

## Showbeam® Luminaire DMX Control Protocol \*

| Channel                          | Marketing Construct       | Description  | Decimal Low | Decimal High | Percent Low | Percent High | Hex Low | Hex High |
|----------------------------------|---------------------------|--|-------------|--------------|-------------|--------------|---------|----------|
| 1                                | Pan                       | Pan Coarse   | 0           | 255          | 0%          | 100%         | 00h     | FFh      |
| 2                                | Pan                       | Pan Fine   | 0           | 255          | 0%          | 100%         | 00h     | FFh      |
| 3                                | Tilt                      | Tilt Coarse  | 0           | 255          | 0%          | 100%         | 00h     | FFh      |
| 4                                | Tilt                      | Tilt Fine  | 0           | 255          | 0%          | 100%         | 00h     | FFh      |
| 5                                | Color Mix Function        | <b>Full Speed Control</b>  |             |              |             |              |         |          |
|                                  |                           | Continuous   | 0           | 15           | 0%          | 6%           | 00h     | 0Fh      |
|                                  |                           | Cycle  | 16          | 31           | 6%          | 12%          | 10h     | 1Fh      |
|                                  |                           | Random   | 32          | 47           | 13%         | 18%          | 20h     | 2Fh      |
|                                  |                           | Tri-Color single flag  | 48          | 63           | 19%         | 25%          | 30h     | 3Fh      |
|                                  |                           | Tri-Color dual flag  | 64          | 79           | 25%         | 31%          | 40h     | 4Fh      |
|                                  |                           | TBD  | 80          | 127          | 31%         | 50%          | 50h     | 7Fh      |
|                                  |                           | <b>MSpeed Control</b>  |             |              |             |              |         |          |
|                                  |                           | Continuous   | 128         | 143          | 50%         | 56%          | 80h     | 8Fh      |
|                                  |                           | Cycle  | 144         | 159          | 56%         | 62%          | 90h     | 9Fh      |
|                                  |                           | Random   | 160         | 175          | 63%         | 69%          | A0h     | AFh      |
|                                  |                           | Tri-Color single flag  | 176         | 191          | 69%         | 75%          | B0h     | BFh      |
|                                  |                           | Tri-Color dual flag  | 192         | 207          | 75%         | 81%          | C0h     | CFh      |
|                                  |                           | TBD  | 208         | 255          | 82%         | 100%         | D0h     | FFh      |
| 6<br>7<br>8                      | Cyan<br>Magenta<br>Yellow | <b>Continuous Mode</b>   |             |              |             |              |         |          |
|                                  |                           | Full Saturation  | 0           |              | 100%        |              | 00h     |          |
|                                  |                           | Open   | 255         |              | 0%          |              | FFh     |          |
|                                  |                           | <b>Cycle &amp; Random Modes. Scan Speed controlled by Cyan Channel</b> |             |              |             |              |         |          |
|                                  |                           | Slow Rate  | 0           |              | 0%          |              | 00h     |          |
|                                  |                           | Fast Rate  | 255         |              | 100%        |              | FFh     |          |
|                                  |                           | <b>Tri-Color Single Flag Mode (Note 6)</b>                             |             |              |             |              |         |          |
|                                  |                           | Flag 1 full to open, flag 2 open                                       | 0           | 127          | 0%          | 50%          | 00h     | 7Fh      |
|                                  |                           | Flag 1 open, flag 2 full to open                                       | 128         | 255          | 50%         | 100%         | 80h     | FFh      |
|                                  |                           | <b>Tri-Color Dual Flag Mode (Note 6)</b>                               |             |              |             |              |         |          |
|                                  |                           | Flag 1 & 2 full saturation   | 0           |              | 0%          | 0%           | 00h     | 00h      |
|                                  |                           | Flag 1 full to open, flag 2 full                                       | 1           | 126          | 0%          | 49%          | 01h     | 7Eh      |
|                                  |                           | Flag 1 & 2 open  | 127         |              | 50%         | 0%           | 7Fh     | 00h      |
|                                  |                           | Flag 1 & 2 full saturation   | 128         |              | 50%         | 0%           | 80h     | 00h      |
| Flag 1 full, flag 2 full to open | 129                       | 254  | 51%         | 100%         | 81h         | FEh          |         |          |
| Flag 1 & 2 open                  | 255                       |  | 100%        | 0%           | FFh         | 00h          |         |          |
| 9                                | CTO                       | Full CTO   | 0           |              | 0%          |              | 00h     |          |
|                                  |                           | Open   | 255         |              | 100%        |              | FFh     |          |
| 10                               | Static Color Function     | <b>Full Speed Control</b>  |             |              |             |              |         |          |
|                                  |                           | Indexed  | 0           | 15           | 0%          | 6%           | 00h     | 0Fh      |
|                                  |                           | Forward Spin   | 16          | 31           | 6%          | 12%          | 10h     | 1Fh      |
|                                  |                           | Reverse Spin   | 32          | 47           | 13%         | 18%          | 20h     | 2Fh      |
|                                  |                           | Fast Scan  | 48          | 63           | 19%         | 25%          | 30h     | 3Fh      |
|                                  |                           | Random   | 64          | 79           | 25%         | 31%          | 40h     | 4Fh      |
|                                  |                           | Blink  | 80          | 95           | 31%         | 37%          | 50h     | 5Fh      |
|                                  |                           | TBD  | 96          | 127          | 38%         | 50%          | 60h     | 7Fh      |
|                                  |                           | <b>MSpeed Control</b>  |             |              |             |              |         |          |
|                                  |                           | Indexed  | 128         | 143          | 50%         | 56%          | 80h     | 8Fh      |
|                                  |                           | Forward Spin   | 144         | 159          | 56%         | 62%          | 90h     | 9Fh      |
|                                  |                           | Reverse Spin   | 160         | 175          | 63%         | 69%          | A0h     | AFh      |
|                                  |                           | Fast Scan  | 176         | 191          | 69%         | 75%          | B0h     | BFh      |
|                                  |                           | Random   | 192         | 207          | 75%         | 81%          | C0h     | CFh      |
| Blink                            | 208                       | 223  | 82%         | 87%          | D0h         | DFh          |         |          |
| TBD                              | 224                       | 255  | 88%         | 100%         | E0h         | FFh          |         |          |
| 11                               | Static Color Position     | <b>Indexed, Scan &amp; Blink modes</b>                                 |             |              |             |              |         |          |
|                                  |                           | Open   | 0           | 63           | 0%          | 25%          | 00h     | 3Fh      |
|                                  |                           | Position 1 (Red)   | 64          | 127          | 25%         | 50%          | 40h     | 7Fh      |
|                                  |                           | Position 2 (Pink)  | 128         | 191          | 50%         | 75%          | 80h     | BFh      |
|                                  |                           | Position 3 (Amber)   | 192         | 255          | 75%         | 100%         | C0h     | FFh      |
|                                  |                           | <b>Spin &amp; Random modes</b>   |             |              |             |              |         |          |
|                                  |                           | Stop   |             |              |             |              |         |          |

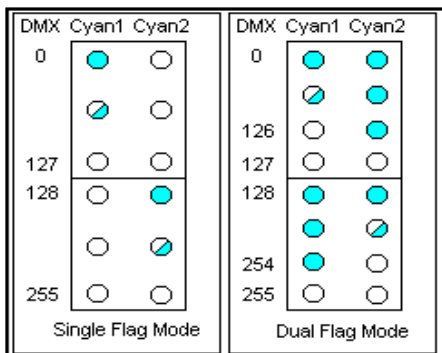
|    |                          |                                |     |     |     |      |     |     |
|----|--------------------------|--------------------------------|-----|-----|-----|------|-----|-----|
|    |                          | Slowest to fastest             |     |     |     |      |     |     |
|    |                          | Continuous mode                |     |     |     |      |     |     |
|    |                          | Positioning from 0-360 degrees |     |     |     |      |     |     |
| 12 | Twinbeam                 | Position 1 (Open)              | 0   | 127 | 0%  | 50%  | 00h | 7Fh |
|    |                          | Position 2 (In)                | 128 | 255 | 50% | 100% | 80h | FFh |
|    |                          | Full Speed Control             |     |     |     |      |     |     |
|    |                          | Indexed                        | 0   | 15  | 0%  | 6%   | 00h | 0Fh |
|    |                          | Forward Rotate                 | 16  | 31  | 6%  | 12%  | 10h | 1Fh |
|    |                          | Reverse Rotate                 | 32  | 47  | 13% | 18%  | 20h | 2Fh |
|    |                          | Blink                          | 48  | 63  | 19% | 25%  | 30h | 3Fh |
|    |                          | Forward Strobe Rotate          | 64  | 79  | 25% | 31%  | 40h | 4Fh |
|    |                          | Reverse Strobe Rotate          | 80  | 95  | 31% | 37%  | 50h | 5Fh |
|    |                          | Reserved                       | 96  | 127 | 38% | 50%  | 60h | 7Fh |
|    |                          | MSpeed Control                 |     |     |     |      |     |     |
|    |                          | Indexed                        | 128 | 143 | 50% | 56%  | 80h | 8Fh |
|    |                          | Forward Rotate                 | 144 | 159 | 56% | 62%  | 90h | 9Fh |
|    |                          | Reverse Rotate                 | 160 | 175 | 63% | 69%  | A0h | AFh |
|    |                          | Blink                          | 176 | 191 | 69% | 75%  | B0h | BFh |
|    |                          | Forward Strobe Rotate          | 192 | 207 | 75% | 81%  | C0h | CFh |
|    |                          | Reverse Strobe Rotate          | 208 | 223 | 82% | 87%  | D0h | DFh |
|    |                          | Reserved                       | 224 | 255 | 88% | 100% | E0h | FFh |
| 13 | Twinbeam Rotate Function |                                |     |     |     |      |     |     |

|   |                        |   |     |      |      |      |      |     |
|---|------------------------|---|-----|------|------|------|------|-----|
| 14  | Twinbeam Rotate Coarse | Indexed/Blink Modes   |     |      |      |      |      |     |
|   |                        | Position 0-360 degrees  | 0   | 255  | 0%   | 100% | 00h  | FFh |
|   |                        | Forward/Reverse/Forward Strobe/Reverse Strobe Rotate Modes                                |     |      |      |      |      |     |
|   |                        | Rotate Stop   | 0   | 3    | 0%   | 1%   | 00h  | 03h |
| 15  | Twinbeam Rotate Fine   | Rotate Slowest to Fastest   | 4   | 255  | 2%   | 100% | 04h  | FFh |
|   |                        | Indexed Mode  |     |      |      |      |      |     |
| 16  | Twinbeam Deviation     | Low Order Byte 0-360 degrees  | 0   | 255  | 0%   | 100% | 00h  | FFh |
|   |                        | In  | 0   |      | 0%   |      | 00h  |     |
| 17  | Zoom Function          | Out   | 255 |      | 100% |      | FFh  |     |
|   |                        | Closed  | 0   |      | 0%   | 0%   | 00h  | 00h |
|   |                        | Variable closed to open   | 1   | 254  | 0%   | 100% | 01h  | FEh |
| 18  | Zoom                   | Open  | 255 |      | 100% | 0%   | FFh  | 00h |
|   |                        | Zoom In   | 0   |      | 0%   |      | 00h  |     |
| 19  | Shutter/Lamp Functions | Zoom Out  | 255 |      | 100% |      | FFh  |     |
|   |                        | Normal Shutter Functions  |     |      |      |      |      |     |
| 20  | Shutter                | Random Random strobe  | 0   | 31   | 0%   | 12%  | 00h  | 1Fh |
|   |                        | Synchronous Random Strobe   | 32  | 63   | 13%  | 25%  | 20h  | 3Fh |
|   |                        | Lamp Functions (note 3)   | 64  | 95   | 25%  | 37%  | 40h  | 5Fh |
|   |                        | Normal Shutter Functions  | 96  | 127  | 38%  | 50%  | 60h  | 7Fh |
|   |                        | Normal Shutter Functions  | 128 | 255  | 50%  | 100% | 80h  | FFh |
| 20  | Shutter                | Normal/Random/Sync Random shutter functions. (Note 2)                                     |     |      |      |      |      |     |
|   |                        | Close   | 0   | 23   | 0%   | 9%   | 00h  | 17h |
|   |                        | Strobe Rate (slow to fast)  | 24  | 229  | 9%   | 90%  | 18h  | E5h |
|   |                        | Open  | 230 | 255  | 90%  | 100% | E6h  | FFh |
|   |                        | Lamp functions. Accessed when the Control channel is set in the range 96 to 127. (Note 3) |     |      |      |      |      |     |
|   |                        | Close   | 0   | 23   | 0%   | 9%   | 00h  | 17h |
|   |                        | Periodic lamp strobes   | 24  | 49   | 9%   | 19%  | 18h  | 31h |
|   |                        | Random random lamp strobes  | 50  | 75   | 20%  | 29%  | 32h  | 4Bh |
|   |                        | Synchronous random lamp strobes   | 76  | 101  | 30%  | 40%  | 4Ch  | 65h |
|   |                        | Boost lamp 1.0 second, black  | 102 | 105  | 40%  | 41%  | 66h  | 69h |
|   |                        | Boost lamp 0.75 second, black   | 106 | 109  | 42%  | 43%  | 6Ah  | 6Dh |
|   |                        | Boost lamp 0.66 second, black   | 110 | 113  | 43%  | 44%  | 6Eh  | 71h |
|   |                        | Boost lamp 0.5 second, black  | 114 | 117  | 45%  | 46%  | 72h  | 75h |
|   |                        | Boost lamp 0.33 second, black   | 118 | 121  | 46%  | 47%  | 76h  | 79h |
|   |                        | Boost lamp 0.25 second, black   | 122 | 127  | 48%  | 50%  | 7Ah  | 7Fh |
|   |                        | Boost lamp 1.0 second, white  | 128 | 131  | 50%  | 51%  | 80h  | 83h |
|   |                        | Boost lamp 0.75 second, white   | 132 | 135  | 52%  | 53%  | 84h  | 87h |
|   |                        | Boost lamp 0.66 second, white   | 136 | 139  | 53%  | 55%  | 88h  | 8Bh |
|   |                        | Boost lamp 0.5 second, white  | 140 | 143  | 55%  | 56%  | 8Ch  | 8Fh |
|   |                        | Boost lamp 0.33 second, white   | 144 | 147  | 56%  | 58%  | 90h  | 93h |
|   |                        | Boost lamp 0.25 second, white   | 148 | 153  | 58%  | 60%  | 94h  | 99h |
|   |                        | Lightning strike 1  | 154 | 157  | 60%  | 62%  | 9Ah  | 9Dh |
|   |                        | Lightning strike 2  | 158 | 161  | 62%  | 63%  | 9Eh  | A1h |
|   |                        | Lightning strike 3  | 162 | 165  | 64%  | 65%  | A2h  | A5h |
|   |                        | Lightning strike 4  | 166 | 169  | 65%  | 66%  | A6h  | A9h |
|   |                        | Lightning strike 5  | 170 | 173  | 67%  | 68%  | AAh  | ADh |
|   |                        | Lightning strike 6  | 174 | 179  | 68%  | 70%  | A Eh | B3h |
| To be determined. Default Black.  | 180                    | 231   | 71% | 91%  | B4h  | E7h  |      |     |
| Open  | 232                    | 255   | 91% | 100% | E8h  | FFh  |      |     |
| 21  | Dim                    | Close   | 0   |      | 0%   |      | 00h  |     |
|   |                        | Open  | 255 |      | 100% |      | FFh  |     |
| 22  | Mspeed                 | Disable   | 0   | 3    | 0%   | 1%   | 00h  | 03h |
|   |                        | Longest (252.7 seconds)   | 4   |      | 2%   |      | 04h  |     |
|   |                        | Shortest (0.15 seconds)   | 255 |      | 100% |      | FFh  |     |
| 23  | Macro (Note 4)         | Macro off   | 0   | 5    | 0%   | 2%   | 00h  | 05h |
|   |                        | Pan Sweep, small to large   | 6   | 62   | 2%   | 24%  | 06h  | 3Eh |
|   |                        | Macro off   | 63  | 65   | 25%  | 25%  | 3Fh  | 41h |
|   |                        | Tilt Sweep, small to large  | 66  | 122  | 26%  | 48%  | 42h  | 7Ah |
|   |                        | Macro off   | 123 | 125  | 48%  | 49%  | 7Bh  | 7Dh |
|   |                        | Clockwise Circle, small to large  | 126 | 160  | 49%  | 63%  | 7Eh  | A0h |
|   |                        | Macro off   | 161 | 163  | 63%  | 64%  | A1h  | A3h |
|   |                        | Counterclockwise Circle, small to large   | 164 | 198  | 64%  | 78%  | A4h  | C6h |
| Reserved. Macro off.  | 199                    | 255   | 78% | 100% | C7h  | FFh  |      |     |
| The Control channel should not be crossfaded. No shutter channel requirement. |                        |   |     |      |      |      |      |     |
|   |                        | Safe (normal operation)   | 0   | 9    | 0%   | 4%   | 00h  | 09h |
|   |                        | Pan & Tilt Mspeed Off   | 10  | 19   | 4%   | 7%   | 0Ah  | 13h |

|  |                        |  |   |   |      |      |     |      |     |
|--|------------------------|--|---|---|------|------|-----|------|-----|
| 24   | Control                | Shutter channel to 0 for access to the following commands. |   |   |      |      |     |      |     |
|  |                        | Display Off (send 20 packets)                              | 20  | 28  | 8%   | 11%  | 14h | 1Ch  |     |
|  |                        | Display Bright (send 20 packets)                           | 40  | 48  | 16%  | 19%  | 28h | 30h  |     |
|  |                        | Home All (send 20 packets)                                 | 60  | 68  | 24%  | 27%  | 3Ch | 44h  |     |
|  |                        | Lamp On (send 20 packets)                                  | 80  | 88  | 31%  | 35%  | 50h | 58h  |     |
|  |                        | Lamp Off (send 20 packets)                                 | 90  | 98  | 35%  | 38%  | 5Ah | 62h  |     |
|  |                        | Shutdown (send 80 packets)                                 | 120   | 130   | 47%  | 51%  | 78h | 82h  |     |
|  |                        | No shutter channel requirement.                            |   |   |      |      |     |      |     |
| 25   | Tracking Ring Dim      | Outrig Mode  | 131   | 140   | 51%  | 55%  | 83h | 8Ch  |     |
|  |                        | TBD  | 141   | 255   | 55%  | 100% | 8Dh | FFh  |     |
| 26   | Ring Function (note 1) | Tracking Ring Dim Tracking Mode                            |   |   |      |      |     |      |     |
|  |                        | Continuous   | 0   | 15  | 0%   | 6%   | 00h | 0Fh  |     |
|  |                        | Cycle  | 16  | 31  | 6%   | 12%  | 10h | 1Fh  |     |
|  |                        | Random   | 32  | 47  | 13%  | 18%  | 20h | 2Fh  |     |
|  |                        | Periodic Strobe (slow to fast)                             | 48  | 73  | 19%  | 29%  | 30h | 49h  |     |
|  |                        | Reserved   | 74  | 127   | 29%  | 50%  | 4Ah | 7Fh  |     |
|  |                        | Tracking Ring Independent Dim Mode                         |   |   |      |      |     |      |     |
|  |                        | Continuous   | 128   | 143   | 50%  | 56%  | 80h | 8Fh  |     |
|  |                        | Cycle  | 144   | 159   | 56%  | 62%  | 90h | 9Fh  |     |
|  |                        | Random   | 160   | 175   | 63%  | 69%  | A0h | AFh  |     |
|  |                        | Periodic Strobe (slow to fast)                             | 176   | 201   | 69%  | 79%  | B0h | C9h  |     |
|  |                        | Reserved   | 202   | 255   | 79%  | 100% | CAh | FFh  |     |
|  |                        | 27<br>28<br>29<br>30<br>31<br>32                           | Tracking Ring<br>Red<br>Red<br>Green<br>Green<br>Blue<br>Blue | Continuous Mode (off 0/0, full 255/255, see note 5) |      |      |     |      |     |
|  |                        |  |   | Red Coarse  | 0    | 255  | 0%  | 100% | 00h |
| Red Fine   | 0                      |  |   | 255   | 0%   | 100% | 00h | FFh  |     |
| Green Coarse   | 0                      |  |   | 255   | 0%   | 100% | 00h | FFh  |     |
| Green Fine   | 0                      |  |   | 255   | 0%   | 100% | 00h | FFh  |     |
| Blue Coarse  | 0                      |  |   | 255   | 0%   | 100% | 00h | FFh  |     |
| Blue Fine  | 0                      |  |   | 255   | 0%   | 100% | 00h | FFh  |     |
| Cycle & Random Modes. Cycle Speed is controlled by Red Coarse Channel (25) |                        |  |   |   |      |      |     |      |     |
| Slow Rate  | 0                      |  |   |   | 0%   |      | 00h |      |     |
| Fast Rate  | 255                    |  |   |   | 100% |      | FFh |      |     |

#### NOTES

- Note 1 In Dim Tracking mode, the Dim Channel (19) will override Tracking Ring Dim (23) if it is at a lower intensity. Visually, the lowest level will take precedence. In Independent Dim mode, the tracking ring will operate at an independent dim level from the dim channel(19).
- Note 2 Strobes transition smoothly from mechanical strobes to electronic strobes. Periodic strobes support 1 - 5.4 Hz operation. Electronic strobes support 5.4 - 20 Hz operation.
- Note 3 Lamp Functions boost the lamp above 2000 watts for boost to white, boost to black, or lightning effects set in the shutter channel 18.
- Note 4 The pan and tilt coarse channels set the center position of the position macro.  
The Mspeed channel is used to control the speed of the macros.  
0-4 Default speed of 2.5 seconds.  
5-255 Minimum speed of 1/2 second with a maximum of 25 seconds.  
With the Mspeed set at the default value of DMX 0-4 all internal effects complete moves at appr. 2.5 seconds. This provides a pleasing look for customers not wanting the additional variation given by using the Mspeed channel. With Mspeed set between DMX 5-255 all internal effects complete moves at selected Mspeed time (up to 25 secs). Those fixture types that support On Board Programming also support the Internal Effects as part of the On Board programming features. The Internal Effects will operate as an additional programming parameter labeled MACR.
- Note 5 In Continuous Mode LED intensity runs from full intensity at 255/255 to off at 0/0. In strobe modes channels 25-30 adjust color, just as in continuous mode.
- Note 6 Tri-color mode representation.



Rev. 3

\* © 2008 High End Systems all rights reserved.