L86 EM264

electronics module

USER MANUAL

This manual describes ETC's *EM264* electronics module. The *EM264* uses DMX512 control signal to control dimmers in ETC *L86 Installation Racks* and *L86 Touring Racks*. Each column of dimmer modules in a chassis is controlled by an *EM264* near the top of the column.

The *EM264* allows customized dimmer numbering within the chassis. It can compensate for a mixture of dimmer types within the same chassis and can customize the control curve for each dimmer. It can also be configured to allow two consoles to control two sets of lights independently, or two consoles to control the same lights with highest level taking priority. Generally, *EM264s* in installation racks are factory configured to match the requirements of your system. For portable racks, standard configurations are available without custom programming. For more details about standard and customized systems, see *Configuring the EM264* on page 3.

Additionally, the *EM264* provides optical isolation between input signals and the rest of your L86 system. The module also isolates the DMX512 input signal between each of the *EM264s*.

There are several important differences between *EM264s* in installation systems and in touring systems. The following table lists the most important differences:
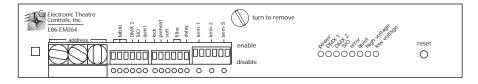
Touring Rack	Installation Rack
Normal output curve	Customized output curves
Standard firing mode	Optional Quiet mode
Dual DMX512 ports use highest-level input	Dual input interaction is programmable
120V output	Output voltage is programmable
Any DMX512 number can be starting address	Rack number is starting address
Dimmer numbers are sequential, following starting address	Dimmer numbers are programmable

Front panel

The front panel of the *EM264* contains eight indicator LEDs that provide you with information about your dimming system. When you first turn on your system (or press [Reset]) the *EM264* processor runs a series of self tests. If an error is found, the Error, Quiet, High Volt, or Low Volt LED flashes and all the other LEDs turn off. See the list on page 2 for information about the LEDs.

Indicator LEDs

Each indicator LED on the *EM264's* front panel provides specific information about the operating status of the *EM264* electronics. LEDs have four conditions: Off, On, Blinking (turning on and off slowly), and Flashing (turning on and off quickly). Generally, a blinking LED is warning you of a condition that might cause a problem. A flashing LED indicates that an error has already occurred and the system has stopped operating. The information each LED provides is described below:

Power

LED On .... *EM264* is receiving power.
LED Off .... *EM264* is not receiving power.

DMX1

LED On .... First DMX512 port is receiving valid DMX512 data.
LED Blinking ...... First DMX512 port is not receiving valid DMX512 data.

DMX2

LED On .... Second DMX512 port is receiving valid DMX512 data.
LED Blinking ...... Second DMX512 port is not receiving valid DMX512 data.
LED Off .... Second DMX512 port is not enabled.

SIO (Serial Input/Output)

LED On .... Serial Input/Output port is receiving valid data.
LED Off .... Serial Input/Output port is disabled.

Error

LED Flashing ..... Error was found in table data or power-up. (Or diagnostic routine is running) Call your ETC service representative.
LED Off .... No error found.

Quiet

LED On .... Quiet mode is enabled.
LED Off .... Quiet mode is disabled.
LED Flashing ..... Invalid DMX512 address (in portable) or invalid rack number (in installation).

High Volt

LED On .... Input voltage exceeds 130V AC.
LED Off .... Normal.
LED Flashing ..... Input voltage exceeded 135V AC at system startup.

Low Volt

LED On .... Input voltage is less than 100V AC.
LED Off .... Normal.
LED Flashing ..... Input voltage was less than 95V AC at system startup.

Reset button

Press [Reset] to reset the *EM264* to match current rotary and DIP switch settings. Press [Reset] any time you change the rotary or DIP switches.

Rotary address switches

The rotary switches are used to set starting DMX512 addresses on portable systems and to set rack numbers on installation systems. They are also used to select self tests and to set speeds and levels for self tests. See *Configuring the EM264*, page 3, for more information.
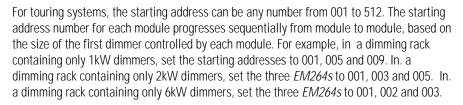
DIP switches

The DIP switches are used to select a variety of *EM264* options. See *Configuring the EM264*, page 3, for more information.

Configuring the EM264

DIP switches on the front panel allow you to select *EM264* options. A switch is Enabled when it is in the up position. It is Disabled when it is in the down position.
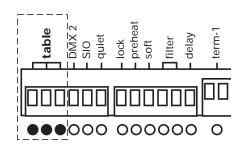
Setting starting address

Three rotary switches on the front panel allow you to set the starting address for the *EM264*.

For touring systems, the starting address can be any number from 001 to 512. The starting address number for each module progresses sequentially from module to module, based on the size of the first dimmer controlled by each module. For example, in a dimming rack containing only 1kW dimmers, set the starting addresses to 001, 005 and 009. In. a dimming rack containing only 2kW dimmers, set the three *EM264s* to 001, 003 and 005. In. a dimming rack containing only 6kW dimmers, set the three *EM264s* to 001, 002 and 003.

For installation systems, the starting address is the rack number. The dimmer numbering sequence for each rack is contained in configuration tables stored in the *EM264's* memory. Valid addresses are 001 to 064 for installation racks. Set the rack address on the rotary switches. See *Selecting configuration tables*, below.

Addresses 513 to 999 are used for self tests.

Note: If an address outside the available range is selected, the Quiet LED flashes and all other LEDs turn off until the address is corrected.
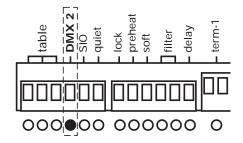
Selecting configuration tables

The three DIP switches labeled **Table** set the *EM264* operating mode. If customized configuration tables have been programmed at the factory, you must enable all three switches and the rack address must be set on the rotary address switches. If a standard configuration is used, set the switches as shown on the chart below.

Note: All EM264s in an installation system are programmed with information for the entire system. This means that they are interchangeable within the system.
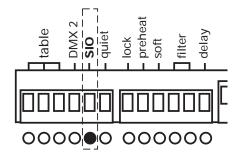
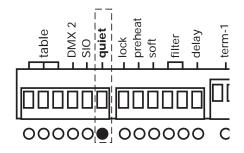| Left	Center	Right	#	Mode of operation
Down	Down	Down	1	All quad 1.2kW dimmers
Down	Down	Up	2	All dual 2.4 kW dimmers
Down	Up	Down	3	All single 6.0kW dimmers
Down	Up	Up	4	All double high 12kW dimmers
Up	Down	Down	5	All dimmers in consecutive DMX order
Up	Down	Up	6	Not used
Up	Up	Down	7	Not used
Up	Up	Up	8	Custom tables

Enabling the second DMX512 port

The *EM264* is equipped with two DMX512 input ports. If the module simultaneously receives input from both DMX512 sources, it sets dimmer output at the higher of the two levels.

The second DMX512 port is activated by enabling the DIP switch labeled **DMX 2**. If you are only using one input, disable the switch.

Enabling the SIO (Serial Input/Output) port

The SIO port is activated by enabling the DIP switch labeled **SIO**. The port is turned off by disabling the switch. If your system is not equipped with the SIO function, leave this switch disabled.
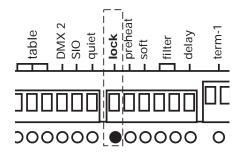
Enabling Quiet mode

The *EM264* allows you to operate some or all of your system's dimmers in Quiet mode. Quiet mode can reduce lamp noise significantly in lamps connected to these dimmers. Available only in *EM264s* in L86 Installation Racks, Quiet mode is most often specified for certain dimmers at the same time the system's configuration tables are programmed at the factory.

Enable the DIP switch labeled **Quiet** to activate Quiet mode for all dimmers programmed to use the mode. Disable the switch for normal operation.
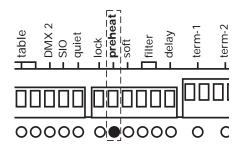
Warning: Do not connect load types other than incandescent lamps to the dimmer if Quiet mode is enabled for that dimmer. In Quiet mode, the dimmer may produce a DC voltage that can damage other types of load.

Enabling Lock

Lock protects programmed information in your module. Once you have configured an *EM264*, you should leave it locked at all times. Before a module can be reprogrammed, you must disable Lock. Lock is activated by enabling the DIP switch labeled **Lock**. It is turned off by disabling the switch.
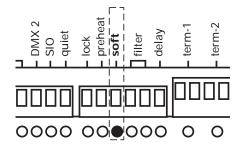
Note: Lock does not affect rotary or DIP switch settings. It protects internal programming.
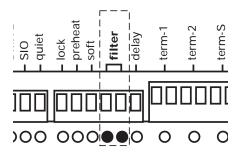
Enabling Preheat mode

In Preheat mode, the *EM264* maintains all dimmers at a minimal level even when the dimmer output level is set to zero. This can prolong the life of your lamps. If your rack contains dimmer modules with indicator lights, Preheat mode makes the indicators glow slightly at all times. Enable the DIP switch labeled **Preheat** to activate Preheat mode. Disable the switch for normal operation.

Note: If you run a blackout while Preheat mode is active, the system blacks out fully for six seconds, then raises all dimmers slightly to the preheat level.
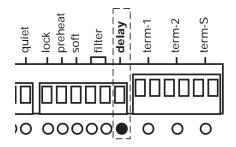
Enabling Soft Start

Soft Start adds a filter that reduces lamp shock caused by turning a lamp with a cold bulb on to full. Soft Start checks the bulb to see if it is cold; if it is, Soft Start applies a filter to protect it. Enable DIP switch 9 to activate Soft Start. Disable the DIP switch labeled **Soft** for normal operation.
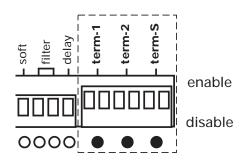
Enabling filtering

The two DIP switches labeled **Filter** set DMX512 filter levels for the *EM264*, as shown on the chart below. Four levels of filtering are provided to help stabilize control levels. Filter settings affect all dimmers.

Left	Right	Filter selected
Down	Down	None
Down	Up	32 ms
Up	Down	64 ms
Up	Up	128 ms

Setting delay

If DMX512 input is interrupted, the *EM264* holds dimmer levels for either three minutes or three seconds, then fades outputs to zero. To set the delay for three seconds, disable the DIP switch labeled **Delay**. For a three minute delay, enable the DIP switch. The fade takes five seconds.

Control termination

Three sets of double DIP switches labeled **Term-1**, **Term-2 and Term-s** are provided to allow you to activate the control termination circuit required at the end of the DMX512 and SIO communication links. Enable all three pairs of termination switches on the highest numbered *EM264* installed in the highest numbered rack in your system. Disable all three pairs of switches on the other two *EM264s* in that rack and all *EM264s* in all other racks.

Note: On some installation racks the termination settings may vary. Consult the switch settings chart in your System Manual before changing termination switches.

Self test mode

EM264's Self test mode allows you to run a number of diagnostic self tests. Set the rotary switches as shown below to select the desired test. Press [Reset] to start the test. When you press [Reset], all the LEDs flash three times then turn off (except for the Power LED which stays on throughout all the tests), the *EM264* resets and the self test runs.

Switch settings

Some of the tests allow you to set the speed at which the test runs. The rate is determined by the setting of rotary switch 3. Set the rotary switch to **0** to freeze the test. Settings from **1** to **9** set the speed from the slowest rate to the fastest rate respectively. In the **Level to all** test, the rotary switches allow you to set output levels of zero through 100 percent.

Serial Input/Output (SIO) port test

If the *EM264* is equipped with SIO receiver hardware, this test confirms that the SIO port is functioning. The optional SIO test module must be installed to run this test. Set the front panel rotary switches to **810** and press [Reset] to run the test. If the test encounters an error, the Error LED flashes.

Output chase

This test flashes each of the system's outputs from 1 through 64, one at a time, to confirm that all outputs are functioning. Set the front panel rotary switches 1 and 2 to **91** and press [Reset] to run the test. Adjust the speed of the test by setting rotary switch 3 from **0** to **9** as noted in *Switch settings*.

Fade all dimmers

This test fades all outputs simultaneously from off to full and back to off. Set rotary switches 1 and 2 to **92** and press [Reset] to run the test. Adjust the speed of the test by setting rotary switch 3 from **0** to **9** as noted in *Switch settings*.

Fade one dimmer

This test fades each output from off to full and back to off one at a time. Set the front panel rotary switches 1 and 2 to **93** and press [Reset] to run the test. Adjust the speed of the test by setting rotary switch 3 from **0** to **9** as noted in *Switch settings.*

Set one dimmer on

This test raises a specified output to full. Set the front panel rotary switches 1 and 2 to **94** and press [Reset] to run the test. Once the test starts, set the number of the desired dimmer (from 001 to 064) using the rotary switches.

Set level to all dimmers

This test raises all outputs to a specified level. Set the front panel rotary switches 1 and 2 to **95** and press [Reset] to run the test. Once the test starts, use the three rotary switches to set the level percentage you desire (from 000 to 100).

Watchdog test

The *EM264's* Watchdog function monitors the *EM264* and restarts the processor if it malfunctions. This test checks the module's Watchdog function. Set the front panel rotary switches to **960** and press [Reset] to run the test. The LEDs light, then turn off one at a time. If the function works, the processor will reset within two seconds. If the test encounters an error, the Error LED will flash.