

# L86<sub>EM24</sub>

electronics module

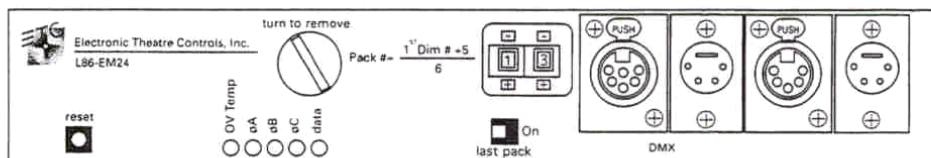
## USER MANUAL

This manual describes ETC's *EM24* electronics module, how it operates, and explains how to run several self tests.

The *EM24* is the control module for *L86 Pack* systems. It accepts a variety of protocols, including DMX512 and AMX192, to control dimmers in ETC *L86 Installation Packs* and *L86 Portable Packs*.

### Front panel

The *EM24* front panel contains a reset switch, five indicator LEDs, an address select thumbwheel, and, on the *EM24D*, input control connectors. These features provide you with information about and access to your dimming system as indicated below.

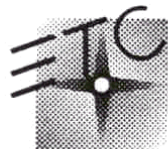


### Indicator LEDs

Each indicator LED on the *EM24*'s front panel provides specific information about the operating status of the *EM24* electronics. The information each LED provides is described below.

- OV Temp**  
LED Off Normal.  
LED On Pack is overheated, or the remote reset line is grounded.  
*Note: If this LED is on, all outputs are turned off.*
- 0A, 0B, 0C**  
LED On Phase is receiving power.  
LED Off Phase is not receiving power.  
*Note: 0B LED will be off if the EM24 is in single phase operation.*
- Data**  
LED Off Analog mode is selected.  
LED On System is receiving digital data. (Normal)  
LED Flashing Digital data input mode is selected, but no digital data is being received.

*Note: When DMX512 input is interrupted, the EM24 maintains the last valid output levels it received for four minutes, then fades all outputs to zero. When AMX192 data is interrupted, the outputs will fade immediately.*



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### Reset switch

Pressing [Reset] causes the system to restart. At this point, the system will reconfigure itself to match current settings. [Reset] should be pressed any time the starting address is changed, and any time an *EM24* is installed into a system which has already been turned on.

### Thumbwheel address switch

The thumbwheel is used to set starting addresses for your dimmers, as well as to select self tests. (See *Setting Starting Address* on page 3 and *Self Test Mode* on page 4.)

### Termination switch

The Termination switch identifies the *EM24* which is at the end of the chain of packs. The switch should be set to **On** for the last *EM24* in the DMX512 chain. All others should be set to **Off**.

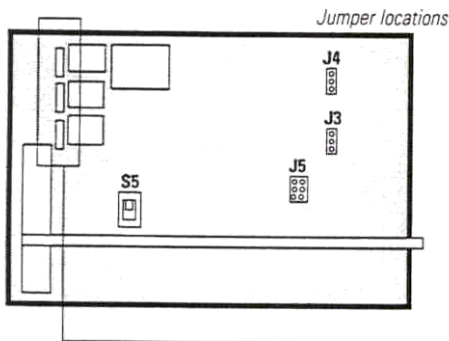
*Note: Switch should be set to Off for AMX192 mode.*

### Data connectors (optional)

Input/Output jacks for various protocols. Pinout:

| DMX512             | AMX192             |
|--------------------|--------------------|
| 1 Common           | 1 Common           |
| 2 Data -           | 2 Clock +          |
| 3 Data +           | 3 Analog Multiplex |
| 4 Analog Multiplex | 4 Clock -          |
| 5 No Connection    |                    |

## Configuring the EM24



Internal jumpers and the front panel thumbwheel allow you to configure several *EM24* options and run self tests.

A jumper consists of two or three vertical pins on the circuit board. A jumper is on when a clip (a small, rectangular piece of plastic) is placed over two of the pins, closing the circuit. It is off when the clip is removed.

*Note: Under normal operation, all EM24s in the racks in your system should have the same jumper settings, except for their starting addresses.*

### Data Fuses

Three fuses are installed inside the *EM24* to protect your system. If there is a short (excess voltage) in the data stream, the affected fuse will fail.

*Warning: Replace data fuses with type GMA-1/8 only.*

#### Two prong jumper

Jumper clip off

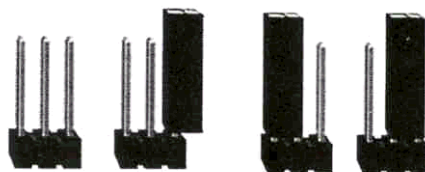
Jumper clip on



#### Three prong jumper

Jumper clip off

Jumper clip on



### Setting starting address

Set the starting address for your *EM24* on the front panel thumbwheel. Select the starting address from the chart below and set the thumbwheels to the corresponding number. For analog mode, set the starting address to 99. If you need to make changes, write down your original settings for future reference.

| Thumb | Start | Thumb | Start | Thumb | Start | Thumb | Start | Thumb | Start | Thumb | Start |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 00    | 1     | 15    | 85    | 30    | 175   | 45    | 265   | 60    | 355   | 75    | 445   |
| 01    | 1     | 16    | 91    | 31    | 181   | 46    | 271   | 61    | 361   | 76    | 451   |
| 02    | 7     | 17    | 97    | 32    | 187   | 47    | 277   | 62    | 367   | 77    | 457   |
| 03    | 13    | 18    | 103   | 33    | 193   | 48    | 283   | 63    | 373   | 78    | 463   |
| 04    | 19    | 19    | 109   | 34    | 199   | 49    | 289   | 64    | 379   | 79    | 469   |
| 05    | 25    | 20    | 115   | 35    | 205   | 50    | 295   | 65    | 385   | 80    | 475   |
| 06    | 31    | 21    | 121   | 36    | 211   | 51    | 301   | 66    | 391   | 81    | 481   |
| 07    | 37    | 22    | 127   | 37    | 217   | 52    | 307   | 67    | 397   | 82    | 487   |
| 08    | 43    | 23    | 133   | 38    | 223   | 53    | 313   | 68    | 403   | 83    | 493   |
| 09    | 49    | 24    | 139   | 39    | 229   | 54    | 319   | 69    | 409   | 84    | 499   |
| 10    | 55    | 25    | 145   | 40    | 235   | 55    | 325   | 70    | 415   | 85    | 505   |
| 11    | 61    | 26    | 151   | 41    | 241   | 56    | 331   | 71    | 421   | 86    | 511   |
| 12    | 67    | 27    | 157   | 42    | 247   | 57    | 337   | 72    | 427   |       |       |
| 13    | 73    | 28    | 163   | 43    | 253   | 58    | 343   | 73    | 433   |       |       |
| 14    | 79    | 29    | 169   | 44    | 259   | 59    | 349   | 74    | 439   |       |       |

### Selecting incoming data type

The first two jumpers at location J5 on the circuit board (see diagram) determine the type of digital data which your *EM24* will receive. After making any changes, press the [Reset] button and the *EM24* will reconfigure to match your new settings.

| Data format    | Jumper 1 | Jumper 2 |
|----------------|----------|----------|
| DMX512         | —        | —        |
| AMX192         | on       | —        |
| Micro II       | —        | on       |
| Preset control | on       | on       |

Additionally, if you are using Colortran data, set the top pair of pins in the three-way jumper at location **J4** to **On**. For all other formats, connect the bottom pair of pins. If you are receiving AMX192 data, set the top pair of pins in the three-way jumper at location **J3** to **On**. For all other formats, or if you are running self tests, connect the bottom pair of pins.

Use the Preset Control setting if your *EM24* is in an *L86 Wall Pack* using wall mounted control stations.

### Setting number of outputs

Set Jumper 3 at location **J5** to **Off** to if you have twelve 2.4k or twenty four 1.2k dimmers. Set it to **On** to if you have six 6k dimmers.

### Setting line frequency

Set Jumper 4 at location **J5** to **Off** for 60 cycle frequency. Set it to **On** for 50 cycle frequency.

### Setting Dimmer Phasing

The red slide switch at location **S5** controls the phase setting for your *EM24*. If your pack is wired for three phase operation, set the switch to the **right** (front panel facing you). Set the switch to the **left** for single phase operation.

right = 3 phase 120/208 4-wire  
left = 1 phase 120/240 3-wire

## Self test mode

The EM24 allows you to run a number of built-in diagnostic procedures. To enter Self test mode, set the thumbwheels on the front panel to the number of the test you want to run. Set the Data Type jumper (at location J3) to the DMX position. Next, push [Reset]. The data LED flashes five times, the system resets, and the self test you chose runs.

| Thumbwheel | Test                                  |
|------------|---------------------------------------|
| 90         | Test preset AD control (factory only) |
| 92         | Chase                                 |
| 93         | Fade all                              |
| 94         | Fade one                              |
| 96         | Level to all                          |
| 97         | Relay driver test (factory only)      |
| 98         | Turn on a driver (factory only)       |

Tests 92, 93 and 94 allow you to adjust the speed at which they run using the ones digit on your front panel thumbwheel. A zero entry freezes the test at the point it is entered. One through nine set the speed from fast to slow, respectively. Test 96 allows you to set the level of your outputs on the thumbwheel.

### **Chase (92)**

The chase test runs through all the system's outputs from 1 through 24. This test confirms that all outputs are functioning. You can adjust the speed of the test by changing the settings on your thumbwheel.

### **Fade all (93)**

This level test fades all outputs simultaneously from off to full and back to off in a slow cycle. You can adjust the speed of the test by changing the settings on your thumbwheel.

### **Fade one (94)**

This level test fades each output from off to full and back to off one at a time. You can adjust the speed of the test by changing the settings on your thumbwheel.

### **Level to all (96)**

This test raises all outputs to a level specified on your thumbwheels. Set the desired level percentage between 00 and 99. The test will not start until the percentage is set.