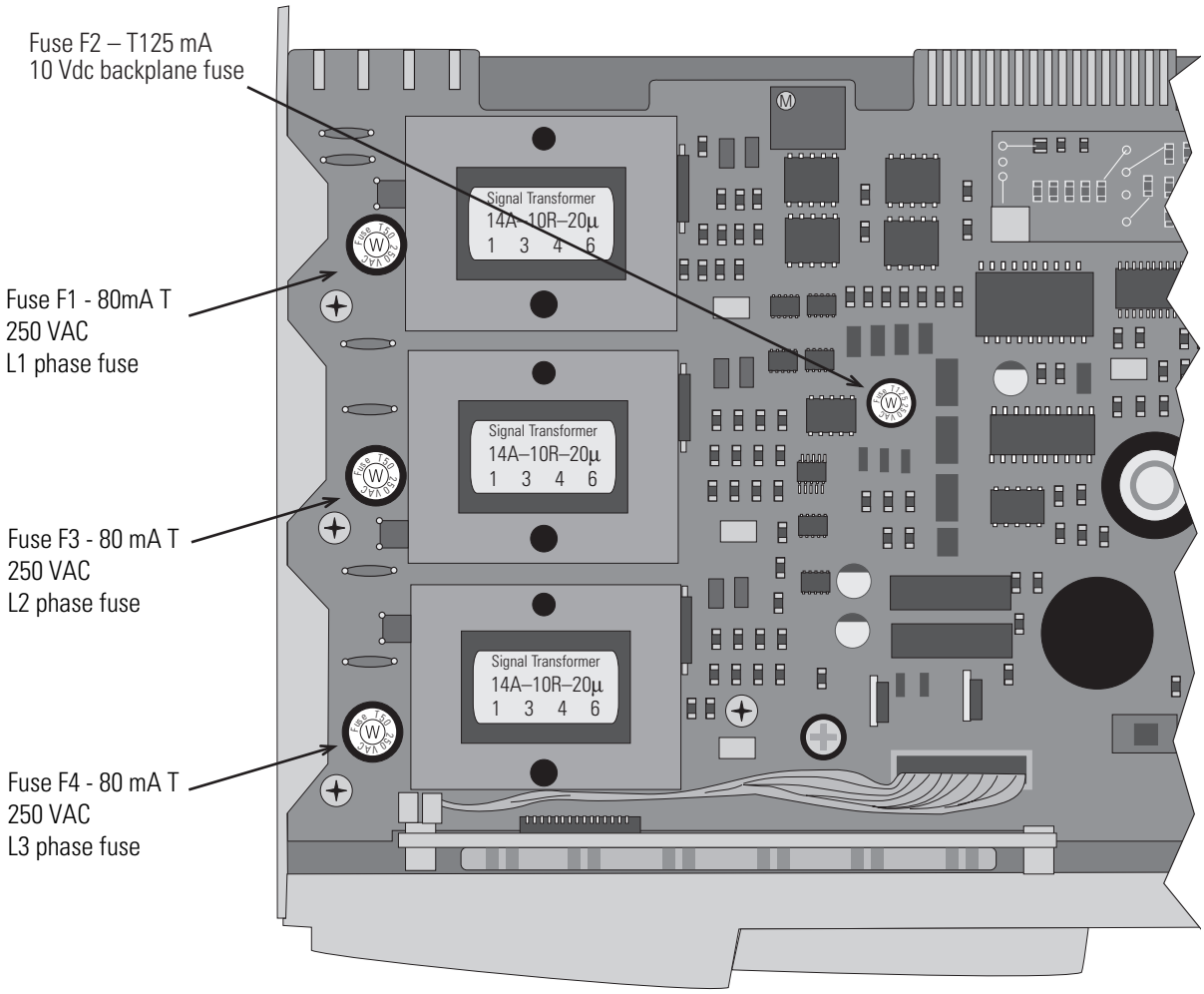



*Figure 17: Replacing CEM phase fuses*

5. Re-insert the CEM into the installation rack.
6. Put the module safety stops back into position.
7. Replace the CEM module and close the door.
8. Apply power and verify rack operation.

# Replacing fan filter relay fuses

There are three fuses on the Fan Filter Relay board inside the rack. If one of these fuses burns out, the associated L1, L2 or L3 LED on the CEM face panel goes dark.

1. Turn off rack power at the main circuit breaker.
2. Determine where the relay board is located:
   - ESR24 racks have the relay board on the bottom left corner of the rack behind the CEM.
   - ESR36 and ESR48 racks have the relay board on the left side of the rack behind the CEM slots
3. Pull out enough rack modules (usually ten) to gain access to filter relay board. Also remove the CEMs if the board is located behind them. See *Changing Installation Rack modules* on page 42 for instructions on removing rack modules.

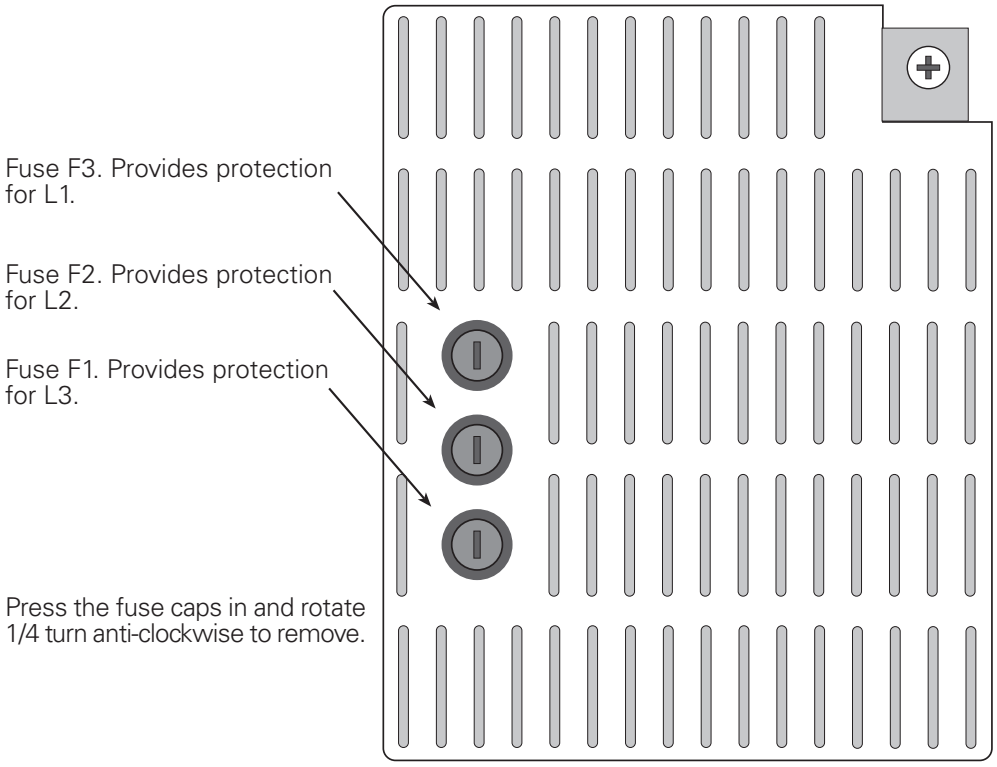



*Figure 18: Replacing the fan relay fuses*

4. Use a flat screwdriver to gently press the fuse caps in and release them with a 1/4 turn anti-clockwise. The spring loaded caps push out slightly after being released.
5. Remove the caps and replace fuses with 5 x 20 mm T-type ceramic body fuses, 2 amp, 250 VAC, 1500 AIC capacity.
6. Reinstall the new fuses and caps by gently inserting them and turning 1/4 turn clockwise.
7. Replace the dimmer modules and CEMs.
8. Reinstall the module safety stops and close the rack door.
9. Apply power to the rack.

# Replacing the fuses for the Line power indicator neons

*ESR48 rack shown. Phase indicator fuse locations for other racks are similar.*

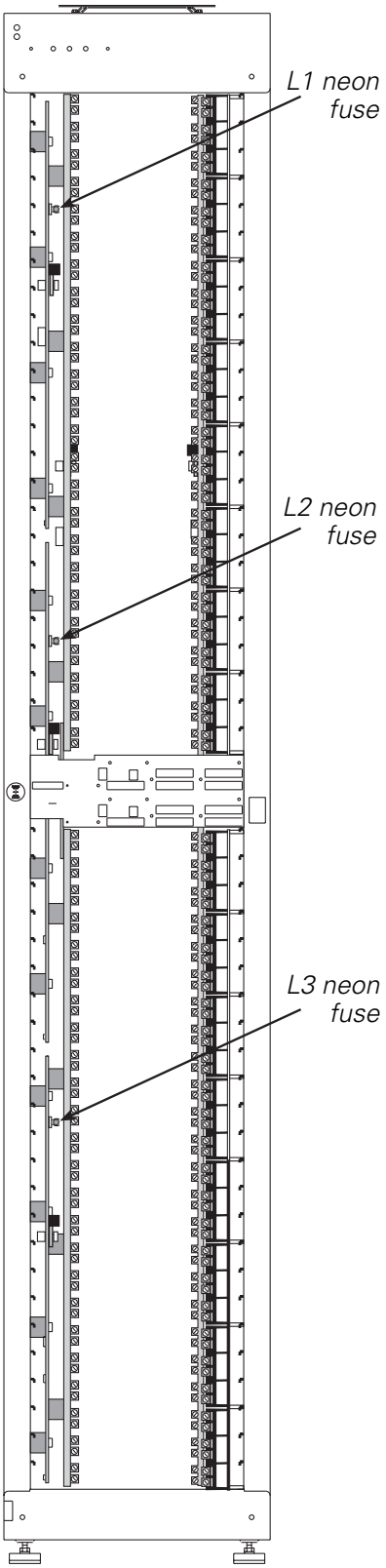



*Figure 19: Line indicator neon fuse locations*

In racks equipped with Line power indicator neons, there are three fuses inside the rack which provide overload protection for the neons and their associated electronics. If one of the indicator neons fails to correctly indicate Line power status, the associated L1, L2 or L3 fuse inside the rack should be checked, and if necessary, replaced.

1. Turn off rack power at the main circuit breaker.
2. Pull out enough rack modules (usually ten) to gain access to either the L1, L2 or L3 indicator neon fuse. See *Changing Installation Rack modules* on page 42 for instructions on removing rack modules.
3. Locate the associated L1, L2 or L3 neon fuse:
4. Replace defective fuses with 20 A Ferraz-Shawmut 6.3 mm x 31.8 mm cylindrical 3AG type fuse rated at 200kAIC at 250 VAC.
5. Replace the dimmer modules.
6. Reinstall the module safety stops and close the rack door.
7. Apply power to the rack.

# Troubleshooting

Your Sensor CE system helps you identify system problems with status reporting and diagnostic testing capabilities.

You will usually notice a system problem in one of two ways:

- The Sensor Beacon on the dimmer rack begins blinking, indicating the CEM has detected a problem. The system may still continue to dim normally.
- You notice a problem with system performance. The error beacon may be flashing, or the problem may be caused by another part of your lighting control system.

When either of these situations occur, you can follow these steps to isolate and correct the cause.

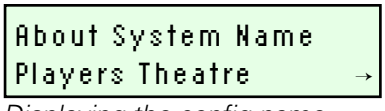
## Make a preliminary examination of your system

1. Check for loose or damaged control cables to your dimmer rack.
2. Check for tripped breakers on your main circuit breaker panel.
3. Look for obstructions on top or in front of your installation rack that may be blocking rack ventilation.
4. Open the door and look for dust buildup on the air filter or rack modules.
5. Check for tripped dimmer module circuit breakers.
6. Check the CEM display for error messages. For an explanation of error message causes and possible corrections, see *Appendix 1: CEM error messages* on page 52.
7. Check for an activated Backup look at your CEM. (This can lock some or all of your dimmer circuits at one level.) See *Controlling Backup looks* on page 23 for details.
8. Make sure your Panic circuit is not activated. (This will drive some of your dimmer circuits to full and hold them there.) See *Assigning dimmers to the Panic circuit* on page 25 for details.
9. Make sure all direct dimmer levels at the CEM are cleared. (This can lock some or all of your dimmer circuits at one level.) See *Setting direct dimmer levels* on page 16 for details.
10. Correct any of these problems you find, press [Reset] on the front of the CEM module and verify system operation.

## If you cannot locate or correct the problem

If you are unable to eliminate the problem, contact your authorized ETC representative. Please have this information available:

- Your location and job name
- Your configuration name. (Press [About] [➤], [➤] to display the configuration name on the CEM status display.)
- Any error messages on the CEM status LCD display
- Related system problems or equipment failures



*Displaying the config name*

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# Glossary

Backup looks: Backup looks are lighting looks recorded in the CEM. Up to 32 Backup looks can be recorded. Backup looks can be played or recorded from the CEM or from ETCLink consoles, PCs or peripheral devices.

CEM: The Control Electronic Module for a Sensor CE dimming system. CEM systems enable multiple DMX512 inputs and addressing modes and support ETCLink.

Dimmer channel: An individual circuit used to set lighting levels.

Dimmer curve: Determines how control signal level maps to dimmer voltage output. Curve options available from the **Setup dimmer** menu are **Square**, **Mod Square**, **Linear**, **Mod Linear,** and **Sensor 2.0**.

Dimmer Mode: Determines the firing mode of a digital dimmer. Available firing modes are: **Normal**, **Switched**, **Off**, and **Non-dim**. Dimmer mode is selected in the **Setup Dimmer** menu.

Dimmer module: A slide-in cartridge containing one or two dimmer channels.

Dimmer rack: The cabinet, cooling and power distribution system for dimmer modules.

Dimmer regulation: Maintains steady dimmer output voltage by adjusting dimmer firing. It is used to compensate for line voltage fluctuations and/or different load resistance.

Dimmer slot: The rails and circuit connections in a dimmer rack that individual dimmer modules slide into during installation.

Direct dimmer levels: Direct dimmer levels are dimmer output values set directly from the numeric keypad of the CEM. Set levels override input from all sources except Panic activation.

DMX mode: The DMX512 addressing scheme. It is set to either **Standard** or **Advanced** in the **Setup rack** menu.

- **Standard** DMX mode – used in the majority of single-console systems. Standard mode automatically assigns dimmers to DMX512 channels using the Start address set by the user. Both port A and B use the same start address. The user can select either port A or B for control, or use both ports in highest takes precedence mode.
- **Advanced** DMX mode – used in multi-console systems or where special addressing is required. The user sets individual Port start and Port end addresses for port A and/or B as desired. The user also enters the First dimmer that each port affects in the rack and assigns each port a priority.

DMX512:The established data protocol for digital control of dimming systems. A DMX512 signal carriers up to 512 dimmer channels – each with an intensity level from 0-255.

ETCLink: A digital Echelon® LonTalk® network that carries system status information, including console-specific and dimmer-specific data, between components of a Sensor CE system. ETCLink components include CEMs and ETCLink consoles, PCs or peripheral devices.

ETCLink Address: A number assigned to a dimmer rack or connected device in a multi-rack ETCLink network. Accessed through the **Setup Rack** menu.

***Note:*** *Dimmer racks are assigned a number between 1-32. These addresses cannot be duplicate or skip numbers (e.g. rack 1, 2, 3, 4, 5 – Not rack 1, 2, 2, 4, 5).*

First dimmer: The first Unique Dimmer Number (between 1 – 8192) affected by a port's addressing scheme. Used with the port start and port end addresses. Accessed through the **Setup rack** menu in Advanced DMX mode only.

Highest takes precedence: Compares levels from two control sources on a channel-by-channel basis and assigns control to the higher channel level.

Panic: Panic is a group of dimmers driven to full intensity by a remote keyswitch station signal.

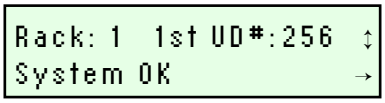
Pile-on mode: Compares levels from two control sources on a channel-by-channel basis and assigns control to the higher channel level.

Port: DMX512 input ports. Each CEM in the rack has two DMX input ports labeled port A and port B.

Port End: The last channel number (between 1 – 512) used from a DMX512 input port. Accessed from the **Setup Rack** menu in Advanced mode only.

Port Start: The first channel number (between 1 – 512) used from a DMX512 input port. Accessed from the **Setup rack** menu in Advanced mode only.

Priorities: Priority determines how dimmer levels from Port A, B and backup looks interact to control dimmers. There are three levels of priority: High, Pile-on and Low. Accessed from the **Setup rack** menu in Advanced mode only.

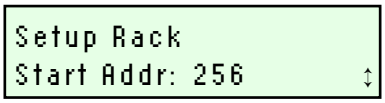


*CEM Status screen display*

Rack Start: The lowest Unique Dimmer Number (between 1 – 8192) in a dimmer rack. Usually the first dimmer channel in the rack. This is the number that appears after **Start:** in the default CEM status display. (In the example the Rack start number is **256**.)

Redundant tracking: Two CEMs in one rack, one serving as primary and the other as backup. If the primary CEM reports errors, the backup takes over dimming functions. If both the primary and backup report errors, the CEM with the fewest reported errors controls dimming.

Scale voltage: Scale voltage sets the maximum voltage the dimmer can output. Scale voltage is set in the **Setup dimmer** menu.



*Start Address screen*

Start address: The DMX512 channel number (between 1 – 512) applied to the first dimmer in the rack. Succeeding channel levels are automatically applied to the remaining dimmers in order of their Unique Dimmer Number. Displayed after **Start Addr:** in the **Setup rack** menu in Standard mode only.

Threshold: Threshold sets the minimum voltage the dimmer can output. Threshold voltage is set in the **Setup** dimmer menu.

Unique Dimmer Number (UDN): The ETCLink number between 1 and 8192 assigned to each dimmer channel in the system. This number is used for error reporting and dimmer setup by CEMs and ETCLink consoles, PCs or peripheral devices.

# Appendix 1: CEM error messages


*CEM Status screen display*

If the CEM detects an error, it will flash the Sensor beacon and display the appropriate error message in the LED Status display. A CEM will only display error messages from its installed rack. ETCLink-capable lighting consoles and peripherals can select racks by ETCLink address and review error messages remotely.

***Note:*** *There may be more than one error message. You can use* [▲] or [▼] *to scroll through multiple error messages.*

*Table 3: CEM Error messages, causes and corrective action*

| CEM Error Message | Probable cause | Possible corrective action |
|---|---|---|
| AMBIENT OVERTEMP | Ambient temperature higher than 46° C | Lower dimmer room temperature |
| AMBIENT TEMP HIGH | Ambient temperature higher than 40° C | Lower dimmer room temperature |
| AMBIENT TEMP LOW | Ambient temperature lower than 0° C | Raise dimmer room temperature |
| BACKUP MISMATCH | Backup look error | Transfer backup look data from another rack |
| CONFIG MISMATCH | Configuration error | Transfer configuration data from another rack |
| DIMMER ERROR | A dimmer in this rack has an error | Use About Dimmers to check the specific error |
| DATA ERROR PORT (A,B) | DMX512 data error | Check DMX512 port input cable and termination |
| DIMMER OVERTEMP | One or more dimmers are overheated | Check exhaust fan and air filter operation |
| ETCLINK FAILED | ETCLink enabled but not responding | Check all ETCLink cable and connectors |
| FREQUENCY ERR | Feed power is not 50 or 60 Hz. (±2.5 Hz) | Check input frequency |
| NO AIRFLOW | Insufficient airflow detected | Check fan and air filter for obstruction |
| NO DATA PORT (A,B) | No DMX512 data received by Port A or B | Check DMX512 source devices and input cables |
| OVERTEMP # | Dimmer has overheated and shut down | Check airflow, press [Clear] to reset dimmer |
| PHASE (A, B or C) ERROR | Voltage below 210 V or above 270 V | Check line feed |
| PHASE (A, B or C) OFF | L1, L2, or L3 dimmers turned off for voltage error | Check line feed |
| PHASE DETECT FAIL | CEM could not read line feed phasing | Reseat CEM and try again<br>If problem persists, replace the CEM |
| PROCESSOR FAIL | CEM processor not responding | Replace CEM |
| SYSTEM ERROR | System and CEM configurations different | Replace CEM or check setup configuration |
| TEMP SENSOR STUCK | Ambient temperature sensor is stuck | Replace CEM |
| ZERO CROSSING ERR | CEM hardware failure | Replace CEM |

# Appendix 2: Redundant Tracking operation

This appendix shows you how to use the redundant tracking control electronics option on ESR24, ESR36 and ESR48 dimming systems equipped with the dual Control Electronics Module (CEM) backplane PCB.

This appendix has three parts:

- A description of normal redundant tracking operation.
- Instructions for switching between automatic and manual CEM selection.
- Monitored CEM error indications and their causes.

## Normal redundant tracking operation

The Sensor CE redundant tracking option provides the highest possible degree of reliability for critical performance environments like live television broadcasts. Redundant tracking duplicates the dimming functions of the primary CEM with a spare tracking CEM.

If the primary CEM fails, or produces errors that do not appear in the tracking CEM, the tracking CEM takes over dimming functions to prevent an interruption in lighting performance.

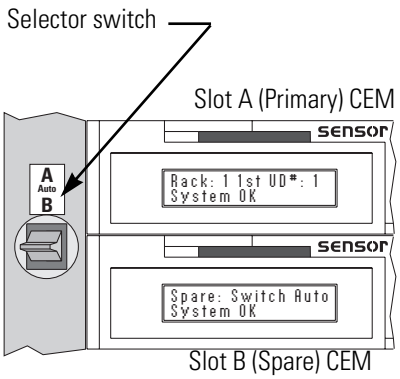



*Figure 20: Redundant CEMs*

### How redundant tracking works

When the primary CEM, in slot A, is operating normally, it controls the dimmers in the rack, sends out periodic status or "heartbeat" signals and monitors itself for errors. The spare CEM, in slot B, tracks the heartbeat signal and error messages from the slot A CEM.

***Note:*** *Redundant tracking dimmer racks are assigned two consecutive ETCLink address numbers. In normal operation the primary CEM has the lower ETCLink address and the spare has the higher.*

The slot B CEM takes dimming control if it detects a slot A CEM heartbeat failure or if slot A CEM errors outnumber its own. Slot B takes slot A off-line and adopts the lower ETCLink address, becoming the primary CEM.

***Note:*** *ETClink consoles and remote displays will define the spare CEM as a spare rack.*

Slot A CEM

```
Spare: Switch Auto
AIRFLOW PROBLEMS
```

Slot B CEM

```
Rack:1 1st UD# 1
System OK
```

*Switching messages*

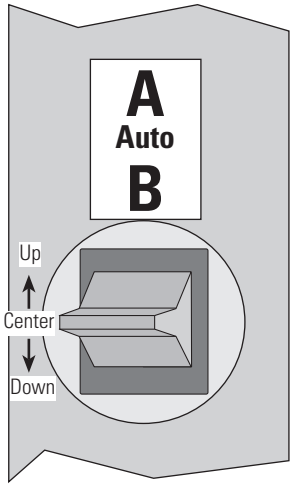
After being taken off-line, the slot A CEM stays off-line for two minutes. Because the higher ETCLink address is deactivated while the slot A CEM is off-line, the interval generates an ETCLink error message to consoles or other ETCLink remote devices reporting an CEM failure. After two minutes, the slot A CEM comes back on line (if it has not failed completely) and resumes self-testing.

If the slot A CEM reports the same number or fewer errors for a one minute interval than the slot B CEM, the slot B CEM returns control to slot A and assigns it the lower ETCLink address. The slot B resumes its tracking functions with the higher address.

***Note:*** *The slot A CEM always functions as the Primary CEM unless it reports more errors than the slot B (Spare) CEM. The slot A CEM never functions as the backup.*

If the slot A CEM continues to detect errors, it remains dormant and sends out ETCLink error messages with the higher address. The slot B CEM continues as the active dimming controller using the lower ETCLink address.

## Switching between Automatic and Manual CEM control




**Up** CEM A controls rack
**Center** Redundant tracking on
**Down** CEM B controls rack

*Figure 21:Selector switch*

Sensor CE Dimmer Installation Racks capable of redundant tracking (the ESR24, ESR36 and ESR48) have two CEM slots. Racks configured for redundant tracking contain a dual backplane PCB and local CEM selection switch, just to the left of the CEMs. The selection switch has three positions.

The up position, "A" selects the primary CEM in the upper (A) slot as the dedicated controller. The down position "B" dedicates control to the spare CEM in the lower (B) slot. When A or B is the dedicated controller, redundant tracking is disabled and the rack functions like a single CEM unit. Only the centre position, "Auto" enables automatic CEM switching by redundant tracking.

A remote switch option is also available. It functions just like the local switch: A selects the primary CEM, B selects the spare and Auto enables CEM switching by redundant tracking.

***Note:*** *Local switch settings override the remote switch unless the local switch is in the Auto position. If a remote switch is installed, both switches must be in the Auto position for redundant tracking to work.*

## CEM error monitoring

The following table lists the errors the CEMs monitor during redundant tracking operation. When any of these errors occur, ETCLink will report it and the CEM with the fewest errors will take control of dimming.

*Table 4: Redundant tracking errors*

| Error Message | Error condition | Possible cause |
|---|---|---|
| RACK OFFLINE | Rack off line, CEM is disabled | Neuron failure, EE PROM checksum error or ST9 failure |
| NO DATA PORT A | No DMX512 data received by Port A | DMX driver failed or DMX connections are faulty |
| NO DATA PORT B | No DMX512 data received by Port B | DMX driver failed or DMX connections are faulty |
| DATA ERROR PORT A | DMX512 data error | DMX driver failing |
| DATA ERROR PORT B | DMX512 data error | DMX driver failing |
| L1, L2 or L3 ERROR | L1, L2 or L3 phase voltage too high or low | ST9 problem |
| L1, L2 or L3 OFF | L1, L2 or L3 phase voltage off | L1, L2 or L3 fuse blown |
| FREQUENCY ERR | Voltage frequency too high or low | DMA problem |
| NO AIRFLOW | No airflow | Airflow sensor failed |
| ZERO CROSSING ERROR | DMA cannot detect voltage zero | DMA problem |
| PHASE DETECT FAIL | CEM cannot track AC phases | DMA failure |

# Available settings on the spare CEM

Normally, CEM menu changes, with the exception of recording loads, should be made using the primary CEM. The primary CEM uses the same menu structure as a single CEM in a regular Sensor system. Both CEMs will be automatically updated when changes are made.

If desired, the spare CEM can make many of the same menu changes as the primary CEM. The only difference in menu structure is in the **Setup Rack** menu. Since the spare CEM takes over the primary CEM's rack address when activated, most **Setup Rack** menu commands are disabled to avoid configuration conflicts.

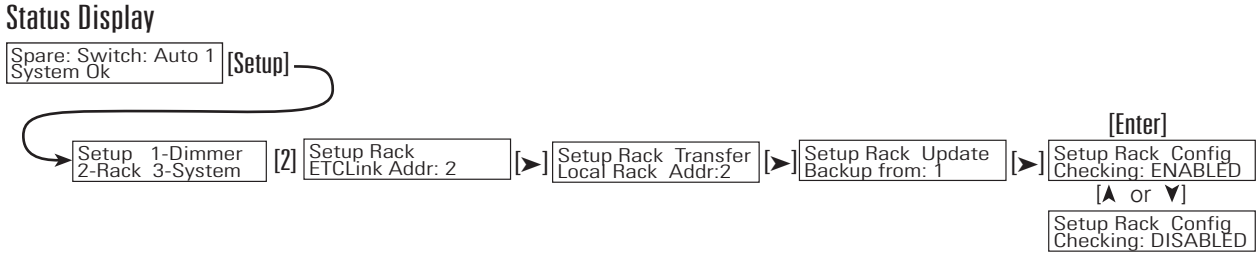


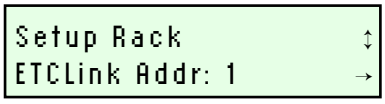

*Figure 22: Setup Rack menu for the spare CEM*

## Entering the Setup Rack menu for the Spare CEM

The Setup Rack menu sets the Spare CEM rack address, updates its configuration and Backup looks, and turns configuration checking on and off.

1. Press [Setup], then [2] to enter the **Setup Rack** menu. The first window is **ETCLink Addr:**

## ETCLink Address:




*ETCLink address*

The ETCLink address is a number between 1–32 that determines rack identity in the system configuration.

1. Use [▲] or [▼] or the numeric keypad to enter an ETCLink address number and press [Enter].
2. Press [➤] to go the next window.

### Transfer configuration

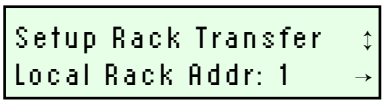
***Note:*** *Do not use the **Transfer** function unless you are directed to by an ETC-authorised service representative as part of the process of replacing a Control Electronics Module (CEM).*

**Transfer** downloads a configuration from one rack to another.

1. Set the CEM selector switch to **A**.

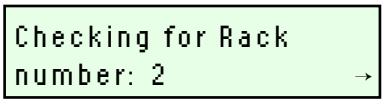
***Note:*** *Attempting to transfer a configuration with the selector switch in **Auto** may result in a corrupted configuration.*

2. If desired, you can change the rack's ETCLink address number by scrolling screen numbers with [▲] or [▼] or typing in a number with the numeric keypad. Press [Enter] to select the number or press [➤] to go the next window.



*Rack transfer ETClink address*

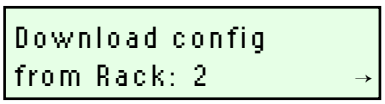
3. The CEM will check to see if any other racks in your system have that address. (An ETCLink network rack must have its own ETCLink number.)



*Checking number*

4. If the number is OK, the window displays **Download config from Rack:**.

5. Scroll through ETCLink rack addresses with [▲] or [▼] or type in the rack number you want to download the configuration from and press [Enter].



*New configuration address*

6. Press [Enter] to download the configuration. After the configuration has downloaded, the **Port A:** window displays.

### Update Backup looks from another rack

***Note:*** *Do not use the **Update** function unless you are directed to by an ETC-authorised service representative as part of the process of replacing a Control Electronics Module (CEM).*

Backup looks are lighting looks recorded and played by the CEM. You can update Backup looks from other racks.

1. To update Backup looks from another rack, use [▲] or [▼] or the numeric keypad to enter the desired rack number and press [Enter] (You must select the number just above or below your rack address number).

*Setting DMX addressing mode*

2. Press [➤] to go to the next window.

### Checking rack configurations (Multi-rack systems only)

All racks in a system must have the same configuration to work properly. Your system can be set to automatically check for mismatched configurations.

1. To change Configuration checking status, use [▲] or [▼] to choose either **Enabled** or **Disabled** and press [Enter].

*Configuration checking status*

2. To bypass **Config Checking:** and go back to the beginning of the Setup Rack menu, press [➤].

***Note:*** *Do not turn Config Checking off unless instructed to do so by an authorised ETC representative.*

## Recording loads for redundant tracking CEMs (AF systems only)

The Advanced Features load monitoring and reporting works with redundant tracking, but loads must be recorded separately for both the primary and spare CEM.

To record loads for the primary CEM, leave the rack in automatic mode and record loads normally. After recording is finished, switch control to the CEM in the B slot and repeat the process. See *Recording multiple dimmer loads (AF systems only)* on page 36 for details on recording loads.

# Appendix 3: Sensor CE 3.0 dimmer curves

Dimmer curves determine how dimmers set voltage output in response to control signal input. To accommodate designer preferences and load response variations, Sensor CE offers five dimmer curve choices, which can be applied to individual dimmers (See *Choosing dimmer curves* on page 28 for details).

## Linear curve

The linear curve matches the control input percentage to Root Mean Squared (RMS) voltage output. Each percent increase in control level increases dimmer voltage output by the same amount.

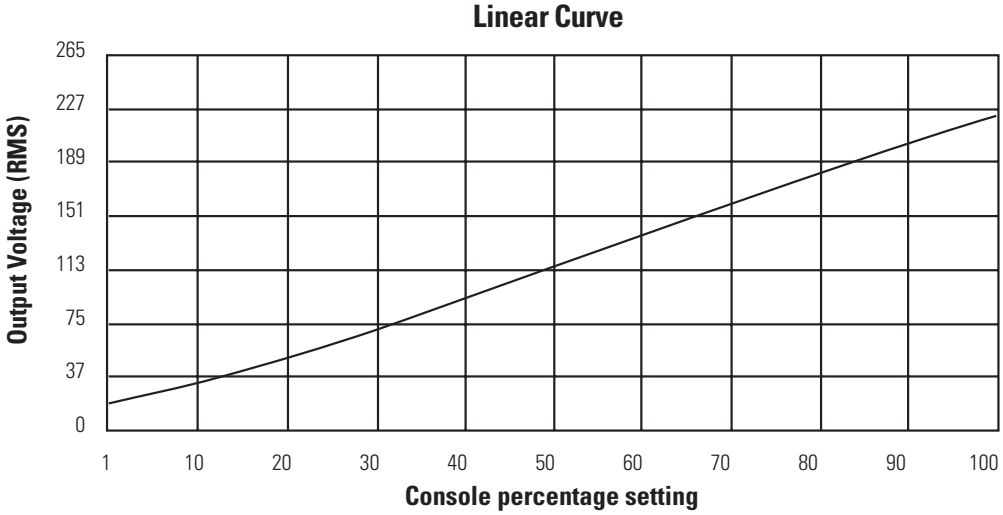



*Figure 23: Linear dimmer curve*

## Modified linear curve

A modified linear curve reduces the voltage change at low control levels for better performance in low-wattage fixtures.

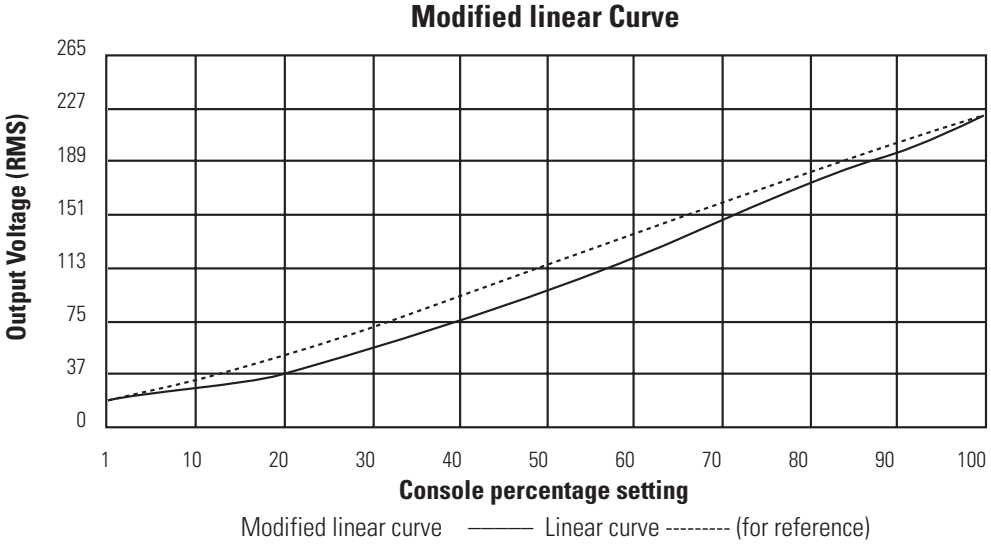



*Figure 24: Modified linear dimmer curve*

## Square law curve

At low control levels, much of a traditional incandescent fixture's light output is in the invisible infrared spectrum. This results in poor visible response to low control levels. A square law curve applies a multiple derived from the square root of the control level (with full output equal to 1.00) to increase voltage response at low control levels to compensate for the infrared loss.

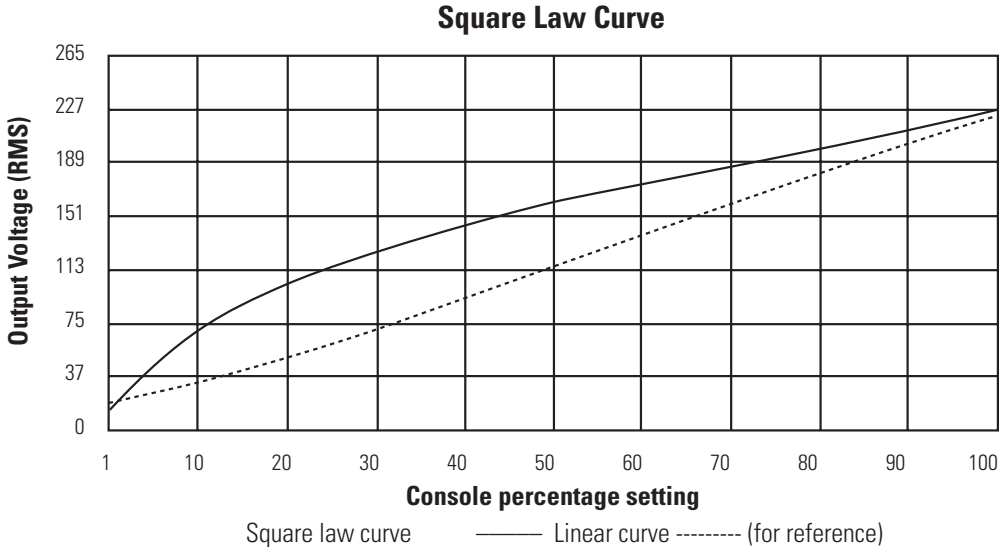



*Figure 25: Square law dimmer curve*

## Modified Square law curve

A standard square law curve may overcompensate for infrared loss, resulting in "steppy" response to incremental control changes at low levels. the modified square law curve applies a second multiple to the standard square law curve for more uniform response to control levels changes across the entire range of dimmer output,

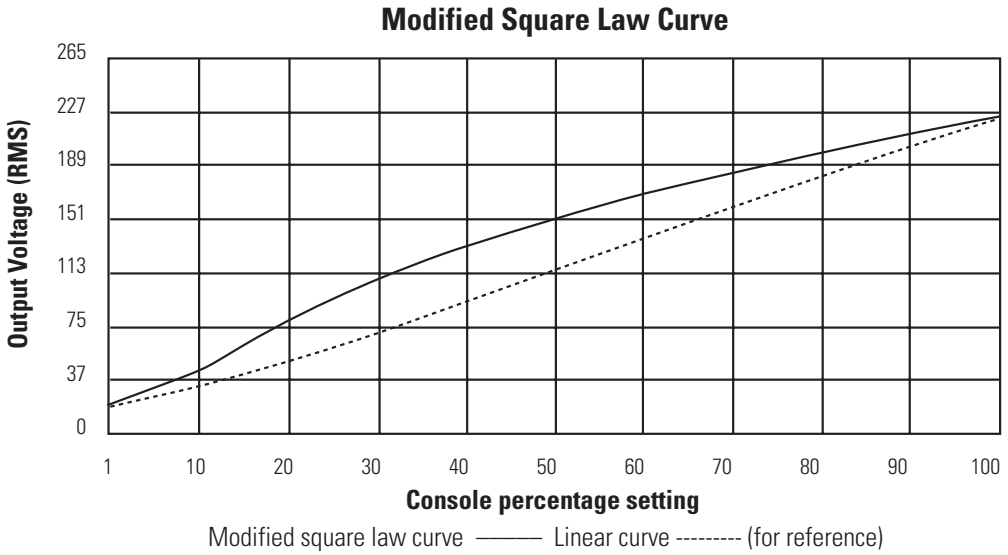



*Figure 26: Modified square law dimmer curve*

## Sensor CE 2.0 curve

The Sensor CE 2.0 curve is the previous version of the modified square law curve. It provides backwards compatibility for shows created using earlier versions of ETC equipment and familiar response for designers who prefer the earlier version.

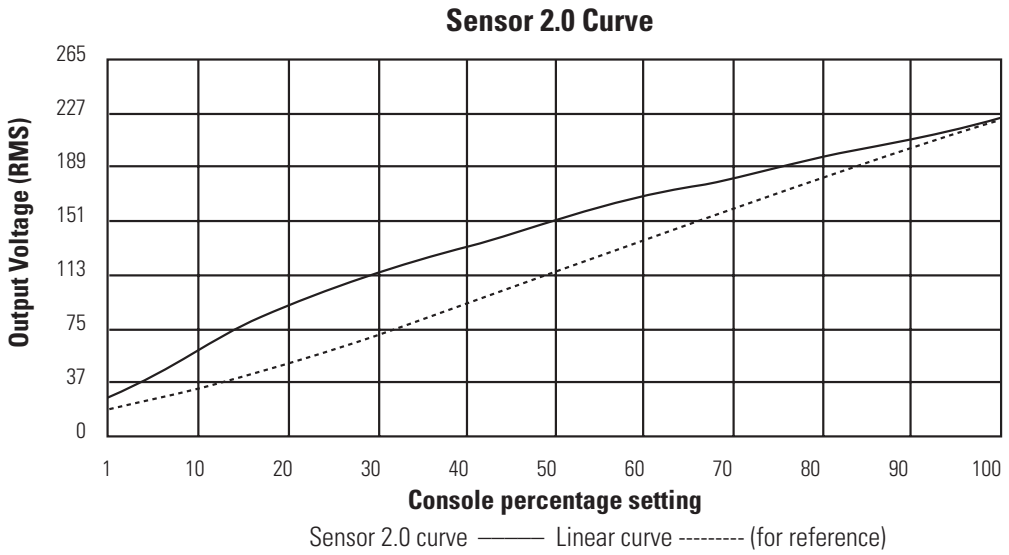
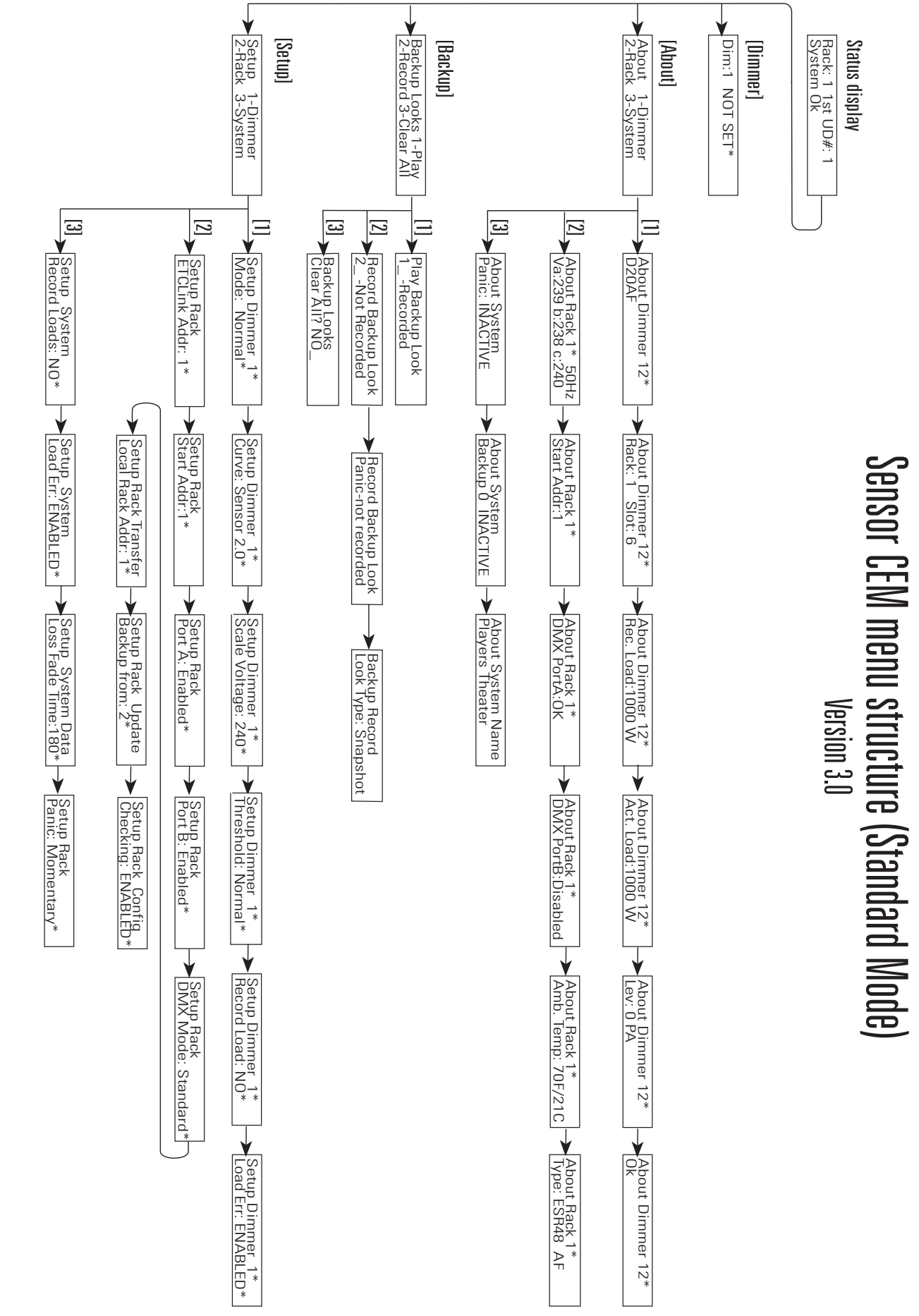
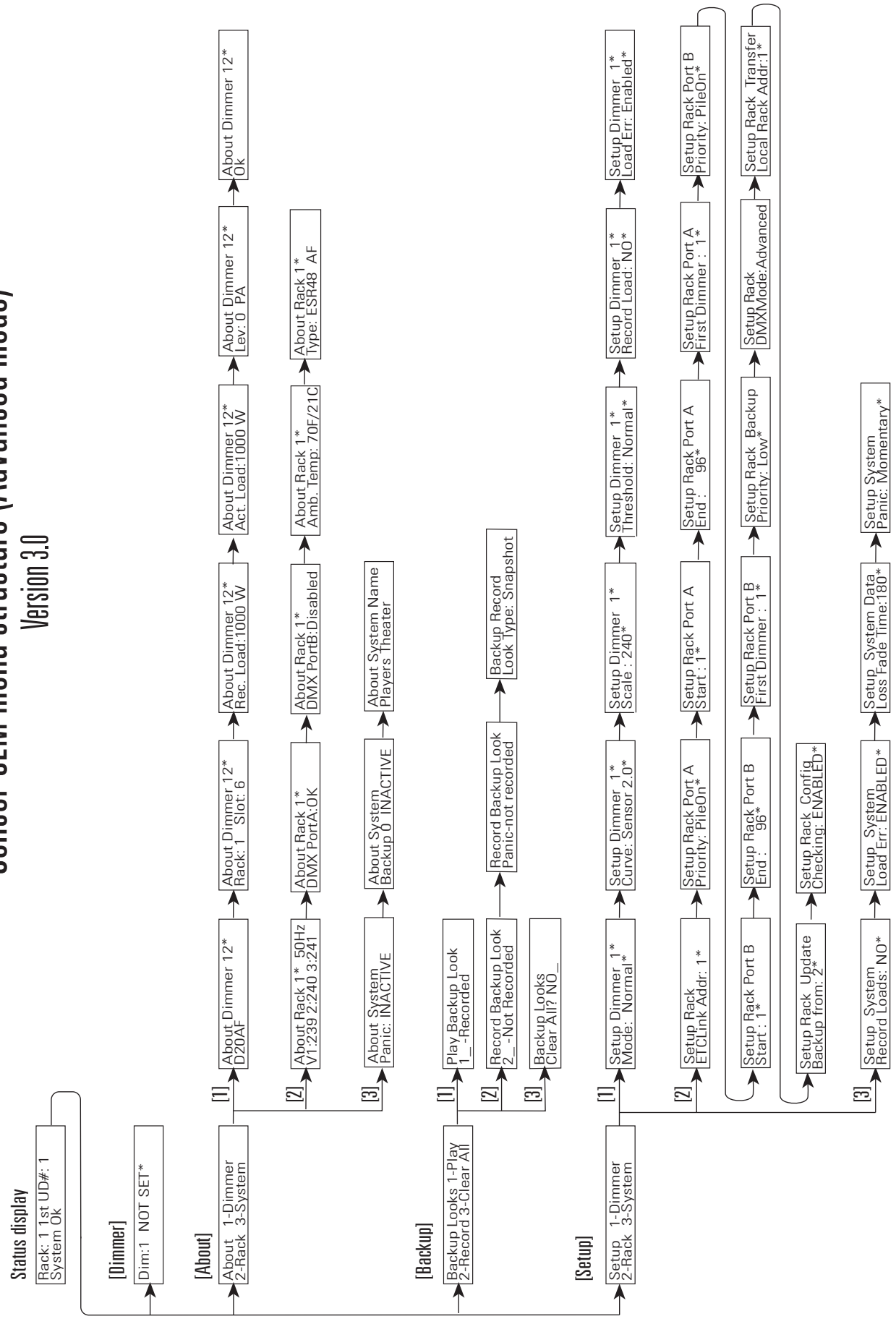


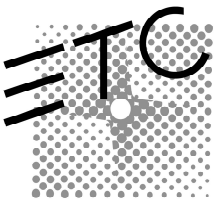

*Figure 27: Sensor CE 2.0 dimmer curve*

# Appendix 4: Standard mode CEM menu flowchart



# Appendix 5: Advanced mode CEM menu flowchart





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