L86 EM24

## *e l e c t r o n i c s   m o d u l e*

U S E R S   M A N U A L

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.
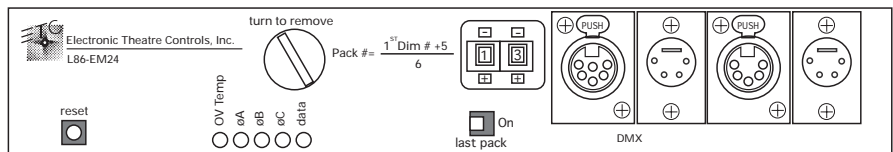
Indicator LEDs

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.

1. **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.

2. **ØA, ØB, ØC**

LED On	Phase is receiving power.
LED Off	Phase is not receiving power.

    Note: **ØB** LED will be off if the EM24 is in single phase operation.

3. **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.

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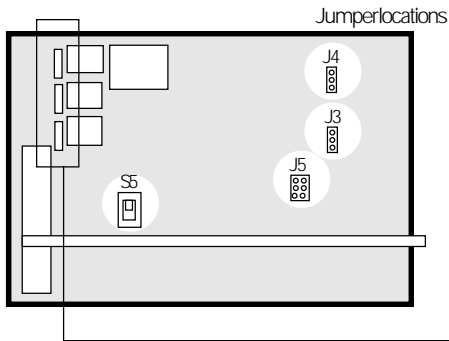
Note: Switch should be set to Off for AMX192 mode.

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

Jumper locations

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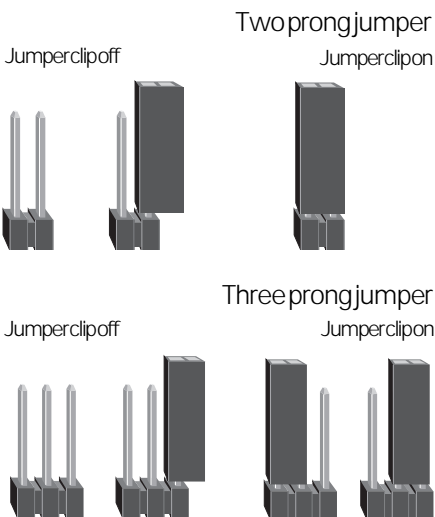
Note: Under normal operation, all EM24s in the racks in your system should have the same jumper settings, except for their starting addresses.

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)on

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.