

SENSOR⁺[®]



CEM+
Configuration Manual

Version 2.0

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Product information and specifications subject to change.
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Introduction

Congratulations...

on your purchase of an ETC Sensor[®]+ system. Sensor+ continues ETC's tradition of providing the highest quality products for the entertainment lighting market.

Using this Manual

This manual contains information on using and configuring features of the Sensor+ CEM+ in any Sensor+ rack or pack available up through the **Power User** login user level.

The following symbols are used in this manual to alert you to danger or important information.



Note: *Notes are helpful hints and information that is supplemental to the main text.*



CAUTION: *A Caution statement indicates situations where there may be undefined or unwanted consequences of an action, potential for data loss or an equipment problem.*



WARNING: *A Warning statement indicates situations where damage may occur, people may be harmed, or there are serious or dangerous consequences of an action.*



WARNING: ***RISK OF ELECTRIC SHOCK!** This warning statement indicates situations where there is a risk of electric shock.*

Please email comments about this manual to: TechComm@etconnect.com

What's New in v2.0

Here's a quick list of changes and new features in this release.

- Basic/Portable Menu geared towards Touring Racks and Portable Packs - a menu structure integrated within standard CEM+ software which takes the CEM+ down to bare bones single DMX input operation. See [Appendix A: Basic/Portable Mode on page 53](#).
- Streamlined and smart menus make information access and configuration changes faster. See [Appendix F: CEM+ LCD Menu on page 69](#).
- Backup of a single rack's data on the backplane - primarily for single rack installs, touring racks and portable packs with presumably no network connected. A user can replace a CEM+ by simply inserting a "new" one and recall the configuration from the backplane. Note: only presets 1 - 16 from the configuration are stored in the backplane.
- Station support for presets via SmartLink - the latest architectural system available in many ETC products. See [Appendix B: SmartLink™ Stations Enabled on page 55](#).
- The Patch system has been simplified to a single data table with several patch utilities available through the menu structure, taking better advantage of the versatility of the CEM+. See [Patch on page 29](#).
- Fade times for presets now include both up and down fade times to be consistent with SmartPack presets.
- The Data Loss Behavior for [Play Preset or Cross Fade to] has been modified to support multiple rooms. See [Data Loss Behavior on page 13](#).
- Preset Record can now include the DMX Out levels.
- Improvement of UL 924 emergency functionality to the CEM+ (Response time)
- Delta power is now supported by specifying the rack type when creating the configuration.
- A menu structure has been added to set time zone and DST mode for the rack group's use to timestamp errors. This will also be for future use. See [DST Mode \[Power\] on page 18](#).

Chapter 1

Overview

This manual covers functions and configuration of the CEM+ via the face panel and Sensor+ Connect interfaces that are available to the **Guest**, **User** and **Power User** login levels.

| User Level | PIN | Login | Password |
|------------|-------|---------------------|-----------|
| Default | none | Just click "Log On" | |
| Guest | none* | guest | guestpass |
| User | 2222 | user | userpass |
| Power User | 3333 | power | powerpass |

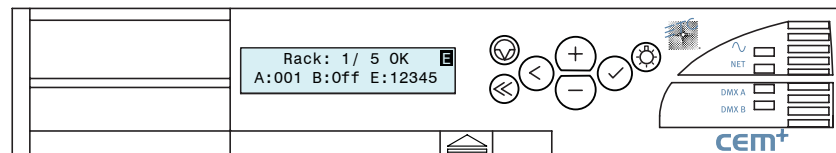
*The face panel no longer has a Guest user level and defaults to User login access.

A Sensor+ dimming system controls lighting using EDMX™ control levels from a lighting control system on the ETCNet2™ network and/or DMX512 control levels from a lighting control system on the DMX network and/or architectural presets which can also be used as backup looks. The CEM+ can accept levels from EDMX and up to two DMX inputs. The configuration of your dimming system determines which input or combination of inputs will generate the output levels of your dimmers.

System Components

The Sensor+ system consists of Sensor+ racks or packs, CEM+ control modules and various dimmer module types, however a module may contain only a circuit breaker, a relay, or may contain no electronics at all.

CEM+ Control Module



The CEM+ control module is required for Sensor+ dimming systems - the system will not function without a properly configured CEM+. This module serves as the real time processor for incoming control signals and transmits that information to the individual dimmers. It also monitors the system status and reports any errors. The CEM+ module can be used to configure the system. Configuration and error data can be accessed either locally at the CEM+ keypad, or by using the Sensor+ Connect web browser interface.

Networked Sensor+ systems can be split into separately configured subsystems called **Groups**. Each configuration can support up to 16 CEM+ modules in a **Group**. The Group configuration is stored in all CEM+ modules in that group. A single ETCNet2 network may contain up to 64 Groups (up to 1024 racks total). One exception to these rules are ESR racks which can contain two CEM+s in redundant tracking mode. In this mode, the number of racks in a Group are limited to 8 racks (still 16 CEM+ modules).

The CEM+ has an Ethernet data input for incoming EDMX data and two DMX512 input ports (Port A and Port B). DMX Port B can be used as a DMX output port for one universe of DMX on the last logical rack in the Group. Data management is determined in the Group configuration.

Sensor+ Connect Web Browser Interface Overview

The CEM+ module contains a web server that delivers graphical web pages for you to use during system configuration. The Sensor+ Connect Web browser interface can be used instead of the direct buttons on the CEM+ module itself. You can use an Ethernet-capable PC connected to the ETCNet2 network and running Windows 2000 or XP and Internet Explorer 6 or later to browse into any of the Sensor+ racks on the network.

If you are using an Emphasis Control System running version 1.8.0 software or later, there is a command in the WYSILink menu that automatically opens a browser window and connects to Sensor+ racks.

The screenshot shows the Sensor+ Connect web browser interface. The title bar reads "SENSOR+ CONNECT ETC Sensor System Rack#1 01-SP6AF" and includes a "Log Out" button. The left sidebar contains a "Navigation Frame" with icons for Panic, Patch, Network, File Transfer, File Upload, and Load Management. The main content area has tabs for "Port Settings" and "Advanced Patch". Below the tabs are "Save Changes" and "Cancel" buttons, and an "Enable Port B Output" checkbox. A table displays patch configurations for 12 different rack and port combinations. Annotations include "Edit Tabs" pointing to the tabs, "Logout button and user level" pointing to the Log Out button, and "Edit Frame" pointing to the table area.

| Rack # | Patch Mode | Port | Dimmer | DMX Start | DMX End | DMX Length | Enable | Priority | Data Loss | Fade Time | Hold Time |
|--------|------------|------|--------|-----------|---------|------------|-------------------------------------|----------|---------------|-----------|-----------|
| 1 | Standard | DMXA | 101 | 1 | 12 | 12 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 1 | Standard | DMXB | 101 | 1 | 12 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 1 | Standard | EDMX | 101 | 101 | 112 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | Standard | DMXA | 201 | 13 | 24 | 12 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | Standard | DMXB | 201 | 13 | 24 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | Standard | EDMX | 201 | 201 | 212 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | Standard | DMXA | 301 | 25 | 120 | 96 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | Standard | DMXB | 301 | 25 | 120 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | Standard | EDMX | 301 | 301 | 396 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | Standard | DMXA | 401 | 121 | 216 | 96 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | Standard | DMXB | 497 | 1 | 512 | 512 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | Standard | EDMX | 401 | 401 | 1008 | 608 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |

Sensor+ Connect uses a navigation layout where the various main areas are selected on the left side of the page presenting sub-options. The right side of the page is used to view or edit the selected information.



Note: *The Emphasis Server network settings are the default ETC values and ready for immediate use. No configuration is required.*

You must set an IP address for any personal computer you plan to use on an ETCNet2 network. ETC recommends that the personal computer used on an ETCNet2 network is dedicated to that network so changes to network settings are kept to a minimum. Please see [Configure Your Computer for an ETCNet2 Network, page 33](#) for setting up your computer.



Note: *If the computer you wish to use is currently being used on a non-ETCNet2 network please consult your Network Administrator before changing the IP address, Subnet Mask or Gateway IP addresses.*

Sensor+ Dimming System Features

Play back Presets from the CEM+

The CEM+ module provides 128 **Presets** that can be recorded from EDMX, DMX, or directly set levels. You can configure each Preset's name, fade times and playback priority. Presets can be assigned to any one of four **Rooms** in the configuration. Sensor+ systems can also have the Group play back a Preset in case of data loss.

Sensor+ Connect for Feedback

Sensor+ Connect duplicates the functions of the CEM+ module on a PC or Emphasis Server on the ETCNet2 network. The Web browser interface allows you to monitor rack activity, reconfigure dimmer curves, record and activate presets, load and backup configurations, and many other features.

Access to the CEM+ and Sensor+ Connect configuration features is protected by specific user levels and passwords to limit system-altering features to selected personnel, while allowing basic operational functions to a wider range of users.



Note: *Sensor+ Connect and Message logging are available on Emphasis Servers as a base functionality.*

Advanced Features

Sensor+ Advanced Features (AF) racks provide additional reporting features that help you to quickly learn the status of your dimming system and diagnose problems. AF dimmer modules indicate the presence of data and the relative output of power with LED indicators on the modules themselves. Much more information can be displayed on the CEM+ module's integral LCD display or a PC on the network running Sensor+ Connect in a web browser.

Advanced Features provides the ability to record and monitor individual dimmer loads, provide error messages such as dimmer removed, SCR fail, breaker trip and other monitoring tools. Constant comparison of actual dimmer loads against the recorded value lets the system signal you when a load value changes. The change usually indicates a lamp has burned out or failed, allowing you to make an immediate replacement.

Dimmer Doubling (60Hz systems only)

ETC's Dimmer Doubler™ technology allows you to double the number of controllable circuits in your system without adding dimmer modules or running additional cable. The key to this feature is the Dimmer Doubler two-fer.

The Dimmer Doubler two-fer is installed between a Sensor dimmer module and two ETC Source Four 77 volt fixtures. It splits the output of a single dimmer into two, separately-controlled outputs. You can then use an ETC control console to independently control the output of the two fixtures.

CEM+ Playback Priorities

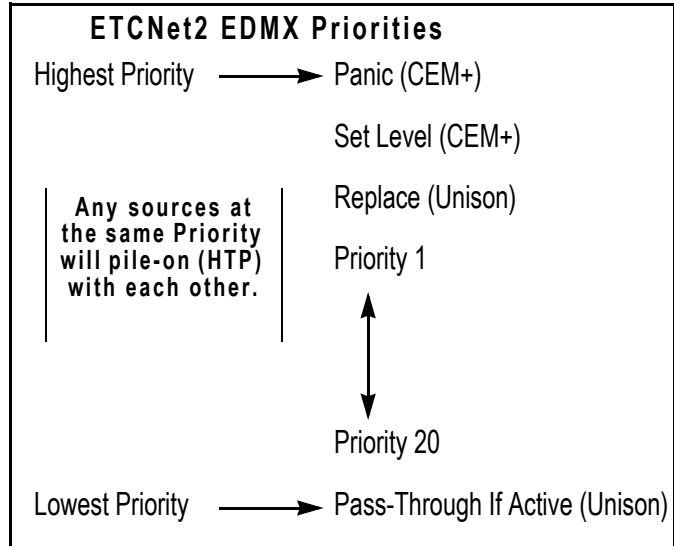
The CEM+ uses the same priority structure as all of the ETC products that use ETCNet2 and adds two more internally.

Any incoming EDMX is re-prioritized internally on the CEM+ as set on the patch page. The priorities of the EDMX sources (Congo, Emphasis, Obsession II, Unison, ETCNet2 DMX Node) are used to determine what level information makes it to the CEM+. That level information is then flatly re-prioritized to the level specified on the patch page.

That means that if (for the same set of EDMX addresses) you set your Emphasis to an EDMX priority of two (2), an Obsession II to a priority of nine (9) and an input port of a DMX Node to a priority of two (2), the level information will pile-on/HTP for the DMX Node and Emphasis and ignore the Obsession II's levels. Internally to a CEM+ that EDMX level information will be prioritized and used at the EDMX priority setting on the patch page (defaults to a priority of 10). The EDMX priority is set on a rack-by-rack basis just like the DMX ports.

Once inside the CEM+, the new priority is used when determining what source level information is used (EDMX, DMX Port A, DMX Port B, Presets, Set Levels and Panic).

EDMX, DMX Port A, DMX Port B, and Presets can all be set with their own priorities (1-20). Set Levels and Panic have fixed priorities above the other priorities. See the inset above.



Chapter 2

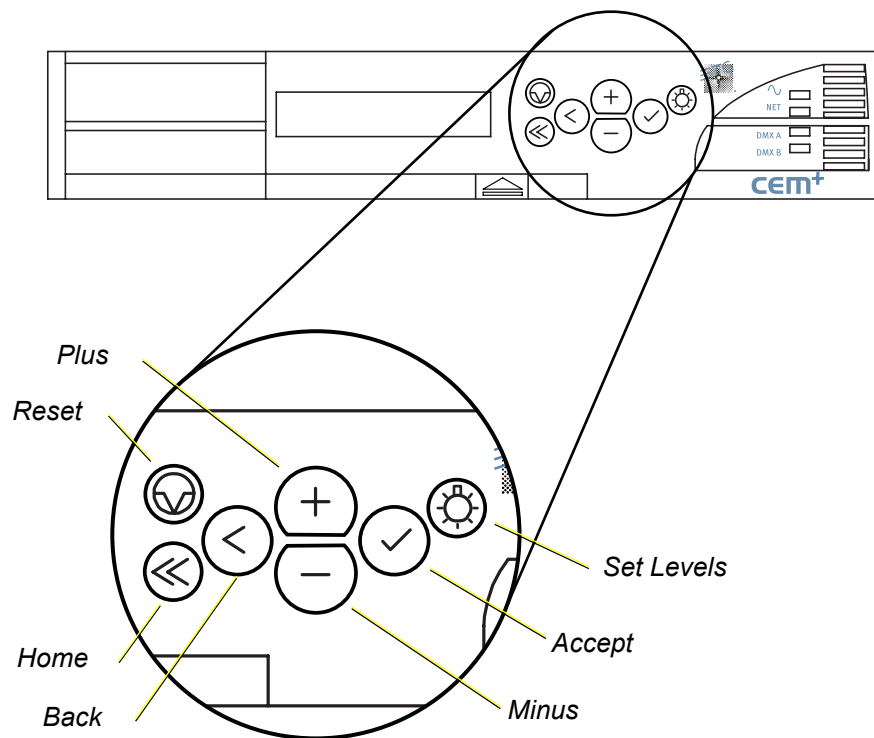
Basic Navigation

This manual covers functions and configuration of the CEM+ and Sensor+ Connect that are available to the **User** and **Power User** login levels of the full face panel menu. The Basic/Portable feature set and menu is covered in [Appendix A: Basic/Portable Mode on page 53](#).

| User Level | PIN |
|--------------|------|
| Default/User | None |
| Power User | 3333 |

The CEM+ User Interface

You can access all the menus described in this chapter using the buttons on the face of the CEM+ module. Menus and messages are displayed on the integral 2x20 LCD display.



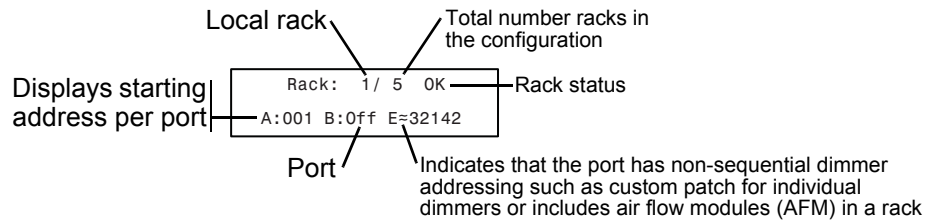
The CEM+ user interface:

- Use ⏪ to return to the main menu at any time.
- Use (+) and (-) to scroll through menus and through digits and letters in screens requiring user input.
- Use (✓) to accept settings and to view the error list.
- Use (←) to step back through menus.
- Use (⚙️) to access the Set Levels menu.
- Use (🔄) to reset the CEM+.

CEM+ Basic Operation

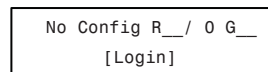
The procedures covered in this section are available to users logged in as **User**, which requires no password or PIN, and **Power User** which does require a password or PIN.

The Default Display

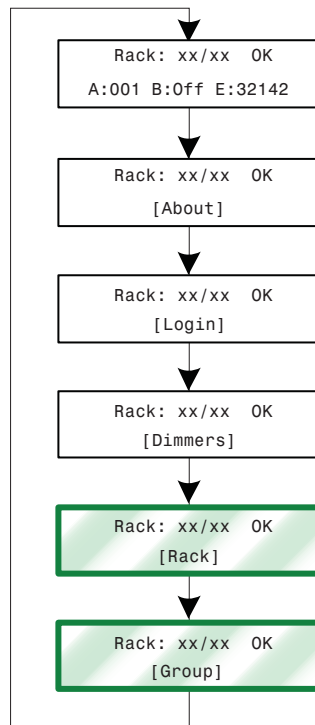


The Main Menu

The main menu is accessed using the (+) and (-) buttons on the CEM+ face panel. Each of the main menu items is described in the following pages. Each main menu item contains a number of sub-menus, each of which is illustrated in each section. To return to the CEM+ resting display (the display at the top of the diagram to the right), press (⏪).



*This menu appears only when there is **no configuration** in the CEM+.*



*This menu appears when there is a **configuration** in the CEM+.*

*These menus are available to **User**.*

*These menus are available to **User & Power User**.*

For the full menu structure, please [See "Appendix F: CEM+ LCD Menu" on page 69.](#)

NoConfig

The NoConfig menu provides a place to make initial base settings and begin to create a configuration for the local CEM+. The NoConfig menu has no login requirements and anyone has access to these menu items.

Generate Defaults

The Generate Defaults menu allows you to create an initial configuration for your local rack. You can set your group and rack numbers along with rack type and dimmer information. However, you can only add multiple racks of the same type. Additional racks or rack types must be added later via the Add Racks menu item. For the face panel menu see [Add Rack \[Power\], page 15](#) and for the web interface see [Add Racks, page 22](#).

- The first menu option within generate defaults allows you to choose between the main modes of operating feature sets. Options are Full Feature or Basic/Portable. This is a fundamental configuration mode choice. Basic/Portable mode provides a subset of full feature functionality for use in simple touring applications. For more info see [Basic/Portable Mode, page 53](#).
- Rack Types: **SRxx** is the U.S. style permanent installation rack and **SPxx** is the U.S. style type of portable rack (including touring racks). **ESRxx** and **ESPxx** are for European installation racks and portable racks respectively. In all cases, the “xx” number is determined by the number of slots in the rack for modules (*not* the number of dimmers).

Set Group/Rack/Net

The Set Group / Rack menu allows you to set the rack number of your local rack and the group number it belongs to. It also provides a place to set the network information (IP address, subnet mask and gateway IP). This should be done before creating a configuration. Changing this information may require the CEM+ to reboot to take effect.

Get Config From

After selecting this function, you will be prompted with the name of the rack you want to get the configuration from.

Options will include:

- **Racks [1-16]** which refers to any of the other racks that may be online and configured as being from the same group.
- **FTP Server** which refers to an FTP server if one is configured on your lighting network. It will ask you to specify the server’s IP address. Please see the section [FTP Server, page 45](#) for more information about setting up an FTP server for use with CEM+.
- **Backplane (Stored in Rack)** which refers to the configuration information stored in the back plane of the local rack.

Once the configuration source has been chosen, it will transfer the configuration to the local CEM+. After the transfer is complete, you will get a confirmation or error message for the transfer.

About

The About menu provides status information about the dimmers, racks, network and Group. Everything in the About menu is accessible by all users. No settings can be changed within the About menu. Data can only be viewed.

Dimmer

About Dimmer provides information about a selected dimmer, including recorded and actual loads, the dimmer type, curve and maximum voltage. You can also view the current output level, the source of that level, and the dimmer’s location.

Rack General

The Rack General menu provides the current ambient temperature and air flow status of the selected rack. It also displays the rack type, the air filter cleaning reminder setting, and the number of hours until the air filter cleaning reminder is due.

Network

About Network provides the network settings for the currently selected rack. You can view the settings for any rack in the Group.

Rack Data Ports

About Rack Data provides status information for the DMX and EDMX inputs for any rack in the Group.

Rack Power

About Rack Power provides status information for the line feed power and the voltage headroom settings for any rack in the Group.

Identify Rack

Identify Rack flashes the LCD and buttons on the face panel of the selected rack.




Group

About Group provides the name set for the Group.

About Software

Provides the software version currently installed in the racks.

Login


The Login menu is where you enter the PIN number for the user level you want to access. **User** level needs no PIN to view the menu items accessible to them. You will need to enter a four-digit PIN to gain access to features that are restricted to higher user levels. Enter **3333** for **Power User** level access. Use  and  to scroll the digits and use  to enter the set digit.

Dimmer [User][Power]

The Dimmer menu allows you access to setting and releasing dimmer levels, and **Power** allows access to less commonly accessed features such as renaming of racks and dimmers as well as higher level module setup items such as setting the scale and preheat properties, advanced feature settings, and deleting the configuration.

Set/Release Levels

The Set Levels menu allows you to set (or release) a dimmer or a range of dimmers to a specified level at the CEM+. Levels set here take priority over any other level inputs, such as control consoles and architectural control systems. Once released, those dimmers are available to other control inputs. Levels set here do not take priority over levels generated by an active Panic look.

The  button on the CEM+ face panel accesses this menu directly.

Setup Dimmer

Set Firing Mode

The Set Firing Mode menu allows you to set a dimmer or a range of dimmers to a specific firing mode. Available modes include Normal, Off, Switched, Fluorescent and DD (Dimmer Doubled).



Note: *Changing the dimmer firing mode will cause a change to default settings for curve, minimum voltage, maximum voltage, threshold and regulation. Whenever a dimmer mode is set the defaults for that mode will be applied to the other dimmer properties.*

Dimmer firing modes:

- Off: turns the dimmer off.
- Normal: operates as a standard incandescent dimmer.
- Switched: dimmers output unregulated AC voltage when the control level is above the threshold level.
- DD (Dimmer Doubled) (60Hz systems only): dimmer operates as two controllable circuits. See [Dimmer Doubling \(60Hz systems only\), page 5](#).

Set Curve

The Set Curve menu allows you to set a dimmer or a range of dimmers to a specific curve. A dimmer curve is a mathematical function that maps control levels to RMS output voltage. Curves are scaled from the minimum voltage to the maximum voltage (settings that are not available to the **User** login). The CEM+ supports the following curves: Square, Mod Square, Linear, Mod Linear, Sensor 2.0. See [Dimmer Curves, page 65](#), for more information.

Scale & Preheat [Power]

The Scale & Preheat menu allows you to set Voltage Regulation, Dynamic Preheat, DC Output Prevent and Inrush Settings for a dimmer or range of dimmers.

- Max Scale Voltage: set a dimmer or a range of dimmers to a maximum output voltage that is the top (100% control) of the scaled output of that dimmer.
- Min Scale Voltage: set a dimmer or a range of dimmers to a minimum output voltage that is the bottom (1% control) of the scaled output of that dimmer. The dimmer will switch on to an RMS output voltage of Min Scale Voltage when the control level reaches the value set for threshold.
- Set Threshold: set a dimmer or a range of dimmers to a specific control level at which it begins to respond. Below that level, the dimmer will remain off.
- Dynamic Preheat: this setting allows quick blackouts on dimmers that are set to preheat.
- Voltage Regulation: when enabled, the dimmer will regulate to the desired output voltage. When disabled, the dimmer will be set to a constant firing time based on the control level. This setting defaults “on”. The ability to disable regulation is sometimes useful when dimming non-tungsten loads.
- Inrush Protection: this setting protects against large voltage increases in a single AC cycle. This protection is useful for high-wattage loads that may cause nuisance tripping of circuit breakers and to limit peak currents in wiring and switch gear. This protection is particularly useful on RCD/GFCI protected circuits. Settings for inrush protection include: Instant (inrush protect off), 100mS (for loads up to 10A), 300mS (for loads up to 25A) and 500mS (for loads of 50 or 100A).
- DC Output Prevent: this setting offers protection on selected dimmers for loads that are sensitive to DC buildup, which can occur under certain conditions when positive and negative half-cycles become uneven.
- Scale Load: This setting adjusts the choke correction curve based on the specified percent load of the maximum for that dimmer type. Scale Load can be set from 1% to 100% and should reflect the approximate percent load on a given dimmer to precisely

match all dimmed load. The default setting is 35% which is based on a single Source Four 750w fixture on a D20 dimmer with a max scale voltage of 115Vac.

Advanced Features [Power]

The Advanced Features menu allows you to set Advanced Features (on/off), Report Load Errors, AF Sensitivity, and AF Reaction Time for a dimmer or range of dimmers.

- Advanced Features (on/off): additional feedback from a dimmer that provides load recording/reporting and advanced error reporting including a breaker trip, module removed, load changes, dc output and SCR failures.
- Report Load Errors (on/off): allows for messages to report load changes once initial loads have been recorded for a dimmer.
- AF Sensitivity (1 to 10): defines the resolution of the Advanced Features sensitivity in reporting load changes. One (1) is the most sensitive/highest resolution setting and the default is 5. AF sensitivity is based on a percentage of the recorded load.
- AF Reaction Time (5 to 60 seconds): this setting defines the hysteresis for an Advanced Feature error. The error must be present for the minimum set in the AF Reaction Time before an error will be reported.

Assign Dim to Room [Power]

The Assign Dimmer to a Room menu allows you to set a dimmer or a range of dimmers to a specific room for use with recording presets. A dimmer can only be assigned to a single room at a time. There are four (4) rooms available and all dimmers default to being assigned to Room 1.

Set Dimmer Name [Power]

The Set Name menu allows you to name a dimmer. Names are alphanumeric and can be up to 20 characters long (not all 20 characters will be visible on the LCD).

Dimmer Check

The Dimmer Check menu allows you to set an output level and then step through dimmers at a selected starting point.

Rack [User][Power]

The Rack menu includes menus for setting the rack name and patch settings. The Rack menu is partially available to those logged in at the **User** and complete to those logged in at the **Power User** level.

Patch

The Set Patch menu allows you to enable and disable DMX and EDMX inputs, set their priority and create the patch for those input ports. Patching is more abstract than simply turning a function on and off. There are different methods try to simplify this process for you by matching a method with your intent.

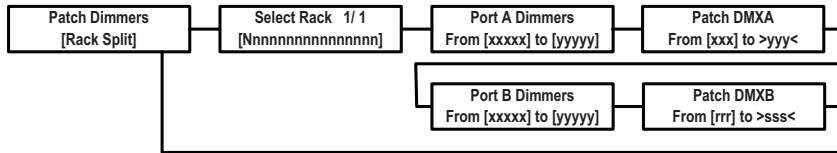
There are three methods to create or modify the patch from the face panel.

By Start Address

This method allows you to pick a rack, pick the port (DMX A, DMX B or EDMX) then a starting address. That starting address is used to sequentially address the rest of the dimmers in that rack for that port. If you are patching DMX A, there is a provision built-in to accomodate crossing over to DMX B after running out of addresses on DMX A. (This typically happens in larger systems on the 6th SR48 rack) This is the simplest way to setup addressing for a dimmer rack.

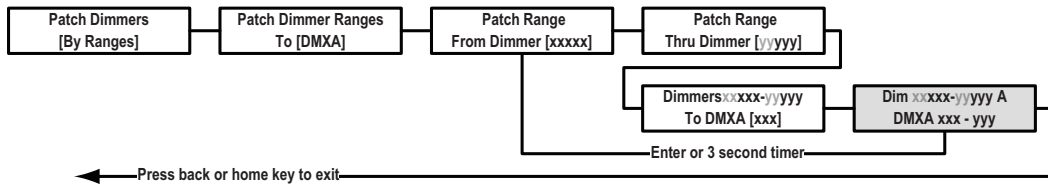


Rack Split



This method allows you to pick a rack, a range of dimmers to assign to DMX Port A, then a range of addresses from Port A to assign them to. It then does the same for DMX Port B. This is mainly used when using two separate sources to control different portions of the same dimmer rack.

By Ranges



This method allows you total control over patching ranges or individual dimmers to ranges of addresses or non-sequential individual addresses via the face panel.

- Step 1: Choose the port (DMX A, DMX B or EDMX) you want to patch.
- Step 2: Choose the first dimmer number you want to patch
- Step 3: Choose the last dimmer number you want to patch. If the last dimmer number is the same as the first dimmer number, you will only patch a single dimmer.
- Step 4: Choose the first address of the previously chosen port to begin assigning to those dimmers. This will be done sequentially from the first to last dimmer chosen or until you run out of addresses by going beyond valid maximum range. DMX has a valid range of 1 to 512 and EDMX has a valid range of 1 to 32767.
- Step 5: Repeat Step 2 through Step 4 until your patching is complete.
- Step 6: Press the button or button to exit.

Data Port & Priority

The Data Port & Priority menu allows you to choose the rack and port (DMX A, DMX B or EDMX) and set the control priority to be used in determining the control source or sources for HTP. Priorities have a range from 20 (lowest) to 1 (highest). All ports default to 10 along with other ETC products so that the default control state is HTP. You can also enable or disable the data ports from this menu.

Data Loss Behavior

Data Loss Behavior can be set independently for each input port (DMX A, DMX B and EDMX) in each rack in the Group. Data loss behavior options are: Hold Last Look, Wait & Fade Out and Play Preset. When data is restored, the source look will fade in at a 2-second rate.

- Hold Last Look: the CEM+ will hold any active dimmers at whatever levels they were receiving when the data was lost. The dimmers will remain on until data is restored or the CEM+ is reset.
- Wait & Fade: the CEM+ will hold any active dimmers at whatever levels they were receiving when the data was lost for a user-defined amount of time and then fade those dimmers to zero (or to the levels generated by the next highest priority source) in a user-defined fade time. The maximum wait and fade time is 60:59 minutes.

- Play Preset: this setting will play back a preset when data is lost. The default fade time is 2 seconds. The preset that is activated is set in the Groups>Presets menu. Please see [DMX Loss Presets \[Power\], page 17](#) for more information.

Set First Dimmer

Set First Dimmer allows you to set the first dimmer number in a selected rack. For example, with two SR48 racks, Rack 1 defaults to a First Dimmer of 1, and Rack 2 defaults to a First Dimmer of 97.

There is also an option to establish “hotel” addressing at time of rack creation. This is done by setting the first rack’s first dimmer to 101. The CEM+ will then ask you if you want all of the racks in the group to use this method. In this scheme, the first rack begins with dimmer number 101, the second rack’s dimmers begins with dimmer number 201 and so on regardless of the number of actual dimmers in the racks. So the number of unused dimmer numbers between racks will vary. For example, SR6’s would typically leave 88 dimmer numbers unused between racks while SR48 would only leave 4.

Advanced Features [Power]

The Advanced Features menu allows you to enable/disable Advanced Features (AF) for a selected rack in the group.

Set Group / Rack [Power]

The Set Group / Rack menu allows you to set the rack number of your local rack and the group number it belongs to. This should be done before creating a configuration. Care and understanding should be used when making a change to these settings after a configuration is already loaded.

Set Rack Name [Power]

The Set Rack Name menu allows you to set the name of the rack you are currently browsing. Names are alphanumeric and can be up to 20 characters long (not all 20 characters will be visible on the LCD).

Set Phase Balance [Power]

The Set Phase Balance menu allows you to set the type of phasing used by the selected rack and the voltage of the line feed power. Available settings include: Balanced-3Phase, Balanced-1Phase, Straight-3Phase and Straight-1Phase.

- Balanced-3Phase: rack is fed 3-Phase power and dimmer numbers are distributed numerically by phase, rather than by rack position. Example: dimmers 1 and 2 are in the top slot of a rack; dimmers 3 and 4 are located first on the second phase, 1/3 of the way down the rack; dimmers 5 and 6 are located first on the third phase, 2/3 of the way down the rack.
- Balanced-1Phase: rack is fed split-phase power and dimmer numbers are distributed numerically by bus bar, rather than by rack position. Example: dimmers 1 and 2 are in the top slot of a rack; dimmers 3 and 4 are located in the first dimmer module of the bus bar, 1/2 of the way down the rack.
- Straight3-Phase: rack is fed 3-Phase power and dimmer numbers are distributed numerically from top to bottom in the rack. Example: dimmers 1 and 2 are in the top slot of a rack, dimmers 3 and 4 are located in the next slot, etc.
- Straight1-Phase: rack is fed 1-Phase power and dimmer numbers are distributed numerically from top to bottom in the rack. Example: dimmers 1 and 2 are in the top slot of a rack, dimmers 3 and 4 are located in the next slot, etc.

Set Temp Alarm [Power]

The Temp Alarm is used to generate a warning when the ambient temperature monitored by the rack exceeds a user-defined level. Use the Set Temp Alarm menu to set that level

for the selected rack.

Configure Fan [Power]

The Configure Fan menu allows you to configure the behavior of the fan in the selected rack. Available settings include: No Data/15 Min and Always On. No Data/15 Min will allow the fan to shut off if there have been no dimmer levels sent to that rack in 15 minutes. When levels are sent to dimmers in the rack, the fan will start up automatically. The fan will always run for 15 minutes following a reset of the CEM+.

Air Filter Timer [Power]

The Air Filter Timer menu allows you to set the amount of time between air filter cleaning reminders for a selected rack. This timer counts down only when the fan is running in the rack.

Voltage Headroom [Power]

This menu allows you to specify the threshold for the incoming voltage at which a warning will appear to notify you about a drop in voltage.

Set Network [Power]

Set Network allows a **User** to enable or disable the network, enable or disable BootP (defaults to disabled) and set the network addressing for a selected rack.

Network Defaults [Power]

Choosing yes from this menu will reset your network table (IP addresses, subnet masks, and gateway IPs) to their defaults for the current Group and Rack settings.

Get Config [Power]


After selecting this function, you will be prompted with the name of the rack you want to get the configuration from.

Options will include:

- **Racks [1-16]** which refers to any of the other racks that may be online and configured as being from the same group.
- **FTP Server** which refers to an FTP server if one is configured on your lighting network. It will ask you to specify the server's IP address. Please see the section [FTP Server, page 45](#) for more information about setting up an FTP server for use with CEM+.
- **Stored in Rack** which refers to the configuration information stored in the back plane of the local rack.

Once the configuration source has been chosen, it will transfer the configuration to the local CEM+. After the transfer is complete, you will get a confirmation or error message for the transfer.

Send Config to All [Power]

Upon pressing  for this function, you will immediately send the locally contained configuration out to all of the other CEM+ modules in the group and to the FTP server if one is configured for the group. Please see the section [FTP Server, page 45](#) for more information about setting up an FTP server for use with CEM+.

Delete All Racks [Power]

Choosing yes from this menu clears the rack configuration from the local rack (the one you are logged into), but does not clear everything from the CEM+. The network settings, and custom PIN for the face panel remain intact.

Add Rack [Power]

The Add Rack menu is the place to add additional racks to your existing configuration. You

do this by specifying: the rack voltage, the rack type, first dimmer in the rack, the patch mode, the ambient alarm temperature, the default module type, the phase balancing, and whether or not to enable Advanced Features for the rack.

Group [User][Power].

The Group menu includes the full menu trees for Presets and Panic functions (as they are both group-wide operations) as well as for recording loads, naming the group, setting the language, default login settings and the preferred scale for temperature reporting.

Presets

The Presets menus are used to activate and deactivate Presets at the rack. If you are logged in at the **Power User** level, you can also record and modify Presets from the CEM+.

There are four available Rooms and 128 available Presets in a single Group. A Room is a way of grouping dimmers - such as "Lobby" or "Auditorium". An individual Preset can only control dimmers assigned to the same Room. For example, a Preset with dimmers assigned to the Room named "Lobby" cannot also control dimmers in the Room "Auditorium".

Presets can also be assigned Priority. Priority is a function of ETCNet2 that defines how various sources of control interact with dimmers. The default priority for controllers on the network is 10. When controllers share the same priority level, a single dimmer assigned to those controllers will output the highest level it receives. If the controllers are at different priorities, the highest-priority controller (lowest priority number - a priority of 1 wins versus a priority 10) will win and the dimmer will output the level sent by that controller.

Activate Preset

The Activate Preset menu allows you to activate a selected preset.

Deactivate Presets

The Deactivate Preset menu allows you to deactivate a selected preset.

Clear Presets

The Clear Presets menu allows you to delete a selected preset.

Record Presets

The Record Presets menu allows you to assign a preset number, and set the source for levels, the fade time and playback priority and the room. If the preset number is already recorded, you can record over it with the new settings, or if the preset is empty, you can record these settings to that selected number.

Edit Fade Time [Power]

The Edit Fade Time menu allows you to update the fade time for a recorded preset.

Edit Priority [Power]

The Edit Priority menu allows you to update the priority for a recorded preset.

Edit Name [Power]

The Edit Name menu allows you to update the name of a recorded preset. Names are alphanumeric and can be up to 20 characters long (not all 20 characters will be visible on the LCD).

Power Up Behavior [Power]

The Power Up Behavior menu allows you to specify how all of the racks in the group behave upon booting up. **Normal** mode does not retain any active presets or dimmer levels. **Previous** mode will reactivate any presets that were active prior to the unit losing power or rebooting.

Station Master [Power]

The Station Master menu allows you to enable or disable this CEM+ as the Station Master.

It is important to understand that an entire Sensor+ group of racks acts (and counts) as a single device on the SmartLink network. The *Station Master* is the *Host Product* for SmartLink preset playback and synchronization. Please see *SmartLink™ Stations Enabled, page 55* for more information.

Remote Record [Power]

The Remote Record menu allows you to enable or disable the ability to record presets from a SmartLink station. This function becomes automatically disabled 30 minutes after the last preset recording action. Please see *Record a Preset from a Wall Station, page 59* for more information.

Edit Room Name [Power]

The Edit Room Name menu allows you to set the name of a room.

Max Active Presets [Power]

The Max Active Presets menu allows a you to set the maximum number of active presets for a selected room.

DMX Loss Presets [Power]

The DMX Loss Presets menu allows you to set the preset that is made active upon DMX data loss on DMX Port A or Port B for each room that has a preset recorded for it.

Panic [User][Power]

The Panic menu allows a **User** to activate and deactivate the Panic look and allows a **Power User** to record and clear the Panic look.

Activate Panic

The Activate Panic menu toggles between “Activate” and “Deactivate”, depending on the status of the Panic look.

Record Panic [Power]

The Record Panic menu allows you to record dimmers that currently have an output level at the Master Level, or greater, to the Panic look. You can set the Master Level to anything between 80% and 100%. When the Panic look is activated, the assigned dimmers will all output at the Master Level. You can also choose to set all other dimmers to turn off when panic is activated.

Clear Panic [Power]

The Clear Panic menu allows you to clear the current Panic settings.

Hold Time [Power]

The Hold Time menu allows you to set the panic hold time to 0 to 30 seconds.

Configure Switches [Power]

The Configure Switches menu allows you to define the external switch action types (maintained vs. momentary) and resting states (normally-open vs. normally-closed).

Record Loads [Power]

The Record Loads menu is used to record the loads on each dimmer. This is useful in Advanced Features systems where load reporting is desired.

Name Group [Power]

The Name Group menu allows you to set the name of the Group. Names are alphanumeric and can be up to 20 characters long (not all 20 characters will be visible on the LCD).

Set Language [Power]

The Set Language menu allows you to set the language of the user interface.

Ambient Temp Type [Power]

The Ambient Temp Type menu allows you to set temperature reporting as either Fahrenheit or Celsius.

Set Time Zone [Power]

The Set Time Zone menu allows you to set the GMT offset for your current time zone.

DST Mode [Power]

The DST Mode menu allows you to set daylight savings to be Auto, On or Off.

Set Login Time-out [Power]

The Set Login Time-out menu allows you to set the time after which the CEM+ will automatically log the current user out and return to the default access level as set in the Group configuration. The time-out is based upon inactivity at the keypad.

Set PIN [Power]

The Set PIN menu allows you to set the PIN for your current login access level and below.

Set Default Access [Power]

Set Default Access allows you to specify which user level the CEM+ boots and remains in. This can be either **User** or **Power**.

Chapter 3

Sensor+ Connect Web Interface Overview

This section covers functions and configuration of the CEM+ and Sensor+ Connect that are available to the **Guest**, **User** and **Power User** login levels.

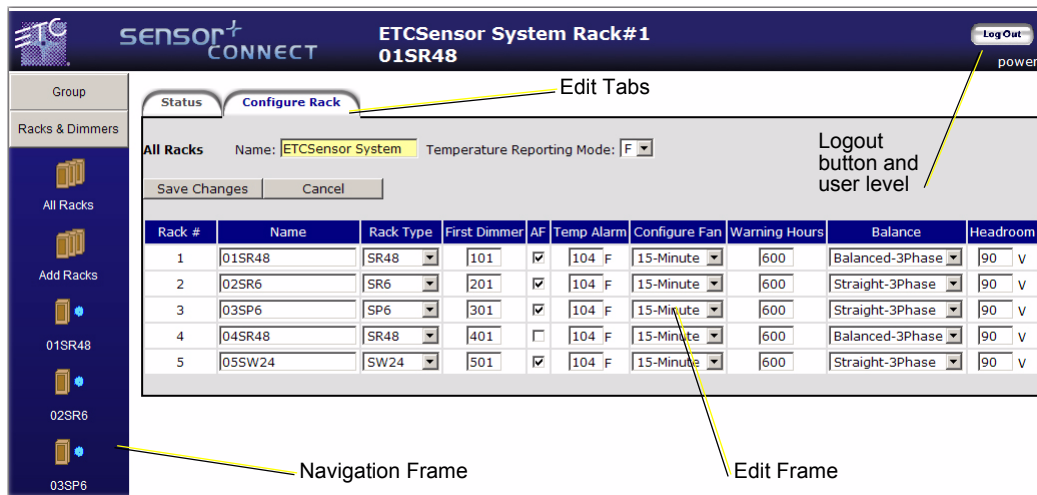
| User Level | Login | Password |
|------------|---------------|---------------|
| Default | [empty field] | [empty field] |
| Guest | guest | guestpass |
| User | user | userpass |
| Power User | power | powerpass |

The web interface is a series of web pages intended to give you easier access to all of a CEM+ module's features and settings. This section will provide you screenshots of various key pages and provide further insight into how to use them. Setup and configuration procedures are covered in [Chapter 4: CEM+ Procedures on page 33](#).

For a complete web interface site map outline, please see [Appendix G: Sensor+ Connect Site Map on page 76](#).

The CEM+ module contains a web server that delivers graphical web pages for you to use during system configuration. The Sensor+ Connect Web browser interface can be used instead of the direct buttons on the CEM+ module itself. You can use an Ethernet-capable PC connected to the ETCNet2 network and running Windows 2000 or XP and Internet Explorer 6 or later to browse into any of the Sensor+ racks on the network. Any changes made in the web interface are not communicated to the CEM+ until you send that information by clicking **Save Changes** on that page.

If you are using an Emphasis Control System running version 1.8.0 software or later, there is a command in the WYSILink menu that automatically opens a browser window and connects to Sensor+ racks.



Sensor+ Connect uses a navigation layout where the various main areas are selected on the left side of the page presenting sub-options. The right side of the page is used to view or edit the selected information.



Note: *The Emphasis Server network settings are the default ETC values and ready for immediate use. No configuration is required.*

You must set an IP address for any personal computer you plan to use on an ETCNet2 network. ETC recommends that the personal computer used on an ETCNet2 network is dedicated to that network so changes to network settings are kept to a minimum.



Note: *If the computer you wish to use is currently being used on a non-ETCNet2 network please consult your Network Administrator before changing the IP address, Subnet Mask or Gateway IP addresses.*

Group

Summary Status

This is the Status Summary page. It's the first page after you login to a CEM+.

The screenshot shows the 'Status Summary' page in the Sensor+ Connect interface. The page is divided into several sections:

- Header:** Displays 'SENSOR+ CONNECT', 'ETCSensor System', and 'Rack# 1 01-SP6AF'. A 'Log Out' button is visible in the top right corner.
- Left Navigation Panel:** Contains a 'Group' menu with options: 'Summary' (selected), 'Dimmer Level', 'Dimmer Check', and 'Search'.
- Main Content Area:**
 - Racks:** A list of racks with status indicators: 01-SP6AF (blue), 02-SR6AF (red), 03-SR48AF (blue), and 04-SR48 (blue).
 - Presets/Panic:** Shows 'Lobby' with a lightbulb icon.
 - Errors:** Lists errors: 'R 2 NO DATA PORT B', 'R 2 NO DATA PORT A', and 'R 2 MODULE 4 REMOVED'.

Annotations point to various elements:

- 'Group name Rack # & Rack name which you are logged into' points to the header.
- 'Current user level' points to the 'power' indicator in the header.
- 'List of racks in the Group' points to the 'Racks' section.
- 'Rack with an error' points to the red indicator for rack 02-SR6AF.
- 'Rack okay' points to the blue indicator for rack 04-SR48.
- 'List of errors within the Group' points to the 'Errors' section.
- 'List of active presets & panic' points to the 'Presets/Panic' section.

Dimmer Check

Also from the Group section is the Dimmer Check page. This page provides a quick and easy method to step through individual dimmers to do a dimmer check.

The screenshot shows the 'Dimmer Check' page for 'ETCSensor System Rack#1 01-SP6AF'. It features a 'Dimmer #' field set to 1 and a 'Level:' field set to 100. Below these are buttons for 'Previous', 'Next', 'Check Dimmer', and 'Release'. Callouts point to these elements with the following descriptions:

- Set dimmer number (points to Dimmer # field)
- Set dimmer level (points to Level field)
- Release current dimmer & apply level to previous dimmer (points to Previous button)
- Release current dimmer & apply level to next dimmer (points to Next button)
- Start dimmer check (points to Check Dimmer button)
- Release current dimmer (points to Release button)

Racks & Dimmers

All Racks

All Racks provides a place to access and set the properties of all racks in the configuration.

The screenshot shows the 'All Racks' configuration page for 'ETCSensor System Rack#1 01-SP6AF'. It includes a table of current rack status and a 'Configure Rack' form. Callouts provide the following descriptions:

- Provides current rack status information for all racks in the Group. (points to the 'All Racks' table)
- Set the name of the group (points to the Name field in the configuration form)
- Set the temperature scale to use (points to the Temperature Reporting Mode dropdown)
- Set the ambient alarm temperature (points to the ambient temperature field)
- Set the rack fan time-out (15 min. or Always On) (points to the Configure Fan dropdown)
- Set the rack name (points to the Name field in the table)
- Set the rack type (points to the Rack Type dropdown in the table)
- Set the first dimmer of the rack (points to the First Dimmer field in the table)
- Turn on/off Advanced Features (points to the AF checkbox in the table)
- Set the Patch Mode (Standard or Advanced) (points to the Patch Mode dropdown in the table)
- Set the fan cleaning countdown reminder (points to the Warning Hours field in the table)
- Set the load balancing according to supply power (points to the Balance dropdown in the table)
- Set the voltage headroom warning (points to the Headroom field in the table)

| Rack # | Name | Rack Type | Phase A | Phase B | Phase C | Frequency | Ambient |
|--------|-----------|-----------|---------|---------|---------|-----------|---------|
| 1 | 01-SP6AF | SP6 | 118V | 117V | 118V | 60.00Hz | 95F |
| 2 | 02-SR6AF | SR6 | 116V | 116V | 116V | 60.00Hz | 95F |
| 3 | 03-SR48AF | SR48 | 118V | 118V | 118V | 60.00Hz | 97F |
| 4 | 04-SR48 | SR48 | 117V | 117V | 117V | 60.00Hz | 73F |

| Rack # | Name | Rack Type | First Dimmer | AF | Patch Mode | Temp Alarm | Configure Fan | Warning Hours | Balance | Headroom |
|--------|-----------|-----------|--------------|-------------------------------------|------------|------------|---------------|---------------|-----------------|----------|
| 1 | 01-SP6AF | SP6 | 101 | <input checked="" type="checkbox"/> | Standard | 104 F | 15-Minute | 450 | Balanced-3Phase | 90 v |
| 2 | 02-SR6AF | SR6 | 201 | <input checked="" type="checkbox"/> | Standard | 104 F | 15-Minute | 450 | Balanced-3Phase | 90 v |
| 3 | 03-SR48AF | SR48 | 301 | <input checked="" type="checkbox"/> | Standard | 104 F | 15-Minute | 450 | Balanced-3Phase | 90 v |
| 4 | 04-SR48 | SR48 | 401 | <input type="checkbox"/> | Standard | 104 F | 15-Minute | 450 | Balanced-3Phase | 90 v |

Add Racks

This page is where you add racks to your configuration.

Add Racks

Save Changes | Cancel | Delete All Racks

First Rack to Add: 5
 Number of Racks to Add: 1
 Rack Type: SP6
 First Dimmer: 1009
 AF:
 240 Volts:
 Rack Name: SP48#5
 Patch Mode: Standard
 Temp Alarm: 104 F
 Module Type: D20AF
 Balance: Balanced-3Phase

Annotations:

- First dimmer of the first added rack.
- Enable Advanced Features for added racks.
- 240V changes the available rack & module types to European models. (Read below)
- Set initial patch mode.
- Set ambient temperature alarm.
- Set the default module type
- Set the phase balancing type

To change the rack and module types to the European models, click the **240V** check box. After checking **240V**, you must click **Save Changes** before you will see the available rack and module types change to European (ESR/ESP) models. Clicking **Save Changes** the first time after the 240V check box has been altered (checkmark vs. no checkmark) will not add a rack to the group.

Rack

Status

This page displays the individual rack's power information, the dimmers' control source and current intensity level.

Displays which rack's info you are viewing which may be different from the rack you logged in to.

Status | Configure Rack | Configure Dimmers | Errors

Rack 02-SR6AF Temp: 95F Phase A: 116v Phase B: 116v Phase C: 116v Frequency: 60.00 Hz
 Clean: 450 Hours

| Dimmer # | Name | Pos. | Control Source | Level |
|----------|-----------|------|----------------|-------|
| 201 | Dimmer201 | 1 | EDMX | 0% |
| 202 | Dimmer202 | 2 | EDMX | 0% |
| 203 | Dimmer203 | 5 | EDMX | 0% |
| 204 | Dimmer204 | 6 | EDMX | 0% |
| 205 | Dimmer205 | 9 | EDMX | 0% |
| 206 | Dimmer206 | 10 | EDMX | 0% |
| 207 | Dimmer207 | 3 | EDMX | 0% |
| 208 | Dimmer208 | 4 | EDMX | 0% |
| 209 | Dimmer209 | 7 | EDMX | 0% |
| 210 | Dimmer210 | 8 | EDMX | 0% |
| 211 | Dimmer211 | 11 | EDMX | 0% |
| 212 | Dimmer212 | 12 | EDMX | 0% |

Configure Rack

This page is the individual rack equivalent to the All Racks/Configure Rack page listed above. See "All Racks" on page 21.

Configure Dimmers

This webpage provides a single place to set all of your dimmer's properties. Below is a list explaining each one of the settings.

| Threshold | Min. Scale Voltage | Max. Scale Voltage | Voltage Regulation | Preheat | Dynamic Preheat | DC Output Prevent | InRush Protect | AF | Load Errors | AF Sensitivity (1-10) | AF Reaction | Scale Load |
|-----------|--------------------|--------------------|-------------------------------------|--------------------------|-----------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-----------------------|-------------|------------|
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |
| 1 % | 6 V | 115 V | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5 | 10 s | 35 % |

Set Dimmer Name [User]

The Set Name menu allows you to name a dimmer. Names are alphanumeric and can be up to 20 characters long (not all 20 characters may be visible on the LCD).

Set Module Type [Power]

The Set Module Type menu allows you to set a dimmer or range of dimmers to a specific module type and firing mode. If the module is set to “Fluorescent”, you also set the threshold in this menu. Threshold is the control level that must be present for the fluorescent dimmer to output voltage based on the selected curve.

Pos (Position) [Power]

This is a display only field. It lists the position of each circuit within a rack.

Set Firing Mode [Power]

The Set Firing Mode menu allows you to set a dimmer or a range of dimmers to a specific firing mode. Available modes include Normal, Off, Switched, Fluorescent and DD (Dimmer Doubled).

- Off: turns the dimmer off.
- Normal: operates as a standard incandescent dimmer.
- Switched: dimmers output unregulated AC voltage when the control level is above the threshold level.
- DD (Dimmer Doubled): dimmer operates as two controllable circuits. See [Dimmer Doubling \(60Hz systems only\), page 5](#).



Note:

Changing the dimmer firing mode will cause a change to default settings for curve, minimum voltage, maximum voltage, threshold and regulation. Whenever a dimmer mode is set the defaults for that mode will be applied to the other dimmer properties.

Set Curve [User]

The Set Curve menu allows you to set a dimmer or a range of dimmers to a specific curve. A dimmer curve is a mathematical function that maps control levels to RMS output voltage. Curves are scaled from the minimum voltage to the maximum voltage (settings that are not available to the **User** login). The CEM+ supports the following curves: Square, Mod Square, Linear, Mod Linear, Sensor 2.0. See [Dimmer Curves, page 65](#), for more information.

Set Threshold [Power]

The Set Threshold menu allows you to set a dimmer or a range of dimmers to come on at a specific intensity level.

Set Min Scale Voltage [Power]

The Min Scale Voltage menu allows you to set a dimmer or a range of dimmers to a minimum output voltage that is the bottom (1% control) of the scaled output of that dimmer.

Set Max Scale Voltage [Power]

The Max Scale Voltage menu allows you to set a dimmer or a range of dimmers to a maximum output voltage that is the top (100% control) of the scaled output of that dimmer.

Voltage Regulation [Power]

When enabled, the dimmer will regulate to the desired output voltage. When disabled, the dimmer will be set to a constant firing time based on the control level. This setting defaults “on”. The ability to disable regulation is sometimes useful when dimming non-tungsten loads.

Preheat [Power]

This setting enables/disables preheat for the selected dimmer. The preheat level is the Minimum Scale Voltage.

Dynamic Preheat [Power]

This setting allows quick blackouts on dimmers that are set to preheat. It sets the amount of time a dimmer will remain at a zero (0) level before returning to the preheat level. It can be set from 0.5 seconds to 15 seconds and has a default of 2 seconds.

DC Output Prevent [Power]

This setting offers protection on selected dimmers for loads that are sensitive to DC buildup, which can occur under certain conditions when positive and negative half-cycles become uneven.

Inrush Protection [Power]

This setting protects against large voltage increases in a single AC cycle. This protection is useful for high-wattage loads that may cause nuisance tripping of circuit breakers and to limit peak currents in wiring and switch gear. This protection is particularly useful on RCD/GFCI protected circuits. Settings for inrush protection include: Instant, 100mS (for loads up to 10A), 300mS (for loads up to 25A) and 500mS (for loads of 50 or 100A).

Advanced Features (AF) [Power]

Enables/disables additional feedback from a dimmer that provides load recording/reporting and advanced error reporting including a breaker trip, module removed, load changes, dc output and SCR failures.

(Report) Load Errors [Power]

Enables/disables messages to report load changes once initial loads have been recorded for a dimmer. Load errors must be enabled to record loads in **Load Management**. See [“Load Management” on page 32.](#)

AF Sensitivity (1-10) [Power]

This setting defines the resolution of the Advanced Features sensitivity to report load changes. One (1) is the most sensitive/highest resolution setting and the default is 5. AF sensitivity is based on a percentage of the recorded load.

AF Reaction (Time) [Power]

This setting defines the hysteresis for an Advanced Feature error. The error must be present for the minimum set in the AF Reaction Time before an error will be reported. Five (5) seconds is the shortest amount of time and 60 seconds is the longest allowed.

Scale Load [Power]

This setting adjusts the choke correction curve based on the specified percent load of the maximum for that dimmer type. Scale Load can be set from 1% to 100% and should reflect the approximate percent load on a given dimmer to precisely match all dimmed load. The default setting is 35% which is based on a single Source Four 750w fixture on a D20 dimmer with a max scale voltage of 115Vac.

Errors

Errors for a rack can be viewed and cleared on this webpage.

1) To clear a specific error, click in the check box then...

2) Click the Clear Error(s) button.

...or...

Click the Clear All Error(s) button to clear all errors regardless of the check boxes.

| Rack # | Error String | Time |
|-------------------------------------|----------------------|-----------------------------|
| <input type="checkbox"/> | R 2 MODULE 4 REMOVED | September 28, 2004 20:57.04 |
| <input type="checkbox"/> | R 2 NO DATA PORT B | September 28, 2004 21:47.48 |
| <input checked="" type="checkbox"/> | R 2 NO DATA PORT A | September 28, 2004 21:48.54 |

Search

The Search pages (search appears multiple times within the Sensor+ Connect webpages) allow you to find dimmers based on multiple search criteria. For example, you can search for all of the D20AF modules in rack 3 with a specific dimming curve.

The results of that search are presented on a dimmer status page (the next tab).

Selected search criteria (from the example above)

Using the Configure Dimmers webpage within the Search function provides an easy way to set one property or properties on the top of the page and have it apply those settings to every found dimmer in the group.

These are the same dimmer properties as explained above. [See "Configure Dimmers" on page 23.](#)

You can also use the **Configure Dimmers** tab to modify the properties of all the found dimmers at once. (See below.)

Apply to All makes the changes to the table below.

Save Changes updates the information in the CEM+

Use this section to make changes that will get applied to all found dimmers below.

This section gets the changes applied to it.

| Dimmer # | Name | Module | Pos. | Mode | Curve | Threshold | Min. Scale Voltage | Max. Scale Voltage | Voltage Regulation | Preheat | Dynamic Preheat | DC Output Preheat | Inrush Protect | AF | Load Errors | AF Sensitivity (1-10) | AF Reaction | Scale Load |
|----------|-----------|--------|------|--------|------------|-----------|--------------------|--------------------|--------------------|---------|-----------------|-------------------|----------------|----|-------------|-----------------------|-------------|------------|
| 301 | Dimmer301 | D020AF | 1 | Normal | Mod-Square | 1 | 5 V | 115 V | | | 2 | | | | | 5 | 10 S | 35 % |
| 302 | Dimmer302 | D020AF | 2 | Normal | Mod-Square | 1 | 5 V | 115 V | | | 2 | | | | | 5 | 10 S | 35 % |
| 307 | Dimmer307 | D020AF | 3 | Normal | Mod-Square | 1 | 5 V | 115 V | | | 2 | | | | | 5 | 10 S | 35 % |
| 308 | Dimmer308 | D020AF | 4 | Normal | Mod-Square | 1 | 5 V | 115 V | | | 2 | | | | | 5 | 10 S | 35 % |

Rooms & Presets

Assign Dimmers

All dimmers in a group default to being in (and thus available only to) Room1. You can assign a dimmer or range of dimmers to any of the rooms (1-4) only once. Shown below, dimmers 101-112 are assigned to Room1 and dimmers 113-114 are assigned to Room2.

Station Proxy = [Station Master, page 55](#)
 Button Program = [Record a Preset from a Wall Station, page 59](#)
 Used with SmartLink stations and SmartLink products

Use this section to assign a range of dimmers to a room.

Use this section to assign an individual dimmer to a room.
 Dimmers may only be assigned to a single room

| Dimmer # | Name | Room # |
|----------|------|-------------|
| 101 | | 1: 2: 3: 4: |
| 102 | | 1: 2: 3: 4: |
| 103 | | 1: 2: 3: 4: |
| 104 | | 1: 2: 3: 4: |
| 105 | | 1: 2: 3: 4: |
| 106 | | 1: 2: 3: 4: |
| 107 | | 1: 2: 3: 4: |
| 108 | | 1: 2: 3: 4: |
| 109 | | 1: 2: 3: 4: |
| 110 | | 1: 2: 3: 4: |
| 111 | | 1: 2: 3: 4: |
| 112 | | 1: 2: 3: 4: |
| 113 | | 1: 2: 3: 4: |
| 114 | | 1: 2: 3: 4: |

Room (1-4)

Clicking on a room in the navigation bar will bring up the display shown below. This is where you create presets, name presets, record or snapshot presets to give them level information or clear a preset to remove all level information from it.

Creates a new preset to be named and recorded later.

Indicates which room you are currently viewing.

Indicates an inactive preset.

Indicates an active preset.

Indicates which preset is being manipulated.

Set Level will record only the level information set at the CEM+ in the preset.

Snapshot will use all level information available to the CEM+ in the preset.

Configuration

Panic

This is the page where you configure Panic for switch mode and type as well as record or clear the Panic preset.

Momentary

Normally-Open

Normally-Closed

Master Level is the threshold for dimmer levels when recording Panic. Dimmers with levels below the threshold will not be recorded in Panic.

Force others off enables load shedding. (If a dimmer is not part of the recorded Panic, they are turned off.)

Patch

Port Settings

The port settings page is where you can enable/disable any of the data input ports as well as the port relative priority inside the CEM+, and any port's data loss behavior on any of the Sensor+ racks. Along with the port settings are the some basic patch settings. You can assign the starting DMX address for each rack's data port (DMX & EDMX).

The default patch gives every port on every rack a starting address and sequentially addresses the rest of the dimmers in the rack from that point. By default every rack added will be set to an incremental DMX address starting at one (1) and continuing with the next available DMX channel available with only port A enabled on each rack (Port B and EDMX are disabled by default).

Hold Last Look
Wait and Fade
Crossfade To

Both must be checked for DMX Output from port B to work.

| Rack # | Port | First Patched Dimmer | Start Address | End Address | Length | Enable | Priority | Data Loss | Fade Time | Hold Time |
|--------|------|----------------------|---------------|-------------|--------|-------------------------------------|----------|---------------|-----------|-----------|
| 1 | DMXA | 101 | 301 | 396 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 1 | DMXB | 101 | 301 | 396 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 1 | EDMX | 101 | 301 | 396 | 96 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | DMXA | 201 | 201 | 212 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | DMXB | 201 | 201 | 212 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 2 | EDMX | 201 | 201 | 212 | 12 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | DMXA | 301 | 101 | 112 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | DMXB | 301 | 101 | 112 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 3 | EDMX | 301 | 101 | 112 | 12 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | DMXA | 401 | 401 | 496 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | DMXB | 401 | 401 | 496 | 96 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 4 | EDMX | 401 | 401 | 496 | 96 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 5 | DMXA | 501 | 501 | 512 | 12 | <input type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 5 | DMXB | 507 | 1 | 512 | 512 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |
| 5 | EDMX | 501 | 501 | 1018 | 518 | <input checked="" type="checkbox"/> | 10 | Wait_and_Fade | 2 Sec. | 180 Sec. |

DMX Port B Output is also enabled here. You need to enable **both** the Port B Output and the DMX B port of the last logical rack in the group. DMX Port B Output takes patched EDMX and outputs 512 channels of DMX.

Patch

The patch page provides a powerful and convenient place to alter the default 1 to 1 patch to suit your individual needs. The patch itself is a table of addresses that you can use to assign various control channels (DMX and/or EDMX) to individual dimmers. The dimmer number and name are in the columns to the left and the rest of the row are the control channels that are patched to that dimmer. Control addresses must be limited to their respective valid ranges. Valid DMX range is 1 through 512. Valid EDMX range is 1 through 32767. If your patching causes the range to exceed either of the valid maximums, the remainder of the specified dimmers will remain unpatched.

Dimmer Doubled Patch

If a dimmer's mode is set to dimmer doubling (60 Hz systems only), the B-side of the dimmer gets its control from one of the columns labeled "DD" depending on the ports that are enabled. By default, DMX B-side dimmers are offset by 256 and EDMX B-side dimmers are offset by 20000 as shown below.

Apply to All makes the changes to the table below.

Save Changes updates the information in the CEM+

Use this section to do range patching based on the criteria given in the fields provided.

Use this section to edit individual dimmers for all ports.

| Dimmer # | Name | DMXA | DMXA DD | DMXB | DMXB DD | EDMX | EDMX DD |
|----------|-------------|------|---------|------|---------|------|---------|
| 101 | Dimmer00101 | 1 | 257 | 1 | 257 | 301 | 20301 |
| 102 | Dimmer00102 | 2 | 258 | 2 | 258 | 302 | 20302 |
| 103 | Dimmer00103 | 3 | 259 | 3 | 259 | 303 | 20303 |
| 104 | Dimmer00104 | 4 | 260 | 4 | 260 | 304 | 20304 |
| 105 | Dimmer00105 | 5 | 261 | 5 | 261 | 305 | 20305 |
| 106 | Dimmer00106 | 6 | 262 | 6 | 262 | 306 | 20306 |
| 107 | Dimmer00107 | 7 | 263 | 7 | 263 | 307 | 20307 |
| 108 | Dimmer00108 | 8 | 264 | 8 | 264 | 308 | 20308 |
| 109 | Dimmer00109 | 9 | 265 | 9 | 265 | 309 | 20309 |
| 110 | Dimmer00110 | 10 | 266 | 10 | 266 | 310 | 20310 |
| 111 | Dimmer00111 | 11 | 267 | 11 | 267 | 311 | 20311 |
| 112 | Dimmer00112 | 12 | 268 | 12 | 268 | 312 | 20312 |
| 113 | Dimmer00113 | 13 | 269 | 13 | 269 | 313 | 20313 |

Network

The Network screen displays the network table for the CEM+. This information is local to the CEM+ and changing IP information here does not change the corresponding CEM+'s actual IP address. It only serves as a place to store and lookup the IP addresses of other CEM+s in the same group. This table does get shared to the other CEM+s in the group.

Save Changes must be clicked to send your changes to the CEM+.

Restore Defaults resets the network table IP information to a default state based on the filled in **Rack** and **Group** settings.

Annotations for the Network screen:

- Save Changes: Send changes to the CEM+.
- Restore Defaults: Resets network table IP information to default state based on Rack and Group settings.
- Web UI Timeout: Set the web UI inactivity time-out in minutes.
- Front Panel UI Timeout: Set the face panel / LCD inactivity time-out in minutes.
- Default Access Level: Set the default login user level. (when logging in with no password)
- Multicast IP: The multicast IP address. Do not change this unless told to do so by Technical Services.
- Network Table: Make the CEM+ active in the network table.

| Rack # | IP | Enable | BootP | Gateway | Network Mask |
|------------|----------------|-------------------------------------|--------------------------|----------------|--------------|
| FTP Server | 10.101.101.117 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.101.117 | 255.255.0.0 |
| 1 | 10.101.109.101 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 10.101.109.101 | 255.255.0.0 |
| 2 | 10.101.109.102 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 10.101.109.102 | 255.255.0.0 |
| 3 | 10.101.109.103 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 10.101.109.103 | 255.255.0.0 |
| 4 | 10.101.109.104 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 10.101.109.104 | 255.255.0.0 |
| 5 | 10.101.109.105 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.109.105 | 255.255.0.0 |
| 6 | 10.101.109.106 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.109.106 | 255.255.0.0 |
| 7 | 10.101.109.107 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.109.107 | 255.255.0.0 |
| 8 | 10.101.109.108 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.109.108 | 255.255.0.0 |
| 9 | 10.101.109.109 | <input type="checkbox"/> | <input type="checkbox"/> | 10.101.109.109 | 255.255.0.0 |

To change the entire network table at once from the web interface, set the Group and Rack numbers and click **Restore Defaults**. This will repopulate the network table with the default addresses.



Note:

To edit the IP addresses directly from the web interface, you need to contact ETC Technical Services.

File Transfer

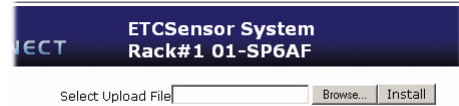
This webpage is used to initiate configuration transfers between the CEM+ module and an FTP server if one is configured and available. Please see the section [FTP Server, page 45](#) for more information about setting up an FTP server for use with CEM+.

Annotations for the File Transfer screen:

- Download: Download configuration from selected device IP address.
- Backup: Backup to all other devices in the group.
- Configuration Files: The four files that make up the group configuration.
- Sensor.rak, Arch.rm, Preset.pre, Panic.pan: The four files that make up the group configuration.
- Left-click file name to view
- Right-click & "Save Target as..." to save the file to disk.

File Upload

The **File Upload** web page is where you send either a configuration file or a software file to the CEM+ you are logged into. The CEM+ looks at the file being sent to automatically handle the file type or part of the configuration file.



Load Management

From this webpage, you can record, check, and clear load information for Advanced Feature modules (such as the D20AF).

For the functions on this page to work properly, you **must** turn on **Load Errors** for each of the advanced features (AF) dimmer modules you want to use in load management. Please see [Configure Dimmers, page 23](#) for more information about enabling load errors for a dimmer.

The **range** versions of these buttons use the **From/To** dimmer fields to determine what dimmers to include in the load management functions instead of dimmers with a non-zero control level as is normal.

| Dimmer # | Recorded Load | Actual Load | Level | Source |
|----------|---------------|-------------|-------|--------|
| 101 | 728 W | 728 W | 100 | Lobby |
| 102 | 718 W | 727 W | 50 | Lobby |
| 103 | 728 W | 728 W | 50 | Lobby |
| 104 | 718 W | 727 W | 50 | Lobby |
| 105 | 718 W | 727 W | 100 | Lobby |
| 106 | 718 W | 727 W | 42 | Lobby |
| 107 | -- | 0 W | 0 | EDMX |
| 108 | -- | 0 W | 0 | EDMX |
| 109 | -- | 0 W | 0 | EDMX |
| 110 | -- | 0 W | 0 | EDMX |
| 111 | -- | 0 W | 0 | EDMX |
| 112 | -- | 0 W | 0 | EDMX |
| 113 | -- | 0 W | 0 | EDMX |
| 114 | -- | 0 W | 0 | EDMX |
| 115 | -- | 0 W | 0 | EDMX |
| 116 | -- | 0 W | 0 | EDMX |
| 117 | -- | 0 W | 0 | EDMX |
| 118 | -- | 0 W | 0 | EDMX |
| 119 | -- | 0 W | 0 | EDMX |

Control Record finds all of the AF dimmers with a **non-zero level** and runs the levels up & down to record the loads.

You **must** turn on (check) **Load Errors for Record Loads** in [Configure Dimmers, page 23](#), for this to work properly. Just turning on **AF** does not turn on Load Errors by default.

Performs a **Control Check** by running the levels of the dimmers up & down checking for differences between recorded and actual loads.

Control Clear will delete the previously recorded loads.

Level & Source display the current dimmer level and the control source for the dimmer. Shown above, dimmers 101-106 are controlled by the Lobby preset.

Chapter 4

CEM+ Procedures

CEM+ Configuration Overview

Configuring a CEM+ from either the face panel via the LCD and buttons or the Sensor+ Connect web interface are basically the same procedures done in the same order. The web interface is more intuitive and you are able to make more changes simultaneously; making it a more efficient way to configure the modules.

Please refer to the LCD menu structures and web interface site map for navigation details.

Since there are nearly an infinite number (at least for practical purposes of counting them) of ways for you to configure your racks and dimmers, the procedures in this section are intended to be building blocks for you to use to configure your unique system.

The headings for each procedure will contain either a **[Power]**, **[User]** or a **[Guest]** to denote the minimum required access level. **[Web]** or **[FP]** will note whether a specific navigation path is for the web interface or the CEM+ face panel.

Configuration Procedures

Configure Your Computer for an ETCNet2 Network

Prior to changing any Network settings on your personal computer please record the current settings in the following spaces below.

IP Address _____:_____:_____:_____

Subnet Mask _____:_____:_____:_____

Gateway IP _____:_____:_____:_____

To use your personal computer on an ETCNet2 network that does not use a network router (i.e. hub and/or switch only), ETC recommends the following default settings:

IP Address 10.101.1.101

Subnet Mask 255.255.0.0

Gateway IP 10.101.1.101



Note: *If you are setting this computer up to be an FTP server, then you should set the IP address to 10.101.101.117 —the default FTP server IP address of CEM+ modules.*

If you have a network that does include a network router, you must set the Gateway IP address to the appropriate port on the router.

Each additional computer on an ETCNet2 network must have it's own IP address which must be different from any other computer on the same ETCNet2 network. Select from the following default range of IP addresses for an additional personal computer on the network:

- 10.101.1.101 thru 10.101.1.249

Browse into a CEM+ from Internet Explorer 6:

- Step 1: Open Internet Explorer 6.
- Step 2: Type the IP address of the rack you want to browse to in the address box and press RETURN. Sensor+ Connect will open in the browser window if the CEM+ at the entered address is online.



Note: 10.101.101.101 is the default address for a CEM+ in the first rack of the first group. Your system may use a different addressing scheme. If that is the case, simply enter the IP address of one of the racks in the group you want to browse.

The default IP address scheme for CEM+ follows the two-digit Group and Rack numbers of each module.

- 10.101.1GG.1RR where GG is the two-digit Group number and RR is the two-digit rack number.

To browse into a CEM+ that is in Group 2, Rack 3 (for instance) the default IP address is 10.101.102.103.

Software Changes [Power]

Software changes must be done via the web interface.

Changing the software in a CEM+ is done by uploading a software file to a CEM+. Once the upload is complete, the CEM+ will automatically start the software replacement process.

Once the software replacement begins, the CEM+ will turn off all of its dimmers and stop responding to all level information data.

These steps begin after you have the CEM+ software file on your computer in a known location.

Upload software to a CEM+:

- Step 1: Launch Internet Explorer 6 (or later) from a PC and browse to the CEM+ by typing in the IP address of the CEM+

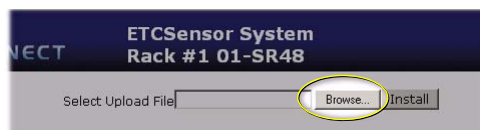


- Step 2: Login to the CEM+ at the Power User level (User name: **power** / Password: **powerpass**)

- Step 3: Browse to the File Upload page by clicking the Configuration button on the side navigation bar then the File Upload icon.

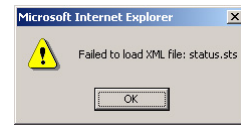


- Step 4: From the File Upload page, click **Browse** and locate the CEM+ software file.



- Step 5: Click **Install**.

- After clicking Install, the software will be uploaded to the CEM+. While the software is being sent to the CEM+, the browser will no longer respond. After several minutes, there will be a pair of errors indicating that the CEM+ is done transferring the file and is now installing the software (and no longer communicating with Internet Explorer which is what causes the errors).



Step 6: After seeing the errors, it is safe to clear the errors (click OK) and close Internet Explorer.

- The following screens will be seen on the face panel display during software installation:

| | |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <p>Loading New SW Please Wait...</p> | While the software is being downloaded. |
| <p>Installing Software <various messages></p> | While the individual components are being decompressed and installed. |
| <p>CEM+ 1.0.2</p> | While the CEM+ reboots with the new software. |
| <p>Loading SW For Dimming Processor</p> | While the CEM+ transfers some software to the dimming engine. |
| <p>Loading SW For AF Card</p> | While the CEM+ transfers some software to the Advanced Features (AF) cards (if installed). |
| <p>RACK: 1 / 4 OK A:001 B:0ff E:10001</p> | Installation is complete. The CEM+ returns to its normal resting display. |

Step 7: Repeat for any remaining CEM+ modules in the system.

Delete All Racks [Power]

- Step 1: Login as a Power User
- Step 2: Delete the config from the local rack (the one you are logged into).
- [Web] Racks & Dimmers>Add Racks>Delete All Racks
 - [FP] Rack>Delete All Racks
- Step 3: Send the local rack's configuration to the other racks. This will send the "noconfig" configuration to the other CEM+s in the group and effectively delete their configuration as well.
- [Web] Configuration>File Transfer>Backup
 - [FP] Rack>Send Config to All

This operation clears the rack configuration from the local rack (the one you are logged into), but does not clear everything from the CEM+. The network settings, and custom PIN for the face panel remain intact.

Build New Configuration (from NoConfig State)

This overall procedure is made up of several smaller procedures.

When a CEM+ is in the state of “NoConfig”, the face panel menu is different than during normal operation. It changes to options that are centered around getting the CEM+ configured. That menu can be found on the first page of [Appendix F: CEM+ LCD Menu on page 69](#) From the NoConfig menu at the face panel you can Generate Defaults for that rack with a any user level including Guest.

Configure/Confirm Network Settings of CEM+

The IP address settings of each CEM+ module must point to each other in order for the configuration information to transfer between racks/CEM+s.

The first part of this process is to confirm/set the individual network settings of each CEM+. The easiest way to do this is at the CEM+ face panel.

- [Web] Configuration>Network
- [FP] Setup Network

From the **Set Group / Rack** menu, specify:

- **Group** - A selection of racks that share a common config and preset, panic and level information between themselves. Groups can be numbered from 1 - 64.
- **Rack** - The number of a rack within the Group. Racks can be numbered from 1-16. All Groups must start with Rack 1.
- **Network Enable** - Makes the specified unit active in the network table.
- **IP address** - The network IP address for the CEM+ you are using (the local CEM+).
- **Subnet Mask** - The network subnet mask for the CEM+ you are using (the local CEM+).
- **Gateway IP** - The network gateway IP address for the CEM+ you are using (the local CEM+).

This must be done for each CEM+ module. It works best if the IP addresses adhere to the default IP address scheme:

- 10.101.1GG.1RR where GG is the two-digit Group number and RR is the two-digit rack number.

Once the racks have all been assigned their group and rack numbers, login to Rack #1 and confirm that the IP addresses that Rack #1 has for each of the other racks matches what was set for each of the previous racks.

To change the entire network table at once from the web interface, set the Group and Rack numbers and click **Restore Defaults**. This will repopulate the network table with the default addresses. Then click **Save Changes**.



Note:

To edit the IP addresses directly from the web interface, you need to contact ETC Technical Services.

Add Racks [Power]

Racks can be added individually or as multiples of the same rack type and dimmer type. Adding racks is very easy and you are asked for everything needed to create a rack.

However, there are a couple of points you need to be aware of:

- Every Group of racks must have a Rack 1.
- Racks must be added sequentially, starting with rack 1 to a maximum of 16 racks.
- For European rack and module options, set the voltage to **240V**.
 - [FP] This is straightforward in the face panel menu (it's the first setting).
 - [Web] However, the web interface requires that you click the **240V** check box then **Save Changes** before the options will change. The first click of Save Changes after altering the 240V setting will not add another rack (it changes the options), the next click of Save Changes will add the specified rack(s).
- Rack Types: **SRxx** is a permanent installation rack and **SPxx** is any type of portable rack (including touring racks). **ESRxx** and **ESPxx** are for European installation rack and portable racks respectively. In all cases, the "xx" number is determined by the number of slots in the rack for modules (*not* the number of dimmers).

Port Settings

Patch by default gives every port on every rack a starting address and sequentially addresses the rest of the dimmers in the rack from that point. To edit the dimmer's addressing individually, change to the Patch tab where all of the patch data is exposed.

By default every rack added will be set to an incremental DMX address starting at one (1) and continuing with the next available DMX channel available with only port A enabled on each rack (Port B and EDMX are disabled by default).

You can edit the DMX start channel for each rack from the **Patch/Port Settings** page. You can enable/disable the data ports here as well.



Note:

To output DMX from port B of the last rack BOTH the checkbox for "Enable Port B Output" and the checkbox to enable port B on the last rack must be checked for this to work.

***Port B DMX Output** is only available from the last logical rack in a group, regardless of its physical position within the group.*

This is also where you set the data priority and data loss behavior for each port of each rack. **Priority** is the preference given to each control source internally to the CEM+ (it is not broadcast to other ETCNet2 devices, nor does it use the source device's priority once inside the CEM+) Priorities can be set for each port of each rack as well as recorded **Presets**. **Data Loss Behavior** tells the port what you want to happen when data is no longer being received on that port.



CAUTION:

An EDMX port will not currently go into a specified data loss behavior. If all EDMX is lost, the dimmers will maintain the last known level until they have new level information to use.

Patch

The **Patch** page provides a powerful and convenient place to alter the default 1 to 1 patch to suit your individual needs. The patch itself is a table of addresses that you can use to assign various control channels (DMX and/or EDMX) to individual dimmers. The dimmer number and name are in the columns to the left and the rest of the row are the control channels that are patched to that dimmer. Control addresses must be limited to their respective valid ranges. Valid DMX range is 1 through 512. Valid EDMX range is 1 through 32767. If your patching causes the range to exceed either of the valid maximums, the remainder of the specified dimmers will remain unpatched.

Dimmer Doubled addresses are always shown in patch, however dimmers are not actually in dimmer doubling mode unless they are set with a Dimmer Double firing mode.

Set Dimmer Properties

When a rack initially gets defined, it contains the default dimmer type with default properties throughout the rack. If you have a mix of dimmer types in a rack, you need to configure those after the racks have been added to the group.

You can either edit the dimmer properties (dimmer type, fire mode, voltage regulation...) individually, or by searching for dimmers by several criteria and edit those found dimmers at the same time.

For specific dimmer configurations:

Switched

Change the firing mode to **Switched** and click **Save Changes**. After saving changes, the remaining dimmer properties will change automatically or can now be set to your desired values. Currently when Switched firing mode is selected, all other properties for that dimmer are ignored.

| Property | 120V | 230V |
|---------------------------|-----------|-----------|
| Firing Mode | Switched | Switched |
| Curve | Linear | Linear |
| Threshold | 1% | 1% |
| Min. Scale Voltage | 140V | 265V |
| Max. Scale Voltage | 140V | 265V |
| Voltage Regulation | Unchecked | Unchecked |
| Preheat | Unchecked | Unchecked |
| Dynamic Preheat | 0 sec. | 0 sec. |
| DC Output Prevent | Unchecked | Unchecked |
| InRush Protect | Unchecked | Unchecked |

Non-Dim

Change the firing mode to **Normal** and click **Save Changes**. After saving changes, make the remaining changes to the dimmer properties as listed below. Currently, setting the firing mode to **Switched** and turning on Voltage Regulation does not work.

| Property | 120V | 230V |
|---------------------------|----------------------------|--------------------------|
| Firing Mode | Normal | Normal |
| Curve | Linear | Linear |
| Threshold | 1% or desired setting | 1% or desired setting |
| Min. Scale Voltage | 115V or desired setting | 265V |
| Max. Scale Voltage | 115V or desired setting | 265V |
| Voltage Regulation | Checked | Checked |
| Preheat | Unchecked | Unchecked |
| Dynamic Preheat | 0 sec. | 0 sec. |
| DC Output Prevent | Unchecked | Unchecked |
| InRush Protect | Unchecked | Unchecked |

Fluorescent

Change the firing mode to **Fluorescent** and click **Save Changes**. After saving changes, the remaining dimmer properties will change automatically or can now be set to your desired values.

| Property | 120V | 230V |
|---------------------------|----------------------------|----------------------------|
| Firing Mode | Fluorescent | Fluorescent |
| Curve | Linear | Linear |
| Threshold | 1% or desired setting | 1% or desired setting |
| Min. Scale Voltage | 56V or desired setting | 56V or desired setting |
| Max. Scale Voltage | 120V or desired setting | 240V or desired setting |
| Voltage Regulation | Checked | Checked |
| Preheat | Unchecked | Unchecked |
| Dynamic Preheat | 0 sec. | 0 sec. |
| DC Output Prevent | Checked | Checked |
| InRush Protect | Unchecked | Unchecked |

Dimmer Doubling™

Change the firing mode to **DimDbl** and click **Save Changes**. After saving changes, the remaining dimmer properties will change automatically or can now be set to your desired values. Dimmer Doubling is only available for 120V systems.

| Property | 120V | 230V |
|---------------------------|------------|------|
| Firing Mode | DimDbl | --- |
| Curve | Mod-Square | --- |
| Threshold | 1% | --- |
| Min. Scale Voltage | 6V | --- |
| Max. Scale Voltage | 115V | --- |
| Voltage Regulation | Checked | --- |
| Preheat | Unchecked | --- |
| Dynamic Preheat | 0 sec. | --- |
| DC Output Prevent | Checked | --- |
| InRush Protect | Unchecked | --- |

To configure a dimmer for **Dimmer Doubling**:

Step 1: Set the dimmer's firing mode to **DimDbl**.

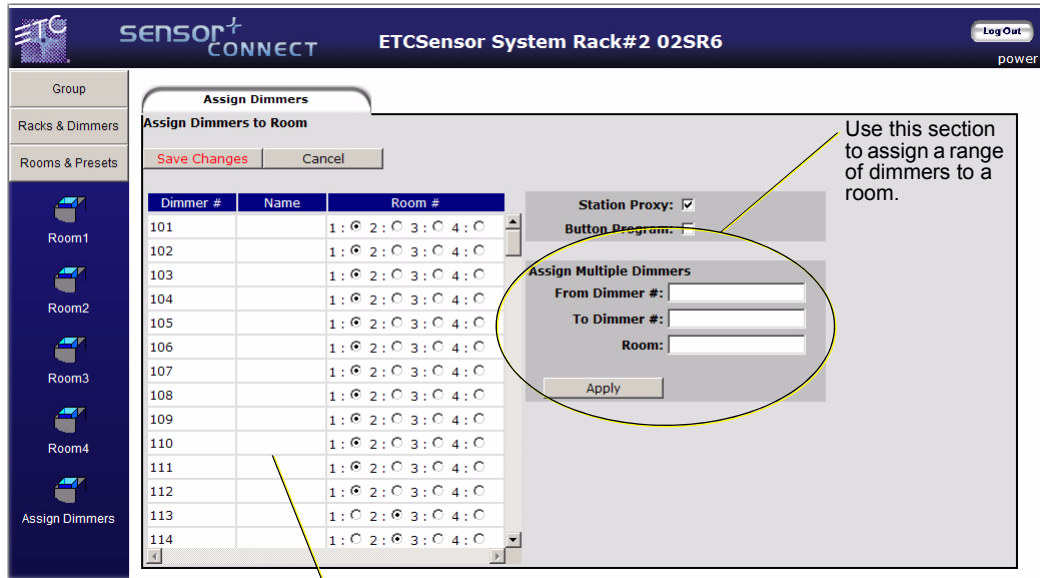
Step 2: Use patch to address your B-side dimmers.

- You will need to patch the Dimmer Doubled side of the dimmer for each port you are using (DMXA DD, DMXB DD, EDMX DD).

Rooms & Presets

Assign Dimmers to Rooms

All dimmers in a group default to being in (and thus available only to) Room1. You can assign a dimmer or range of dimmers to any of the rooms (1-4), but to only one room at a time. Shown below, dimmers 101-112 are assigned to Room1 and dimmers 113-114 are assigned to Room2.

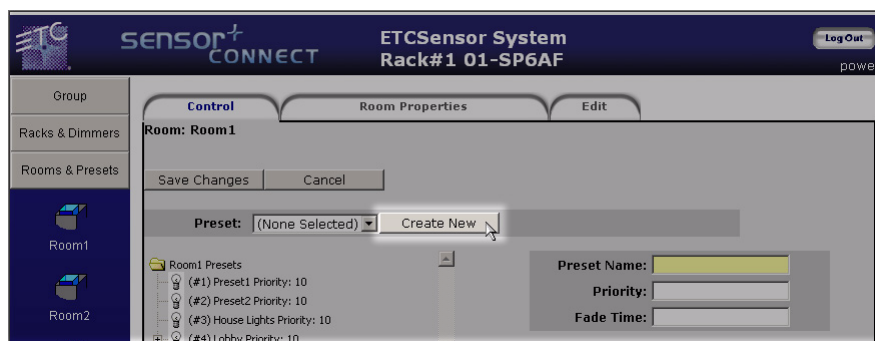


Use this section to assign an individual dimmer to a room.
Dimmers may only be assigned to a single room at a time.

Create a Preset (Web Only)

In the web interface, you must create a preset before you can record levels into it. The face panel combines creating a preset with recording it.

Click on **Create New** and the web interface will add a new preset to the list below. It will add an incremental preset (Preset1, Preset2, Preset3 and so on) or if an older preset was recorded, it will recycle the old preset first before making a new one. Once it appears in the list, you can record and modify it as needed.



Record vs. Snapshot a Preset

Record and **Snapshot** are two different operations.

Record will only use level information from Set Levels from the CEM+ modules in the group when storing a preset.

Snapshot will use level information from all available sources to the CEM+ modules (DMXA, DMXB, EDMX, and Set Levels) when storing a preset.

Activate/Deactivate a Preset

You can toggle any preset on or off from either the web interface or the face panel. Stations are also supported for preset activation, deactivation and recording. Please see [Appendix B: SmartLink™ Stations Enabled on page 55](#) for more information on SmartLink stations.

Max Active Presets

Maximum Active Presets defines how many presets can be active in any one given room at a time. It can be set from a minimum of one (1) and to a maximum of four (4) at a time. Activating one preset more than allowable by **Max Active Presets** will deactivate the active preset with the lowest priority or if all active presets are at the same priority, the oldest previously activated priority.

Max Active Presets defaults to one (1) which results in a “last action” activation/deactivation manner. (Turning on one preset turns off the previous preset.)

Panic

Panic is configurable for different external switch action types (maintained vs. momentary) and switch resting states (normally-open vs. normally-closed). Panic always operates at the highest priority in the CEM+ and no other control source can pile-on with it or override it.

Record Panic

Create the desired panic look by setting dimmer levels from the CEM+ or from a external control source. Keep in mind that the **Master Level** acts as an intensity threshold for dimmers and determines whether or not they are included in the panic. Only dimmers with an intensity level equal to or greater than the Master Level will be included in Panic. When Panic is active, the dimmers will also playback at the set Master Level.

Set the Panic **Master Level** to your desired level (80% to 100%).

Enable **Force Others Off** if you want load shedding to occur when Panic becomes active. What this means is when Panic becomes active, any dimmers that are not included in Panic will be turned off.

Lastly, record Panic.

Activate Panic

Panic can be activated via an external switch closure or locally via the face panel menu. It cannot be activated/deactivated via the web interface. Deactivation is also done by a switch closure (or lack of one, depending on the switch action type) or locally via the face panel menu.

Load Management

Load management can be used after your system is setup and your loads (lights) are connected to dimmers. For load management to work properly, **Load Errors** must be enabled for each dimmer you want to monitor under dimmer properties. See [Configure Dimmers on page 23](#). **Load Errors** is not enabled on any dimmers by default.

Record Loads

When you record loads, the CEM+ steps through a series of dimmer intensities and monitors the wattage as it proceeds. **Only dimmers that have an initial intensity level greater than zero (0) are included in the process.**

Once loads have been recorded, load changes and missing loads are reported at the face panel menu and in the web interface.

Clear Loads (Web Only)

Clearing loads will clear all previously recorded loads. Clearing loads is only available via the web interface.

Clear Errors

Errors will appear on both the face panel and in the web interface.

When viewing errors on the face panel at an access level of **User** or higher, pressing ☺ will clear that error. Continuing to press ☺ will cycle through the remaining errors and clear any that are capable of being cleared. Errors that are still current will quickly reappear in the list (such as No Data Port B or Module Removed).

From the web interface, you can view the errors present from a couple of locations, however you can only clear errors from the individual rack's errors tab webpage. From this page you will have the option to checkmark and clear individual errors or to clear all errors.

The screenshot shows the 'Errors' tab for 'Rack 02-SR6AF' in the 'ETCSensor System Rack#1 01-SP6AF'. The interface includes a sidebar with 'All Racks' and 'Add Racks' options. The main content area displays system status (Temp: 95F, Phase A: 116v, Phase B: 116v, Phase C: 115v, Frequency: 60.00 Hz) and a table of errors. Two errors are listed: 'R 2 NO DATA PORT A' and 'R 2 MODULE 4 REMOVED', both occurring on October 13, 2004 at 17:25:38. There are checkboxes and buttons for 'Clear Error(s)' and 'Clear All Errors'.

| | Rack # | Error String | Time |
|--------------------------|--------|----------------------|---------------------------|
| <input type="checkbox"/> | 2 | R 2 NO DATA PORT A | October 13, 2004 17:25:38 |
| <input type="checkbox"/> | 2 | R 2 MODULE 4 REMOVED | October 13, 2004 17:25:38 |

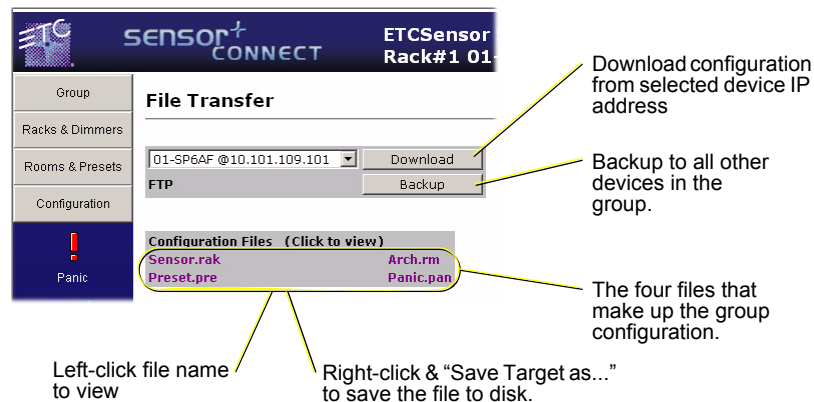
File Transfers

The configuration files that are shared from CEM+ to CEM+ in a group are XML files that are sent and received via FTP (File Transfer Protocol). They are then parsed at each CEM+ for use locally within that CEM+ depending on the rack number (the CEM+ knows what rack number it is and looks to that part of the configuration to get its settings).

There are four (4) separate files that make up the user-defined configuration.

- **Sensor.rak** - Contains all of the rack configurations and dimmer information including the patch.
- **Preset.pre** - Contains the preset information for the group.
- **Arch.rm** - Contains the room/dimmer assignments for the group.
- **Panic.pan** - Contains the settings for Panic within the group.

Understanding these few pieces of information first makes the rest of this section easier to use and understand.



Download (config from selected IP)

This function will make the local CEM+ (the one you are logged into) get the group configuration (all of the racks configurations in one) from the specified device and IP address in the pull-down menu. The configuration will go from the specified device to only the one device asking for the configuration.

This is useful to get an existing configuration into a new or replacement CEM+.

Backup (to all)

This function will send the local CEM+ module's group configuration to all other devices (CEM+ modules and FTP if one is configured) in the group as set in the network table.

This is useful to send a newly uploaded/modified configuration to the other CEM+ modules in the group.

View a Configuration

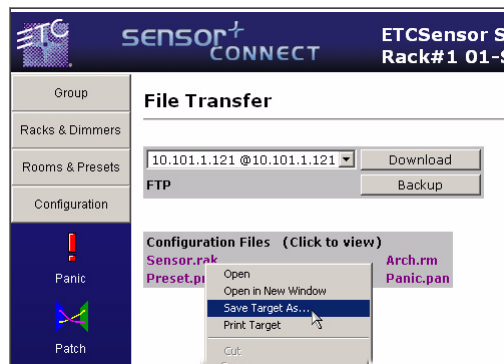
To view a configuration file's raw XML content on screen, just left-click on the configuration file name you want to see. Once you are viewing the configuration, click back in your browser to get back to the **File Transfer** page. (You can not make any edits to the configuration file while viewing it like this.)

Below is what the **sensor.rak** file looks like viewed in this manner.



Download a Configuration

To download a configuration file to disk, just right-click on the file name and select “Save Target As...”. This will bring up a standard dialog box asking you to name the file and to pick a location to save it. It will append the file name with “.xml” instead of the file extension listed on the web page. This will not prevent you from uploading the configuration file to a CEM+ later.



Upload a Configuration

Browse to the **File Upload** web page and click **Browse** to select a file to upload to the local CEM+. Once the file is selected, click Install and the file will begin to transfer to the CEM+. This is the same place and manner to send either a configuration file or a software file. The CEM+ looks at the file being sent to automatically handle the file type or part of the configuration file. In the same way, it doesn't matter if the file ends with .rak or .xml when it is sent.



FTP Server

An FTP server can be configured to be on the ETCNet2 network and act as a file storage location for the configuration files of the group.

An FTP server is not provided as standard with a CEM+.

CEM+ modules can access any stock FTP server that is configured with the following minimum settings:

- IP address of the FTP server needs to match the one specified in the network table in the configuration.
- The CEM+ uses an authenticated login so the FTP server must have a user created and configured for the CEM+. (The user name and password are usually case-sensitive.)
 - User name: **etc**
 - Password: **sensor**
- The FTP server must have a specified default file storage location. The CEM+ does not specify any path to write the file to on the server. They will only go in the default root directory.



WARNING: *By default, you cannot currently use an FTP server with more than one (1) rack group at the same time. All CEM+ modules will send their configurations to the FTP server with the same file names and the same directory (root) and will overwrite other configuration files present. Contact ETC Technical Services if this is a requirement of your system.*

System Maintenance

Replacing a CEM+ Control Module

- Step 1: Open the rack door and locate the control module labeled CEM+ within the rack. Though no harm is expected by removing the control module live, ETC recommends powering down the rack before removing any rack components.
- Step 2: Remove existing control module as explained in [Remove a CEM+ Module on page 49](#)
- Step 3: Install the new control module in the rack and use your thumbs on the outer edge of the control module to firmly seat the module in its connectors until you feel it hit the back of the connector.



CAUTION: *CEM+ uses high density edge card connections to pass power and data to and from the rack which requires 7 lbs insertion force. A partially inserted CEM+ may result in incorrect operation or even damage to components of the rack.*

- Step 4: Apply power to the Sensor+ rack.

Verifying the Configuration of the New Control Module

For Single Rack Systems

Sensor+ racks contain a backplane memory chip that allows the CEM+ to detect upon boot if it holds the correct configuration for the system. If the CEM+ was last booted with the same configuration, it will finish booting with its local copy of the group configuration and

begin responding to incoming data. If CEM+ boots and its local configuration does not match the backplane, it will stop its boot and display “**CEM+ Not from Group**” and offer options for further action as follows:

Use Rack's Configuration (default)

- CEM+ will get the configuration from the backplane, overwrite its local configuration and begin to respond to incoming data according to the new configuration. This option may take up to 3 minutes to complete before responding to incoming data.

Get Configuration From

- CEM+ joins the group by reading group and rack and IP information from the backplane memory chip and allowing user to choose to pull in the configuration from any of the online racks in the group or an FTP server if one is available. Scroll through the options and press on the desired rack. The CEM+ will then overwrite its configuration including group, rack, and IP address information with that of the configuration being transferred and then begin to respond to data.

Go to no Configuration

- CEM+ face panel will switch to the no configuration menu assuming that you will overwrite the configuration by creating a new one in the generate defaults menu. In the No Configuration menu, you will again have a chance to transfer a configuration from another rack or you can change rack, group and network information and begin a new configuration.

Use this CEMConfig

- This option tells the CEM+ that all of the other racks in the group contain the incorrect configuration and gets ready to overwrite the configurations in the other racks in the configuration with the configuration held locally in the replacement CEM+. The CEM+ confirms that you indeed want to “**Replace Group Configuration w/this CEMConfig [y]**”. If you choose Yes, then the CEM+ warns you again by asking “**Send to all racks? Are you sure [Yes]**”. Both questions must be answered as yes for this option to take effect. If you have any doubts about whether this option is correct for your situation, you should choose no. If you choose no, the CEM+ will back you out to the main “**No Configuration**” menu.



WARNING: *If the configuration that is in the replacement CEM+ doesn't match the actual hardware in the group (number of racks, types of racks, module types and so on) it will result in a unstable and possibly non-functional configuration. If this happens, you will need to delete the configurations and begin a new configuration.*

Chapter 5

Service

Contacting ETC

If you are having difficulties, your most convenient resources are provided in this user manual. To search more widely, try the ETC website at www.etconnect.com. If none of these resources is sufficient, contact ETC Technical Services directly at one of the offices identified below.

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

- Your location and job name
- Any error messages on the CEM+ status LCD display
- Related system problems or equipment failures

Americas

Electronic Theatre Controls Inc.
Technical Services Department
3031 Pleasant View Road
Middleton, WI 53562
800-775-4382 (USA, toll-free)
+1-608 831-4116
service@etconnect.com

United Kingdom

Electronic Theatre Controls Ltd.
Technical Services Department
Unit 26-28 Victoria Industrial Estate
Victoria Road,
London W3 6UU England
+44 (0)20 8896 1000
service@etceurope.com

Asia

Electronic Theatre Controls Asia, Ltd.
Technical Services Department
Room 605-606
Tower III, Enterprise Square
9 Sheung Yuet Road
Kowloon Bay, Kowloon, Hong Kong
+852 2799 1220
service@etcasia.com

Germany

Electronic Theatre Controls GmbH
Technical Services Department
Ohmstrasse 3
83607 Holzkirchen, Germany
+49 (80 24) 47 00-0
techserv-hoki@etconnect.com



Note:

For the best service results, always tell your service representative you are using the CEM+ version of Sensor dimming system.



WARNING:

RISK OF ELECTRIC SHOCK! Servicing Sensor CEM+ dimming equipment exposes high amperage power connections inside the rack. If possible, always turn off power at the main circuit breaker before servicing your system.

Changing Installation Rack Modules

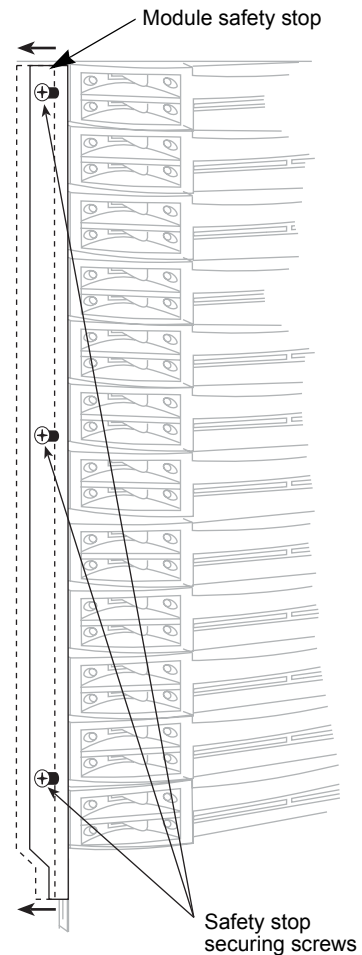
All Sensor+ rack dimmer modules can be easily replaced without tools. Modules slide in and out of their slots and are ready to start dimming immediately.

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

Releasing and Securing Module Safety Stops (ESR Racks Only)

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

- Step 1: Turn off rack power at the main breaker.
- Step 2: Open the rack door. The safety stops are along the left side of the dimmer modules. See the illustration.
- 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.
- Step 3: Follow the appropriate instructions below to remove or replace the desired dimmer or control modules.



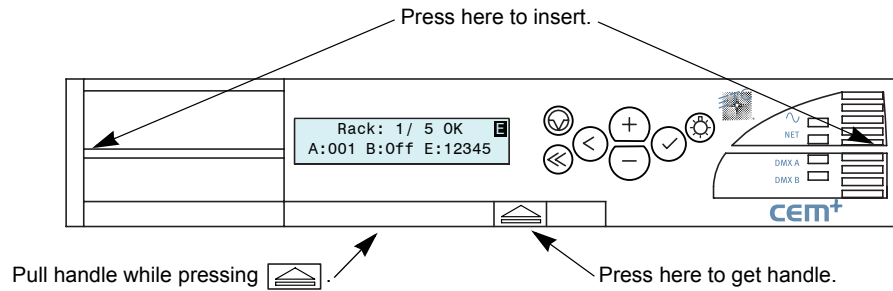
CAUTION: *Operating a dimmer rack with open module slots disrupts airflow inside the rack, which can lead to rack overheating and subsequent rack shutdown.*

Remove and Replace a Dimmer or Airflow Module

- Step 1: Turn off rack power at the main breaker, if possible.
- Step 2: Open the rack door.
- Step 3: Switch the dimmer module's circuit breaker(s) to the "off" position (breaker to the right).
- Please see [Releasing and Securing Module Safety Stops \(ESR Racks Only\)](#) above if appropriate.
- Step 4: Grasp the dimmer module by the center of the main air vent.
- Step 5: Pull the dimmer straight out.
- Step 6: Ensure the circuit breaker(s) on the replacement module are in the "off" position.
- Step 7: Insert the replacement dimmer or airflow module into the correct slot and firmly press the module into the slot until you feel the connections seat (the module face will be flush with the other modules).
- Step 8: Switch the module's circuit breaker(s) to the "on" position (to the left).
- Step 9: Close and lock the Sensor rack door before applying power.

Remove a CEM+ Module

- Step 1: Turn off rack power at the main breaker.
- Step 2: Open the rack door.
 - Please see [Releasing and Securing Module Safety Stops \(ESR Racks Only\)](#) above if appropriate.
- Step 3: Press the “eject” symbol on the right end of the spring-loaded handle and grab the other end of the handle, pulling it until it is perpendicular to the face of the CEM+. The CEM+ will be gently pushed out of the rack as you move the handle.
- Step 4: Pull the CEM+ straight out.



Replace a CEM+ Module

- Step 1: Firmly press the new CEM+ module into the correct slot by pressing on the outside edges until you feel the connections seat (the module face will be flush with the other modules).



WARNING: *Do not press on the center of the CEM+ to insert it into a rack. Doing so may result in damage to the CEM+.*

- Step 2: Close and lock the Sensor rack door before applying power.
- Step 3: *ONLY* if directed to do so by an ETC-authorized service representative, transfer the configuration files/information to your new CEM+.

CEM+ Fuses

The CEM+ has two fuses:

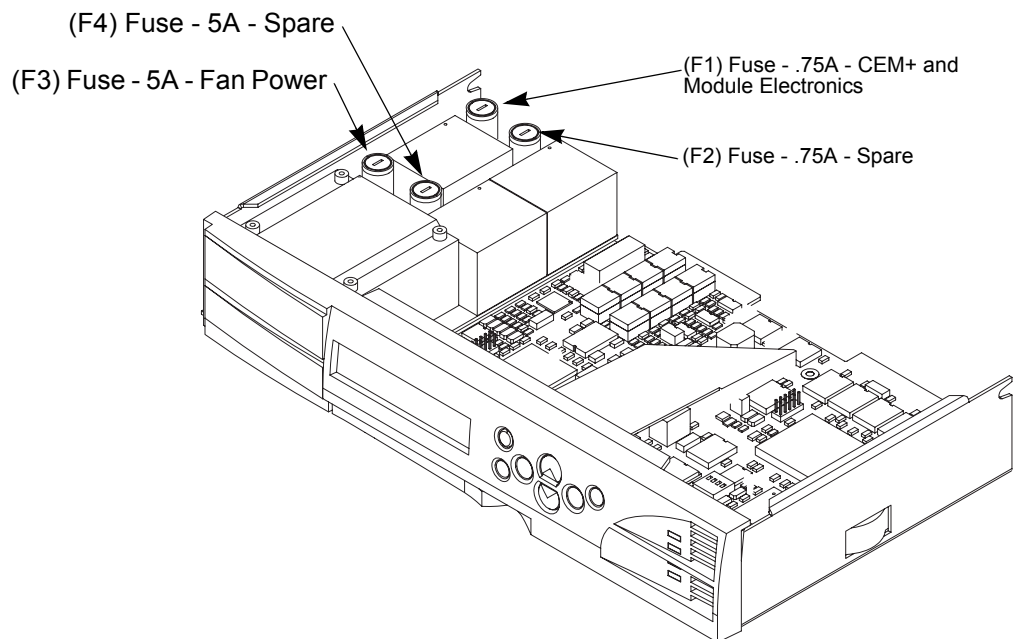
- The F1 fuse is a 250V, 0.75 amp, fuse. CEM+ operating power and power for the dimmer module electronics, is drawn through this fuse. If F1 fails, the CEM+ will not operate and dimming will not work. The Sensor+ rack beacon will be dark. The fuse in the F2 position is a spare 0.75 amp fuse.
- The F3 fuse is a 250V, 5 amp fuse. Power for the rack's fan is drawn through this fuse. If F3 fails, the fan will stop running and the CEM+ will display an air flow error. The Sensor+ rack beacon will flash to signal a problem. The rack may shut down due to overheating. The fuse in the F4 position is a spare 5 amp fuse.

Replacing a Fuse:

Step 1: Remove the CEM+ module (See [Changing Installation Rack Modules, page 48](#)).

Step 2: Locate and replace the defective fuse. Fuses are held in vertical fuse holders.

- a: Use a flat-blade screwdriver to gently turn the cap of the fuse holder to the left until it comes free.
- b: Lift the cap and the fuse straight out of the fuse holder.
- c: Remove the defective fuse and replace it with a fuse of the same type. A spare fuse of each type is provided on the CEM+.
- d: Replace the fuse and cap in the fuse holder and use a flat-blade screwdriver to gently turn the cap to the right to fully capture the fuse.



Step 3: Replace the CEM+ module and close the door.

Troubleshooting

Your Sensor+ 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 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...

- Check the CEM+ display, Sensor+ Connect or WYSILink for error messages. For an explanation of error message causes and possible corrections, see [CEM+ Error Messages, page 63](#).


If lights are stuck on...

- Check for an activated Preset at your CEM+. (This can lock some or all of your dimmer circuits at one level.)
- Make sure your Panic circuit is not activated. (This will drive some of your dimmer circuits to full and hold them there.)
- Make sure all direct dimmer levels at the CEM+ are cleared. (This can lock some or all of your dimmer circuits at one level.)

If lights won't come on...

- Look for obstructions on top or in front of your installation rack that may be blocking rack ventilation.
- Open the door and look for dust buildup on the air filter or rack modules.
- Check for tripped dimmer module circuit breakers.
- Check for tripped breakers on your main circuit breaker panel.
- Check for loose or damaged control cables coming into your dimmer rack.

When you think you've found the problem...

- Correct any of these problems you find, press the reset button  on the front of the CEM+ module and observe the system to see if the problem still exists.

If You Cannot Locate or Correct the Problem...

If you are unable to eliminate the problem, contact your authorized ETC representative.

See [Contacting ETC, page 47](#), for procedures on contacting ETC for technical help.

Appendix A

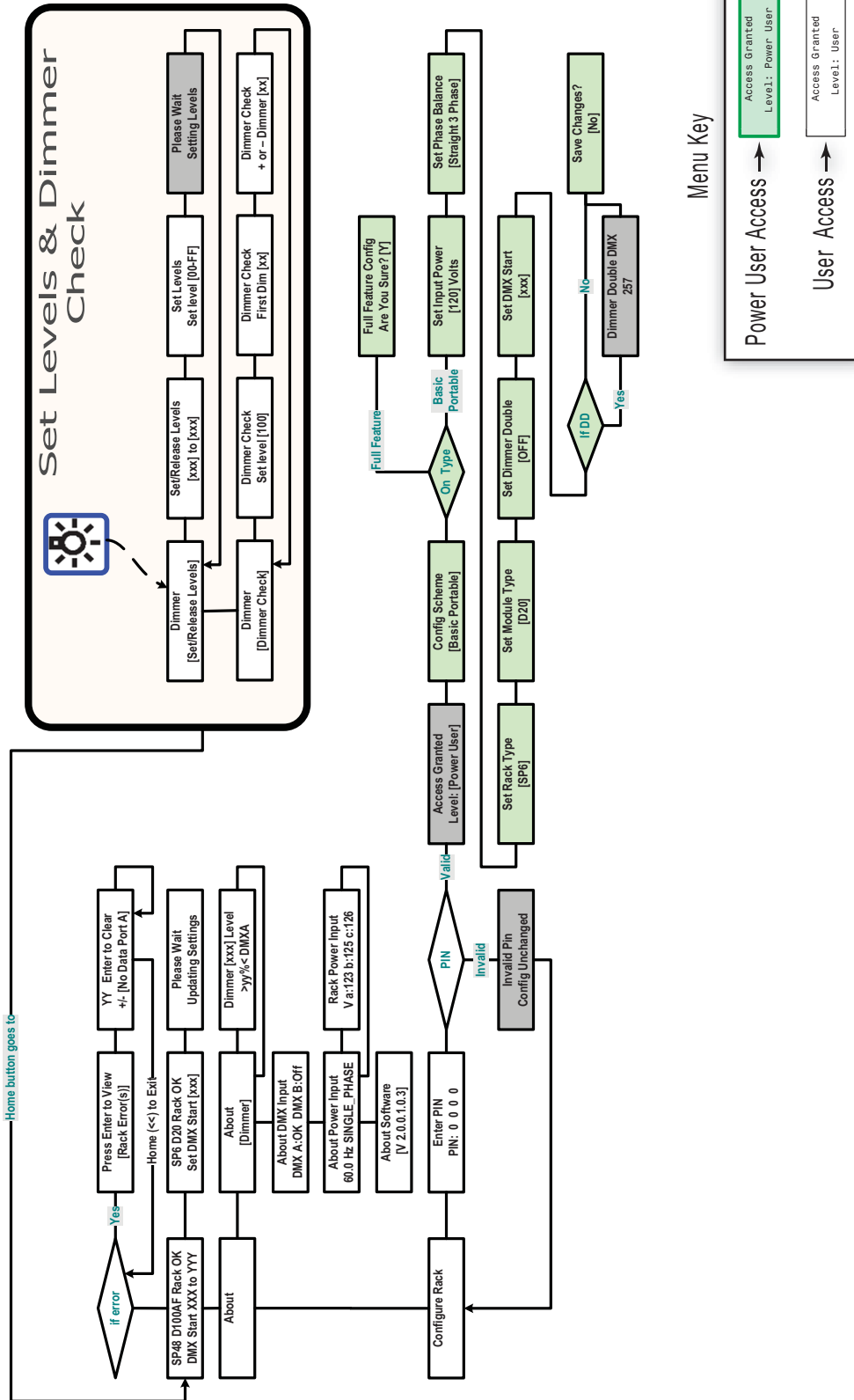
Basic/Portable Mode

Basic/Portable mode is a separate mode that you can put the CEM+ into when you initially begin the configuration. It is a truncated menu structure focusing on the functions that touring rack and portable pack users need most often allowing for quicker navigation and ease of configuration. To switch between Basic/Portable Mode and Full Feature Mode, you need to start over with your configuration as this choice can only be made while generating the default state of a CEM+.

This mode also brings some notable limitations with its simplicity of use.

- If Dimmer Doubling is selected, the whole rack is dimmer doubled.
- AF modules are able to be selected. However, AF functions are not enabled, such as: Load recording, Load errors and so on.
- Patch mode is limited to a starting address and numbers the dimmers contiguously within the rack.
- Basic/Portable mode is limited to DMX input port A only.
- Basic/Portable mode turns off the web interface of the CEM+. All configuration is done via the face panel.
- Panic and Preset functionality is turned off.

Basic/Portable is intentionally limited in functionality for ease of use. If features are required that are not available in this mode, Full Feature mode should be used.




Appendix B

SmartLink™ Stations Enabled

Features

SmartLink is a communications network created for enhanced control of the 128 built-in presets found in SmartLink enabled CEM+ dimmer racks. The addition of the SmartLink network facilitates two additional control features, wall stations and SmartLink product to SmartLink product synchronization. Neither control feature is dependent upon the other for operation but instead rely independently on the SmartLink network and specific host messages.

- **Synchronization** - each CEM+ group, SmartPack and SmartSwitch in the system must have an I/O board installed (i.e. be SmartLink enabled) and connected on the SmartLink network. A SmartLink enabled Sensor+ rack is identified by the logo  on the front of the door. Up to four SmartPack or SmartSwitch products may be utilized on the SmartLink network.
- **Wall Station** - In addition to the I/O board, one Sensor+ rack, SmartPack or SmartSwitch in the system must have a LinkPower supply installed. The LinkPower supply powers up to four SmartLink wall stations. ETC recommends installing the LinkPower supply in the same Sensor+ rack, SmartPack or SmartSwitch product that the station data run terminates in and utilizing that product as the “station master”.

Definitions

Host Product

Any SmartLink enabled product within a system that sends specific host messages to other SmartLink enabled products in the system for preset and sequence synchronization. Default functionality is that the last SmartLink product updated in the system acts as the host product and sends its host messages to the other products in the system. If a preset or sequence is activated from another pack in the system, it will then act as the host product and send its host messages to the other products in the system.

Station Master

Any SmartLink enabled product, with a LinkPower supply installed, that is configured via the menu to control wall stations, track and update LED status when preset or sequence changes occur, and receive host messages from the wall stations when a button is pressed and released. In addition the “station master” will act as the “host product” for preset and sequence synchronization. ETC recommends configuring the product with the LinkPower supply installed and the station data runs terminated as the “station master”.

Host Messages

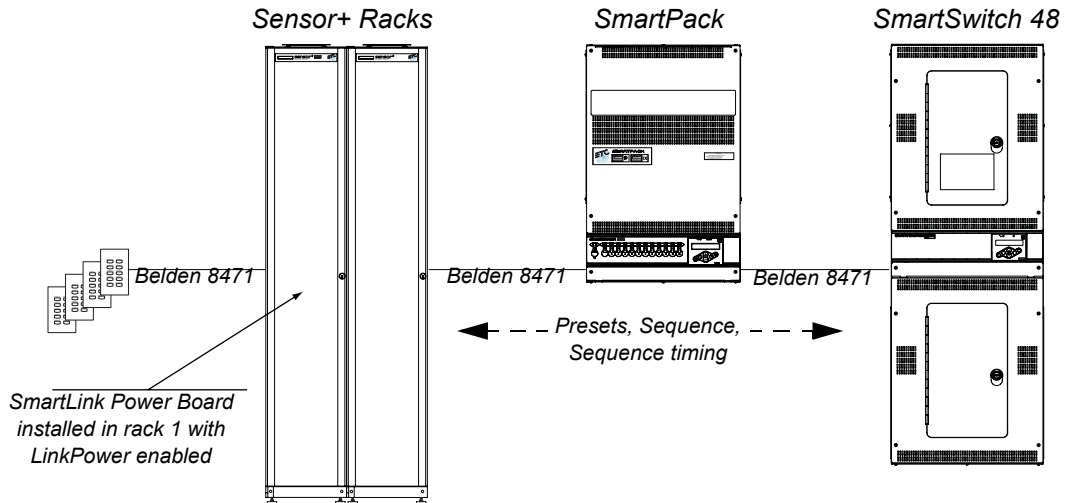
Specific configuration settings and events sent from the host product to other SmartLink enabled products for lock step synchronization of preset and sequence playback. Host messages communicated include:

- DMX Loss Behavior: Hold Last Look, Wait and Fade, or Fade to Preset. Wait and Fade Times or Fade to Preset Number, if applicable
- Sequence: Start, Stop and Loop Yes or No (SmartPack and SmartSwitch only)
- Preset: Fade Up Time, Fade Down Time and Hold Time
- Language: Language selected

- Station Master: Enable or Disable
- Power Up Behavior: Normal or Previous state

Synchronization

It is possible to synchronize presets and sequence activation across up to four Sensor+ groups, SmartPack or SmartSwitch products when they are connected on a SmartLink network. SmartLink connected products share various configuration parameters and events, known as host messages, as sent from the host product. Reference [Host Messages, page 55](#) for more information.



Preset and Sequence Synchronization

Default functionality is that the last CEM+, SmartPack or SmartSwitch updated in the system acts as the host product and sends its host messages to the other SmartLink enabled products in the system. Each product will retain its own preset and sequence (SmartPack and SmartSwitch) configuration as programmed but when a host product is selected each SmartLink enabled product will activate and play its sequence with the number of steps and timing (fade up, fade down, hold time) as sent by the host product.

Preset Synchronization

Selecting a preset on any rack/pack affects the same numbered preset to run on all inter connected SmartLink enabled products simultaneously.

If “Preset 1” is activated from the facepanel of a SmartLink device:

That device will act as the host product and send its host messages to the other SmartLink enabled products in the system to activate “Preset 1”. The preset will activate with the same fade up time, hold time, and fade down time as sent from the host product.

Sequence Synchronization

Sequence is a host product feature native to SmartPack and SmartSwitch only. CEM+ does not support sequence as a host product. However, because of the way messages are transmitted over SmartLink, a CEM+ will respond to the messages generated by a sequence activated on an SmartPack or SmartSwitch.

Activating a sequence on any pack causes all connected SmartLink enabled SmartPack and SmartSwitch products to run the same sequence in lock-step synchronization using the

host product fade up, hold, and fade down times. In addition, sequence loop “yes” or “no” will be sent from the host product to all inter-connected SmartLink enabled products to ensure lock step synchronization.

If the sequencer is activated from the facepanel of a SmartPack:

That SmartPack will act as the host product and send its host messages to the other SmartLink enabled products in the system. Each SmartLink enabled product in the system will activate the sequence as sent from the host product with steps and timing synchronized. If one product in the system does not have specific step recorded and the host product sends the message to play that step, the receiving product will simply ignore that command and pick up with the next recorded event.

Wall Stations

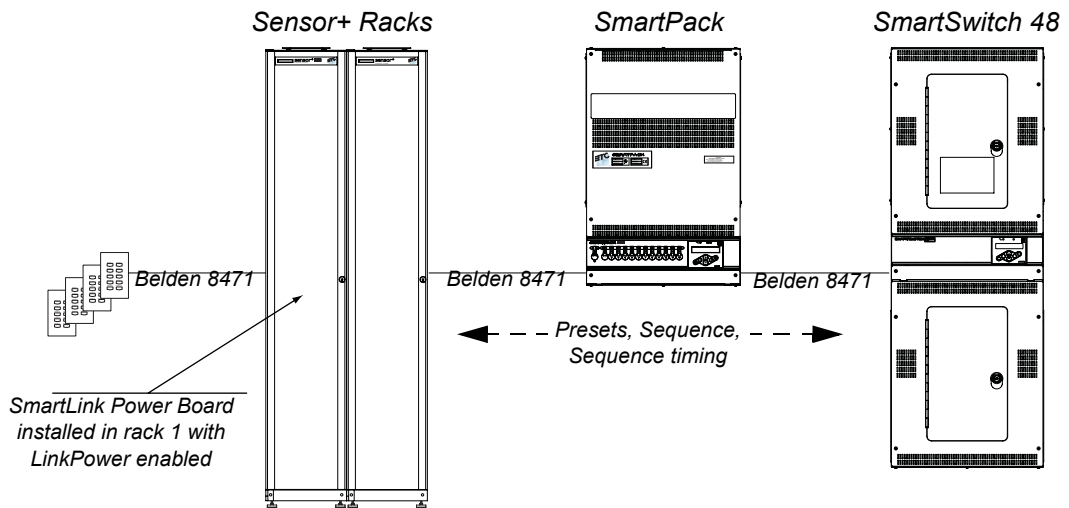
Two wall station types are available for use on the SmartLink network, a 5 button and a 10-button. Wall stations provide remote access to the 128 built-in presets in CEM+ and 32 built-in presets and sequencer in the SmartPack.



Note:

Wall station use with the SmartPack Portable dimmer pack requires additional hardware that is separate from the pack itself. Contact ETC for assistance.

A LinkPower supply must be installed into one host product and is required to operate up to four wall stations per system. Please reference the *SmartLink Power Board Kit Setup Guide* for installation instructions in a Sensor+ rack.

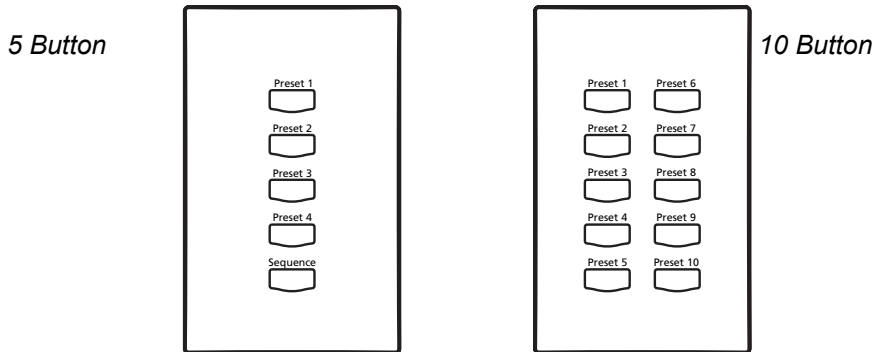


Note:

A SmartLink network is limited to four SmartLink wall stations and up to four SmartLink enabled products in a system. A SmartLink data run is limited to 1500 feet and is FTT-10A topology-free and polarity-independent.

Station Options

Control station electronics mount directly into a flush mount, single gang, industry standard back box. Station faceplates are constructed of ABS plastic and use no visible means of attachment. All stations are available in white, ivory, gray or black faceplates and buttons.



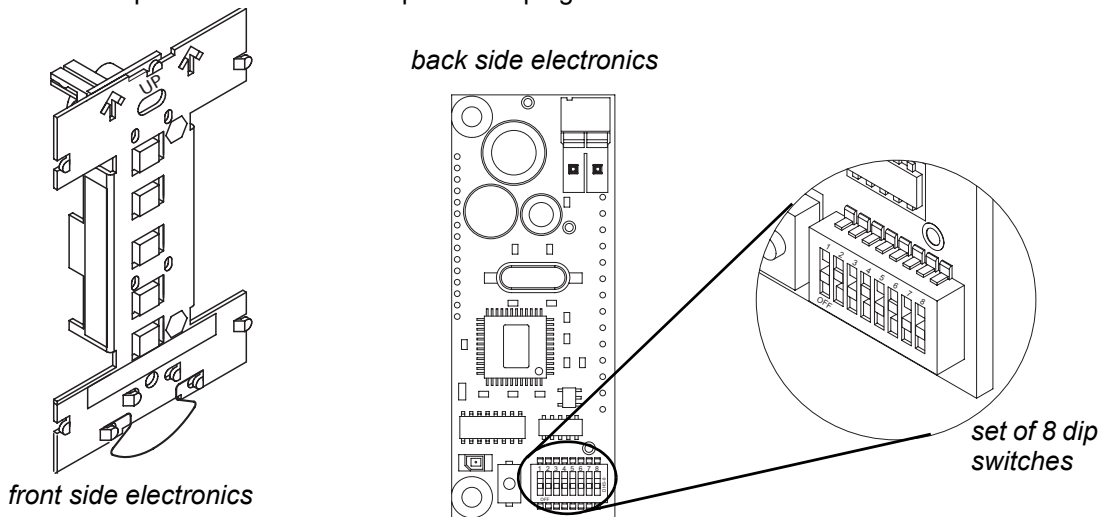
A sampling of the standard legends available include:

| 5 - Button Station | | 10 - Button Station | |
|--------------------|---------------------------|---------------------|---------------------------|
| Presets Only | Presets and Sequence | Presets Only | Presets and Sequence |
| Preset 1-5 | Preset 1-4 and Sequence | Preset 1-10 | Preset 1-9 and Sequence |
| Preset 6-10 | Preset 5-8 and Sequence | Preset 11-20 | Preset 10-18 and Sequence |
| Preset 11-15 | Preset 9-12 and Sequence | Preset 21-30 | Preset 19-27 and Sequence |
| Preset 16-20 | Preset 13-16 and Sequence | Preset 31-40 | Preset 28-36 and Sequence |
| Preset 21-25 | Preset 17-20 and Sequence | Preset 41-50 | Preset 37-45 and Sequence |
| Preset 26-30 | Preset 21-24 and Sequence | Preset 51-60 | Preset 46-54 and Sequence |
| Preset 31-35 | Preset 25-28 and Sequence | Preset 61-70 | Preset 55-63 and Sequence |
| Preset 36-40 | Preset 29-32 and Sequence | Preset 71-80 | Preset 64-72 and Sequence |

Custom options available, contact ETC quotations department for assistance.

Station Personality Settings

The control electronics (back side) include a set of eight dip switches. Each setting activates standard functionality or personalities from within the station including the starting preset number and sequence looping.



The table below indicates dip switch settings for both the 5 button and the 10 button preset stations.

Determine the functionality required and set the dip switches for station personality

| Station # | 5 Button Station | | 10 Button Station | | Switch | | | |
|-----------|-------------------------------------------|--------------------------------------|-------------------------------------------|--------------------------------------|--------|-----|-----|-----|
| | Switch 1 On = presets & sequence | Switch 1 Off = presets only | Switch 1 On = presets & sequence | Switch 1 Off = presets only | 2 | 3 | 4 | 5 |
| 1 | 1-4 | 1-5 | 1-9 | 1-10 | Off | Off | Off | Off |
| 2 | 5-8 | 6-10 | 10-18 | 11-20 | On | Off | Off | Off |
| 3 | 9-12 | 11-15 | 19-27 | 21-30 | Off | On | Off | Off |
| 4 | 13-16 | 16-20 | 28-36 | 31-40 | On | On | Off | Off |
| 5 | 17-20 | 21-25 | 37-45 | 41-50 | Off | Off | On | Off |
| 6 | 21-24 | 26-30 | 46-54 | 51-60 | On | Off | On | Off |
| 7 | 25-28 | 31-35 | 55-63 | 61-70 | Off | On | On | Off |
| 8 | 29-32 | 36-40 | 64-72 | 71-80 | On | On | On | Off |
| 9 | 33-36 | 41-45 | 73-81 | 81-90 | Off | Off | Off | On |
| 10 | 37-40 | 46-50 | 82-90 | 91-100 | On | Off | Off | On |
| 11 | 41-44 | 51-55 | 91-99 | 101-110 | Off | On | Off | On |
| 12 | 45-48 | 56-60 | 100-108 | 111-120 | On | On | Off | On |
| 13 | 49-52 | 61-65 | 109-117 | 121-130 | Off | Off | On | On |
| 14 | 53-56 | 66-70 | 118-126 | | On | Off | On | On |
| 15 | 57-60 | 71-75 | 127-135 | | Off | On | On | On |
| 16 | 61-64 | 76-80 | | | On | On | On | On |

Record a Preset from a Wall Station

It is possible to record a preset from a wall station if "Remote Record" has been enabled in the station master. Please see [Remote Record \[Power\], page 17](#) All products on the SmartLink network will record the current output levels and assign the preset to the button.

- Step 1: Set dimmer levels to a desired look via the test menu and/or other DMX control device.
- Step 2: Press and Hold the preset button for 5 seconds.
- After two seconds, the LED will start to blink at a 1/2 second interval. If the button is held for 5 seconds a record action will be begin.
 - If the button is released before the 5 seconds have elapsed, recording will be canceled and the normal preset will be activated.
- Step 3: Release the preset button. The new recorded preset will activate and the LED will illuminate.

Appendix C

Redundant Tracking Backup

Features

In European ESR racks, Redundant Tracking Backup (RTB) systems feature two control modules per rack with the ability to switch between the control modules automatically upon detection of errors, failure or manually. The manual switching can be done from the front of the rack or from a remote contact closure wired into the rack.

This is not available for any other Sensor+ rack types other than ESR racks.

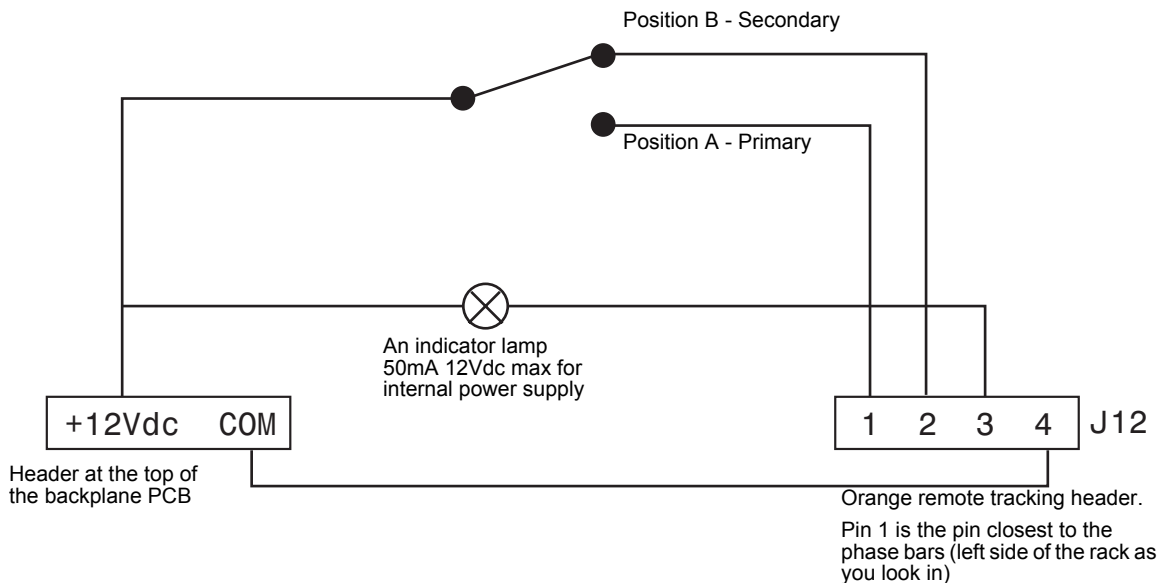
The doubling of control modules in a rack means that the maximum number of racks in a group is limited to 8. The maximum total number of CEM+s in a group is always 16.

Hardware

In order to fit two control modules to the rack, a special dual backplane is required. If you require an upgrade to a dual backplane, please contact ETC. See [Contacting ETC, page 47](#)

There is a three position switch provided to the left of the control modules that allows control to be switched to either the top or bottom control module. When the switch is in the centre position control is automatically given to the module with the least errors, or the top module if there are no errors. When the switch is in the upper or lower position control is given to the upper or lower CEM+.

There is a option for remote switching between the top and bottom module of each rack, provided by the four pin J12 connector on the rear of the dual backplane. This can be wired to remote switching and remote status indicators as shown below.

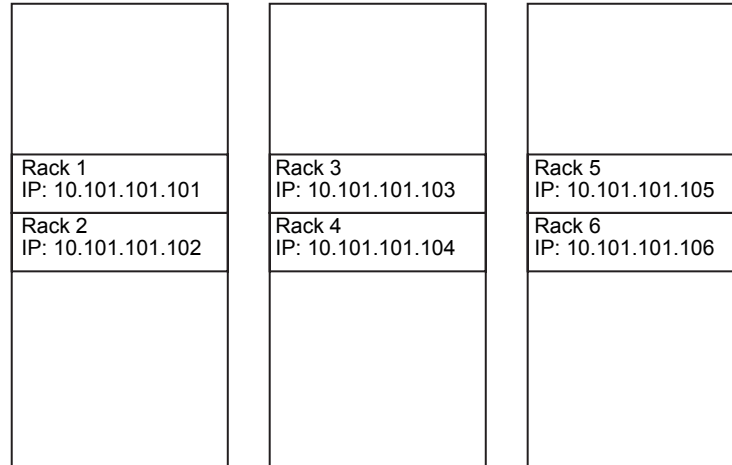


The +12Vdc supply can either be from the internal rack power supply provided at the backplane, or an external 12Vdc power supply.

Addressing

In RTB systems, the control modules are still configured sequentially in terms of IP addressing and rack numbering, but each rack contains two CEM+ modules. This means that **logical CEM+ rack numbering is not the same as the physical rack**.

For example, here is a RTB system with three RTB ESR racks.



Physical rack 1 contains CEM+ modules configured as rack 1 and rack 2. Rack 2 contains CEM+ modules configured as rack 3 and rack 4 and so on.

Configuration

To configure an RTB system, follow the steps below.

- Step 1: Set the rack number and rack IP addresses in the same manner as shown above.
- Step 2: Connect to the network using your PC and web browser.
- Step 3: Configure the racks as you would normally, however add 2 racks of the same type for each single rack physically present.
- Step 4: After adding all of the racks, set the type of each second rack (corresponding to the secondary CEM+ in each physical rack) to “Tracking” [Face Panel only]
- Step 5: Finish configuring your racks and dimmers. Any CEM+ set to tracking will automatically inherit configuration changes made to the top (primary) CEM+ when they are both online.

Operation

When a CEM+ is running in tracking mode, a letter “A” or “B” is shown in the bottom right corner of the face panel LCD. This shows whether it is the primary (A) or secondary (B) CEM+. The CEM+ that has control of the rack will display an asterisk “*” next to the letter.

With the processor switch in the centre position, control will default to the primary (A) CEM+. If the primary (A) CEM+ has errors, it will automatically switch to using the secondary (B) CEM+ for control.

You can also manually switch the between the CEM+ modules by moving the switch to the up or down positions.




Appendix D

CEM+ Error Messages

If the CEM+ detects an error, it will flash the beacon and display the appropriate error message on the LCD display. A CEM+ will only display error messages for the same rack it is in. You can't see other rack's error messages from a single CEM+.

Errors are also displayed in the WYSILink Message Log on Emphasis Control Systems and WYSILink PCs on the network. You can also view rack error messages in the Sensor+ Connect interface on Emphasis Control Systems or by browsing into a CEM+ using Internet Explorer 6 on a PC on the network.

View error messages on the CEM+ LCD display:

- Step 1: Open the door of the rack with the blinking beacon. The CEM+ will display the message [Rack Errors].
- Step 2: Press  to enter the error list. The number of errors and which error is currently displayed of that number are displayed at the top of the display.
- Step 3: Press  and  to increment and decrement through the list, if necessary.

| CEM+ Error Message | Probable Cause | Possible Corrective Action |
|------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------|
| AMBIENT OVERTEMP | Ambient temperature is higher than 115°F (46°C). | Lower dimmer room temperature. |
| AMBIENT TEMP HIGH | Ambient temperature is higher than 104°F (40°C). | Lower dimmer room temperature. |
| AMBIENT TEMP LOW | Ambient temperature is lower than 32°F (0°C). | Raise dimmer room temperature. |
| DIMMER ERROR | A dimmer in this rack has an error. | Use About Dimmer to check the specific error. |
| DATA ERROR PORT (A or B) | DMX512 data error | Check DMX512 port input cable and termination. |
| FREQUENCY ERROR | Feed power is not 50 or 60Hz. (±2.5Hz) | Check input frequency. |
| NO AIRFLOW | Insufficient airflow detected. | Check fan and air filter for obstruction. |
| NO DATA PORT (A or B) | No DMX512 data has been received by Port (A or B). | Check DMX512 source devices and input cables. |
| MODULE __ OVERTEMP | Dimmer module has overheated and shut down. | Check airflow |
| PHASE (A, B or C) OFF | No voltage on phase (A, B or C). | Check line feed. |
| PHASE DETECT FAIL | CEM+ could not read the line feed phasing. | Re-seat the CEM+ and try again. If problem persists, replace the CEM+. |
| TEMP SENSOR STUCK | Ambient temperature sensor is stuck. | Replace CEM+. |
| ZERO CROSS ERROR | CEM+ hardware failure. | Replace CEM+. |
| SOFTWARE ERROR | CEM+ units running different versions of software are on the same network. | Install the same version of software on all CEM+ units. |
| PHASE (A, B or C) VOLTS HIGH | Voltage on phase (A, B or C) is higher than 140Vac. | Check line feed. |
| PHASE (A, B or C) VOLTS LOW | Voltage on phase (A, B or C) is lower than 80Vac. | Check line feed. |

| CEM+ Error Message | Probable Cause | Possible Corrective Action |
|----------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| LOW AIRFLOW | Airflow is low. | Check fans and air filter for obstruction. |
| CLEAN YOUR FILTER | This is a reminder to clean your air filter. It appears when the "Clean Time" clock has counted down to zero. | Reset the "Clean Time" counter to the number of hours you want between filter cleaning. |
| PHASE (A, B or C) HEADROOM | Incoming line voltage on phase (A, B or C) has dipped below the configuration-defined Headroom level. | Reduce the load on the indicated phase through repatching or lowering output levels of associated dimmers. |
| CONFIG MISMATCH __ | Configuration error. | Transfer configuration data from another rack. |
| BREAKER __ TRIP | The circuit breaker on dimmer __ has tripped. | Check circuit for cause of circuit breaker trip, such as too many lamps on the dimmer, or bad cabling. |
| SCR __ STUCK ON | The SCR in dimmer __ has failed on. | Replace dimmer module. |
| SCR __ STUCK OFF | The SCR in dimmer __ has failed off. | Replace dimmer module. |
| RCD __ TRIP | The RCD in __ has failed tripped. | Replace RCD module. |
| MODULE __ REMOVED | Module has been removed from the rack. | Reinsert or replace module. |
| LOAD __ CHANGE HIGH | Load is currently higher than the recorded load for this dimmer. | Rerecord the load, or check for additional or higher wattage lamp(s) on the circuit. |
| LOAD __ CHANGE LOW | Load is currently lower than the recorded load for this dimmer. | Rerecord the load, or check for missing or burned-out lamp(s) on the circuit. |
| LOAD __ NO LOAD | A load is recorded, but there is currently no load present on this dimmer. | Rerecord the load, or check for missing or burned-out lamp(s) on the circuit. |

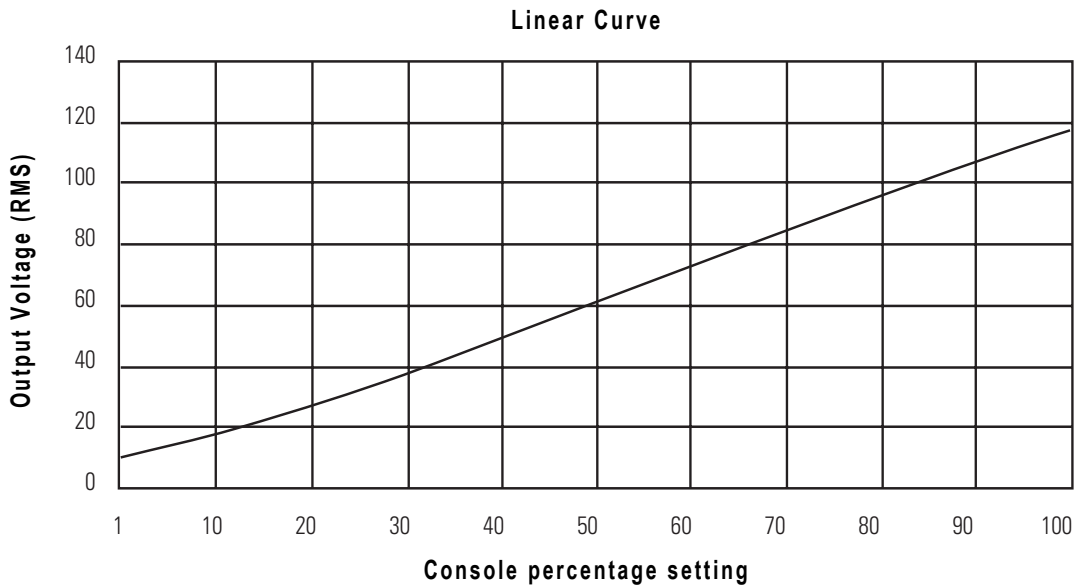
Appendix E

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 offers five dimmer curve choices, which can be applied to individual dimmers.

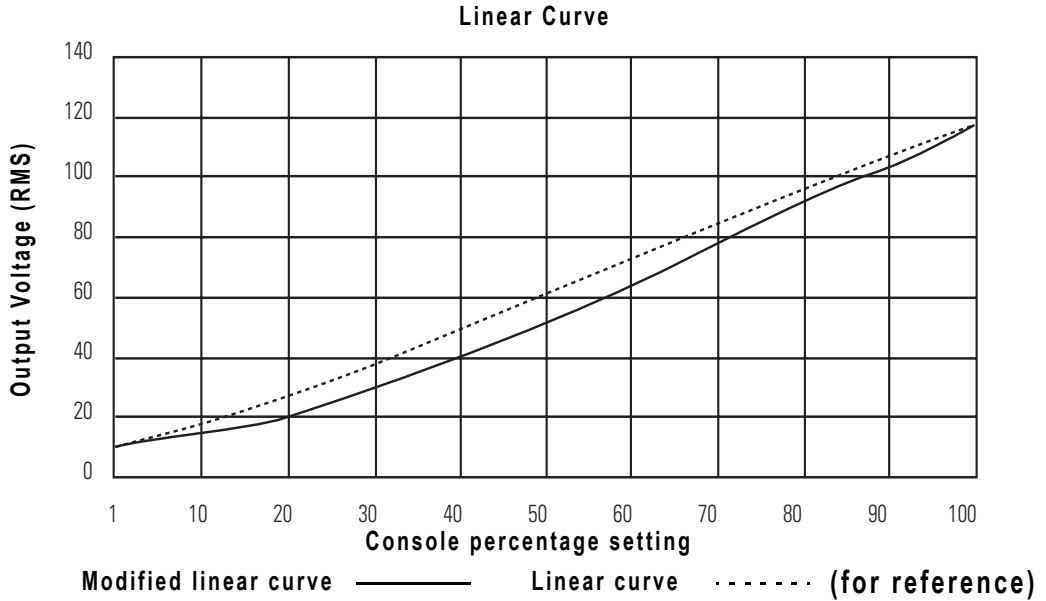
Linear curve

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



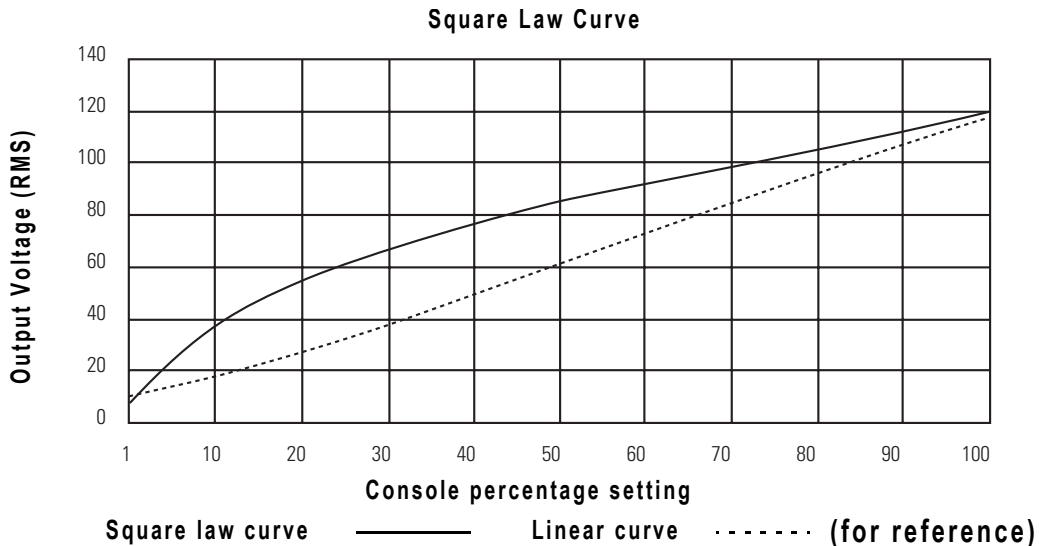
Modified linear curve

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



Square law curve

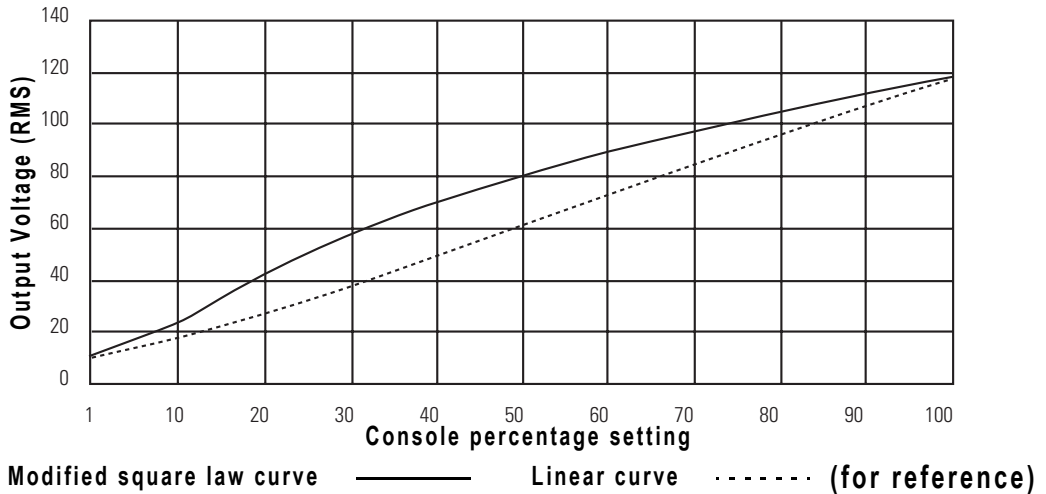
At low control levels, much of a traditional incandescent fixture's light output is in the invisible infrared spectrum. This results in poor visible response to low control levels. A square law curve applies a multiple derived from the square root of the control level (with full output equal to 1.00)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



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. ETC’s 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,

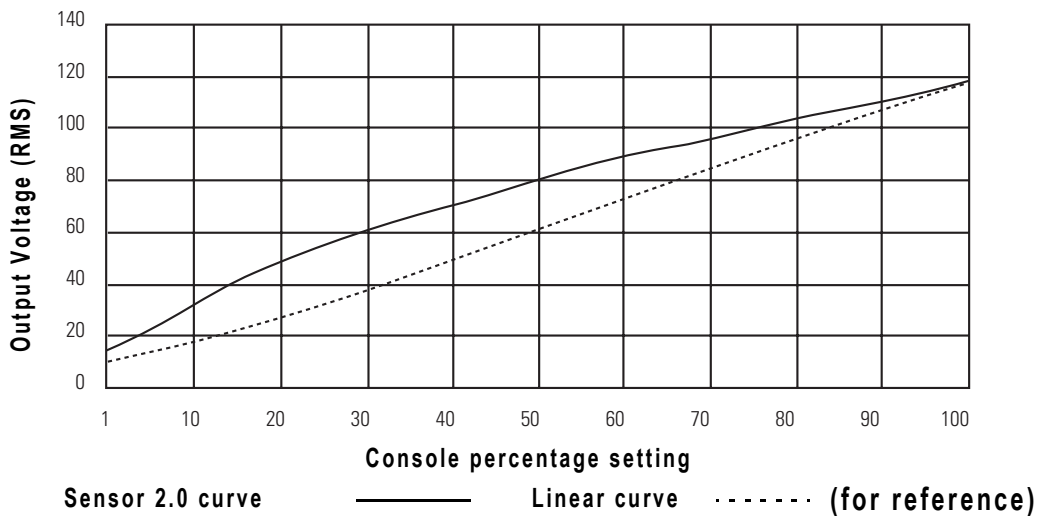
Modified Square Law Curve



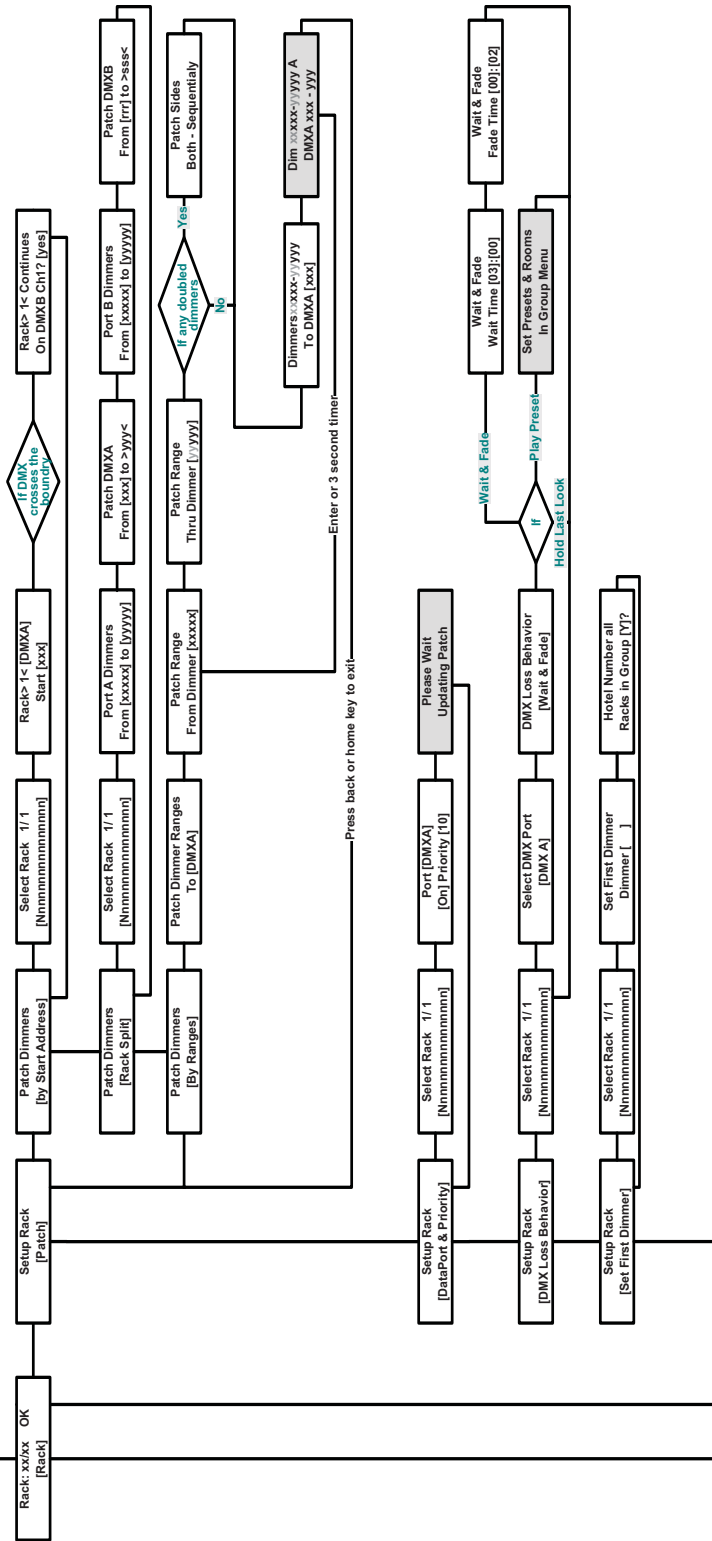
Sensor 2.0 curve

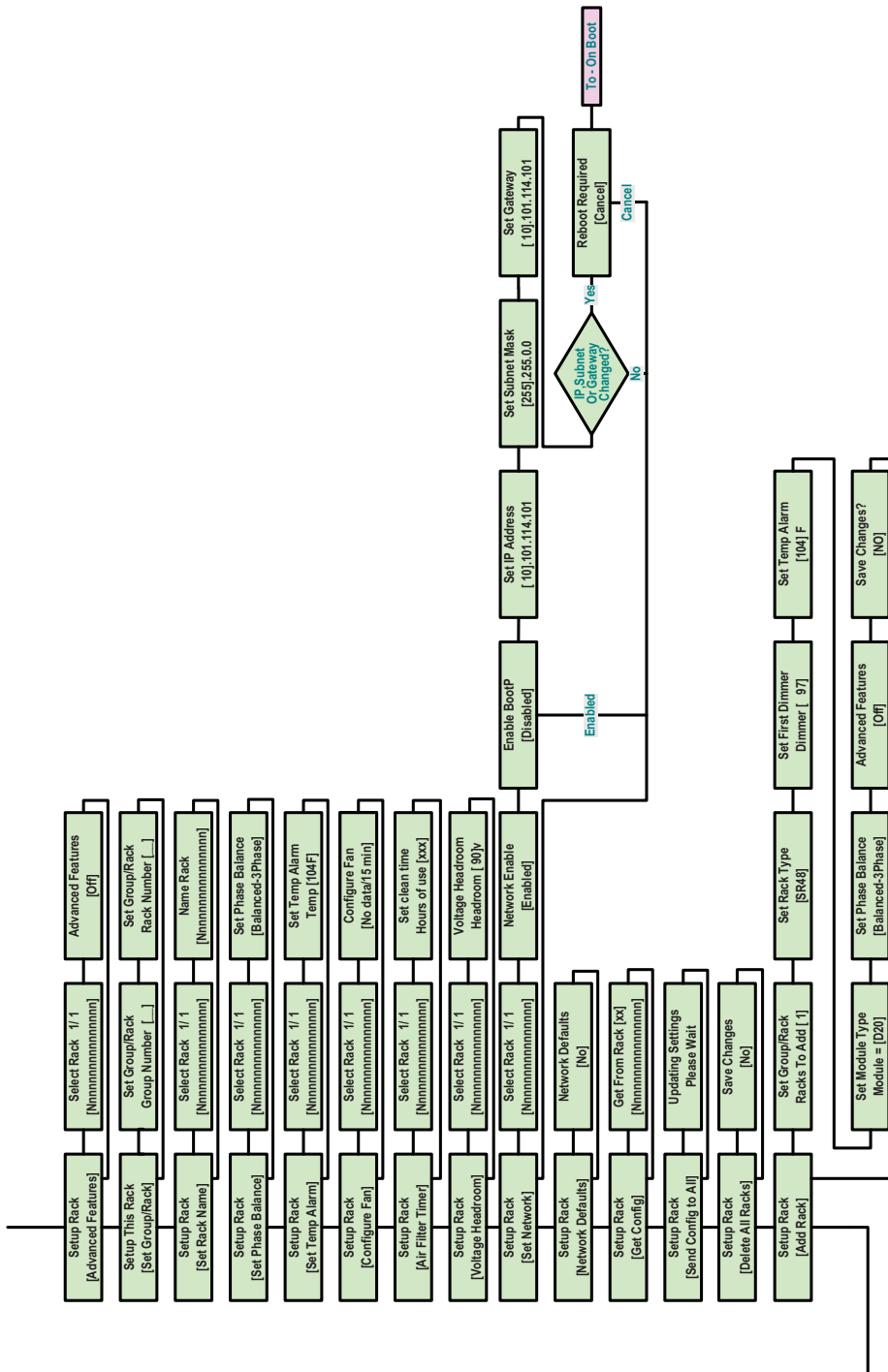
The Sensor 2.0 curve is the previous version of ETC’s modified square law curve. It provides backwards compatibility for shows created using earlier versions of ETC equipment and familiar response for designers who prefer the earlier version.

Sensor 2.0 Curve

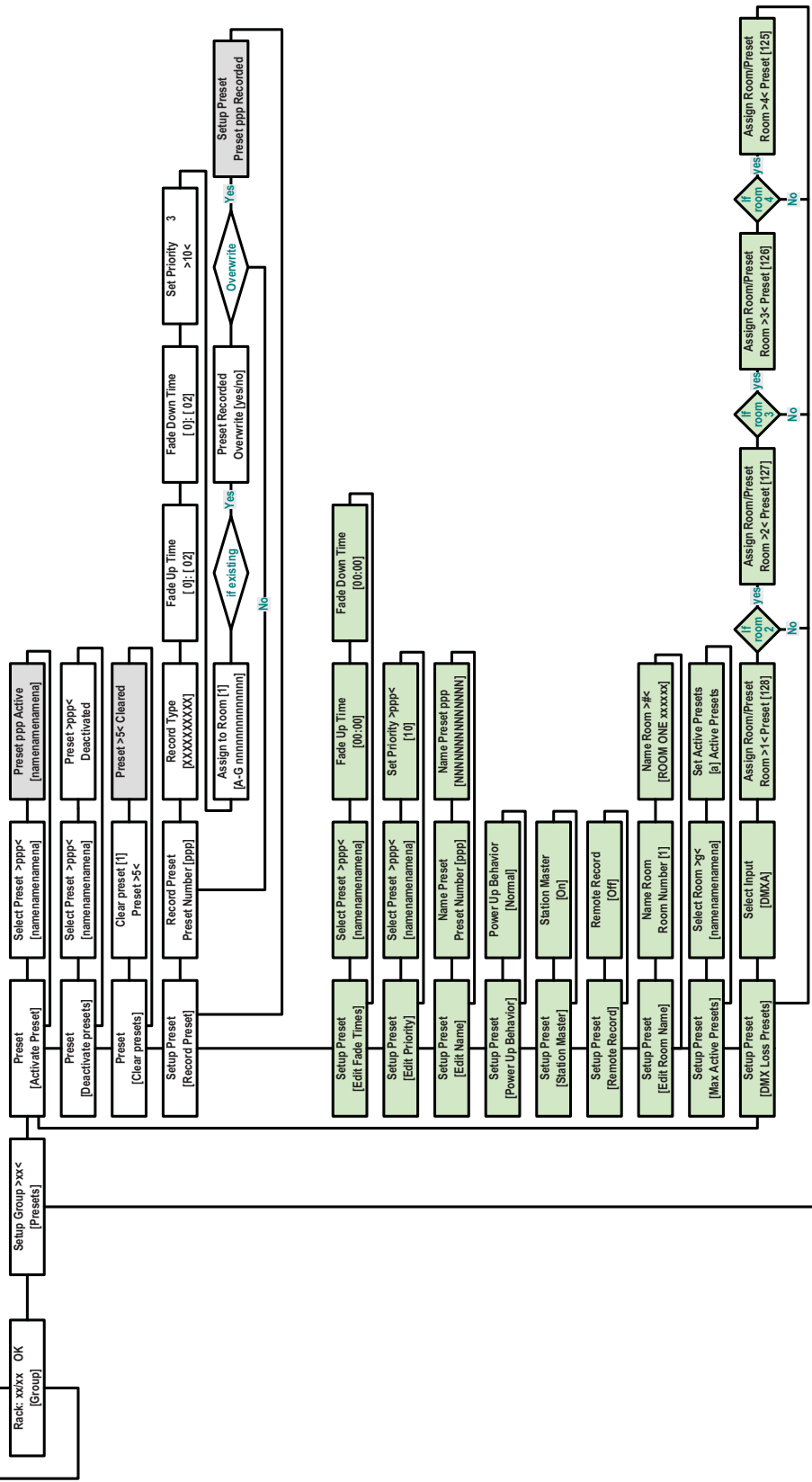


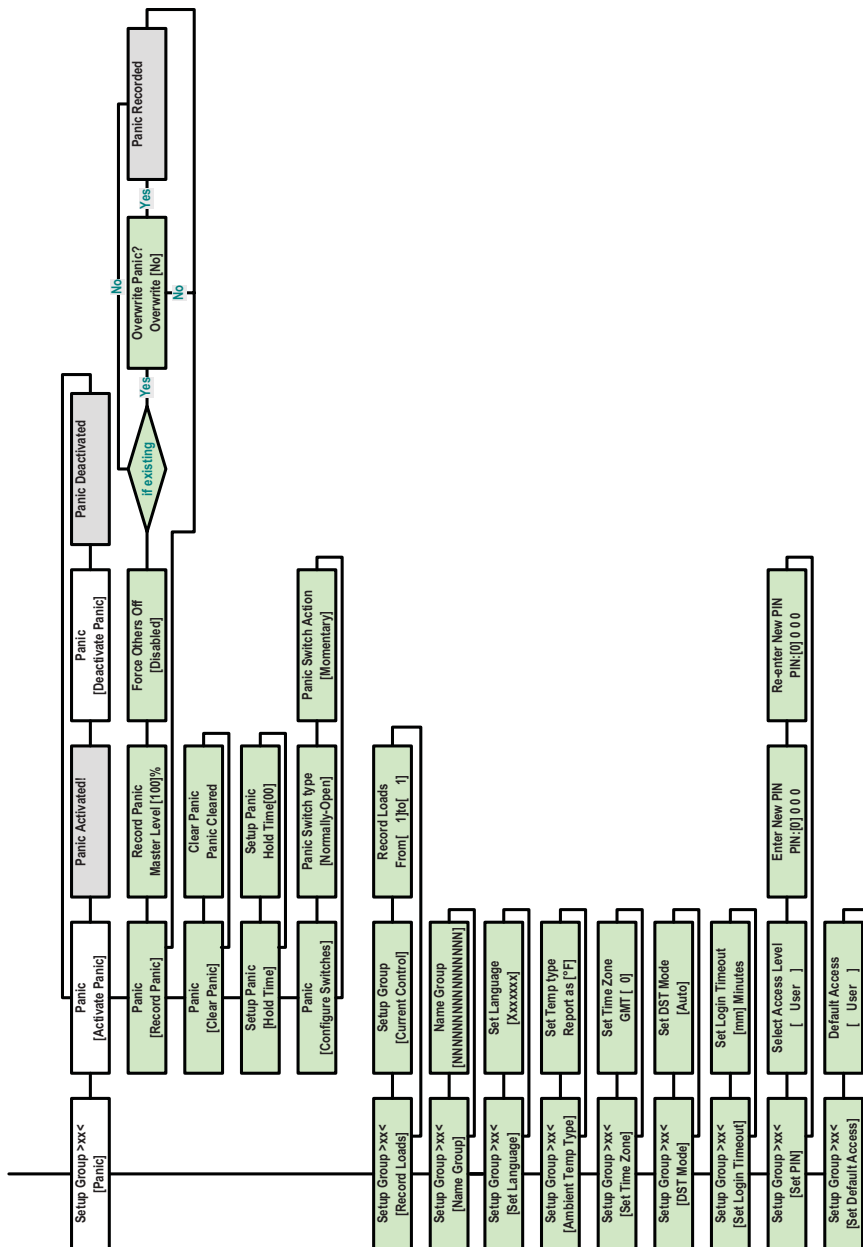
Racks





Group (preset & panic)

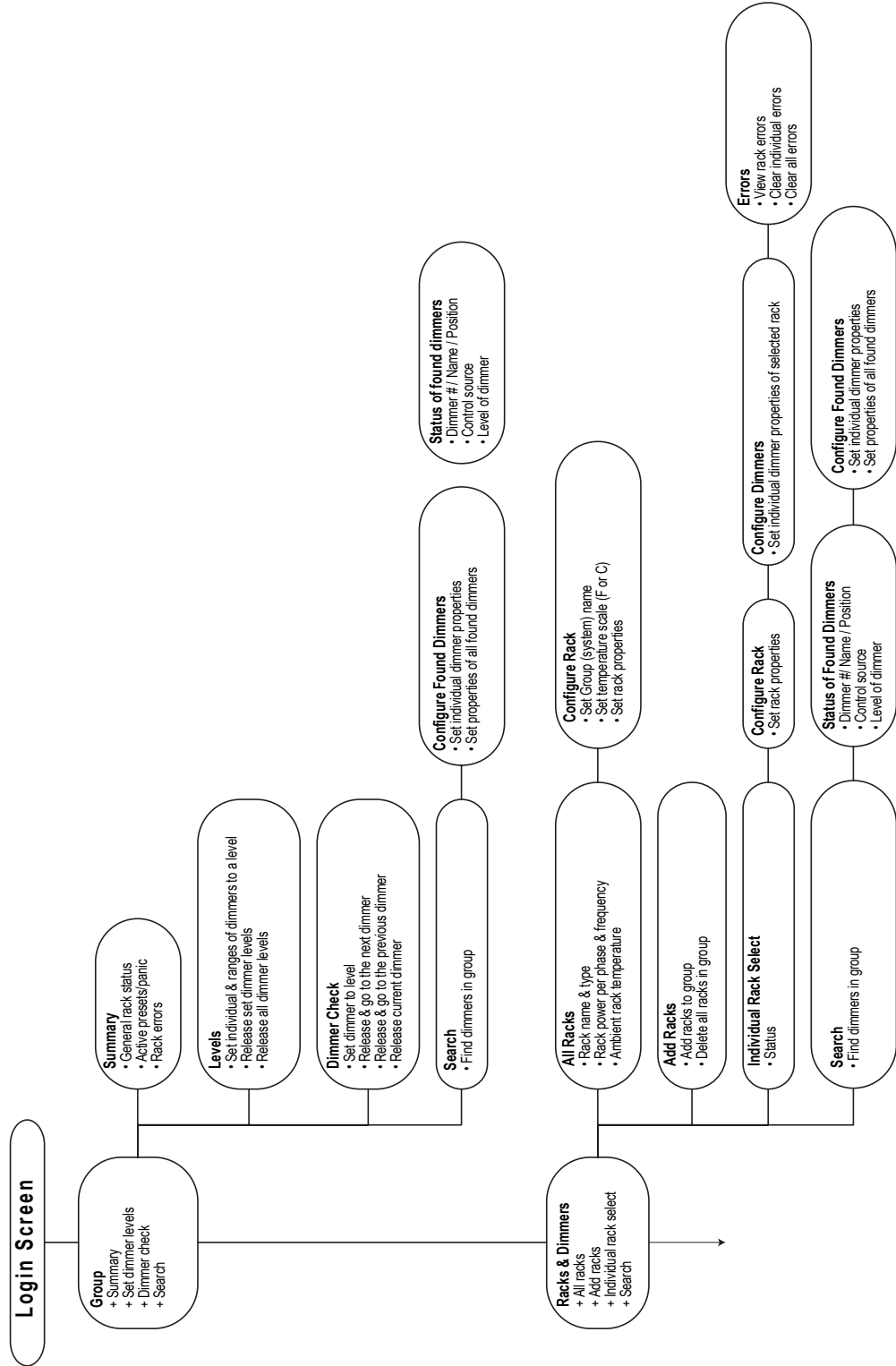




Appendix G

Sensor+ Connect Site Map

This is an outline of the Sensor+ Connect web interface.







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7150M1400-2.0.0 ■ Rev A ■ Released 01/2006