

**MLC 16**

**INTELLIGENT LIGHTING CONTROLLER**

Release 1.20

**OPERATION MANUAL**



**MLC 16**  
**INTELLIGENT LIGHTING CONTROLLER**  
**OPERATION MANUAL**

**Software Revision 1.20 and above**

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**NSI CORPORATION**

**Wilsonville, OR**

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# 1 Installation\Setup

## Power Supply

The MLC 16 requires 120VAC to operate. Connect the female end of the supplied AC power cable to the power input connector on the rear panel of the MLC 16. Connect the male end to a source of AC power. Use the power switch located next to the power input connector to turn the console on.

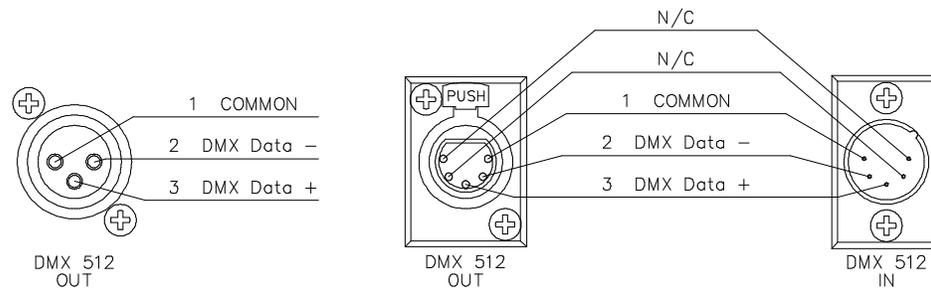
## DMX512 Output

The MLC 16 console comes standard from the factory with two DMX512 output connectors. One is a standard USITT specified 5 pin XLR. The other is a 3 pin XLR connector used by some fixture manufactures. **Note: Be sure the fixture connector pinout matches that of the MLC 16. For example, Martin fixtures use a 3 pin XLR, but reverses pins 2 and 3 from the norm.** Pins 2 and 3 of the 3 pin XLR can be swapped internally to support these situations. See the chapter "3 Pin XLR Pin Reversal" for details.

DMX512 is a digital signal that provides the highest speed, precision, and noise immunity. Rules for connecting DMX512:

- Use cable that is specified as RS-485 or RS-422 compatible (1 or 2 twisted pair w/ shield) and use largest gauge available (22 - 18 gauge is good for long runs of 1000 ft).
- Daisy chain the cable only (no star or home runs) and terminate the end of the cable with a 120 ohm resistor. (See fixture manual for proper terminating practice).

Connect the cable from the fixtures to the marked connector on the rear of the console.



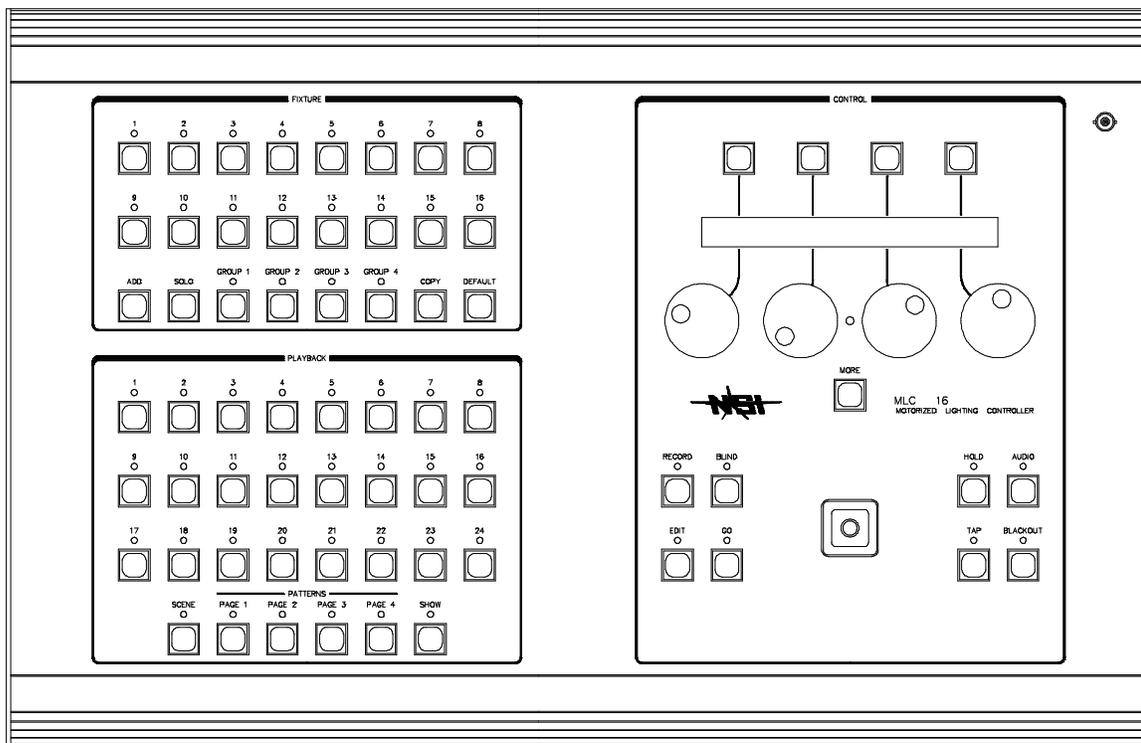
## Setup

The first time the MLC 16 is used, the fixture personality assignments need to be set, in order to properly control the fixtures. Please see the chapter, Setup Guide, in this manual for further details.

## 2 Overview

### Front Panel

1. *Fixture Select Buttons* Up to 16 different fixtures can be accessed through these buttons. Each button can be assigned to any of the console's fixture personalities. These personalities can be defined and modified to suit your needs.
2. *Group Buttons* Many times it is convenient to control more than one fixture at a time. While controlling multiple like fixtures is not difficult, unlike fixtures are more complicated since they are not all implemented the same. The group buttons allow unlike fixtures to be grouped together to form a new fixture of like parameters. For instance, if all fixtures share color as a parameter with labels cyan, amber and magenta, these attributes will be accessed simultaneously when the group is activated.
3. *Add* Use the Add button to access more than one **like** fixture at a time.



4. *Solo* The Solo button will blackout all fixtures except the one selected. When the solo is released, the blacked out fixtures return to their proper intensities.
5. *Copy* The values of one **like** fixture can be copied to another using the Copy button.
6. *Default* When a fixture is selected, tapping the Default button will set all parameters to the default values assigned to that fixture personality.
7. *Scene/Pattern/Show buttons* These 24 playback buttons select any of the 24 scenes, 96 patterns or 24 shows programmed in the console. Use the Scene, Page 1 - 4 and Show buttons described below to select their mode.
8. *Scene* When the LED above this button is lit, the 24 playback buttons are in scene mode.
9. *Pages 1 - 4* Tapping any one of these buttons selects one of the four pages of patterns.

- 
9. *Show* Allows the playback buttons to select Shows.
10. *Function Buttons* The Function buttons located above the LCD display allow selecting items as they appear on the display.
11. *Modify Wheels* Use the Modify Wheels to make changes to items on the LCD display.
12. *Record* Use the Record key to initiate programming of Scenes, Patterns, Shows and Console Setup Menus.
13. *Edit* Scenes, Patterns, and Shows can all be edited using this button.
14. *Blind* To make modifications to a fixture in the blind, first make sure that the Blind LED is lit. Any changes made to the fixture will not appear on stage until the Go button is pressed.
15. *Go* Manually stepped Patterns can be advanced with the Go button. If the Blind function is active, tapping the Go will transfer any fixture changes to stage.
16. *Hold* Stop any Pattern or Show with the Hold button.
17. *Tap* Tapping the Tap button a number of times will override any preprogrammed step times at the rate that the Tap is pressed.
18. *Audio* When the Audio LED is lit, audio input to the console will override the preprogrammed step times.
19. *Joystick* Any Fixture Personality Trait can be assigned to either the X or Y axis of the Joystick. Generally, it is used to control the pan and tilt of the fixture. Moving the Joystick up will increase the Y axis trait while moving it down will decrease the Y axis trait. Moving the Joystick to the right will increase the X axis trait while moving it to the left will decrease the X axis trait.
20. *Worklight* A BNC connector is provided at the upper right hand corner of the front panel for powering a standard worklight. The connector provides 12VAC at 1A. Since the light is powered by the same supply that provides power to the isolated DMX 512 circuit, **the metal portion of the gooseneck and lamp should not be allowed to touch the chassis ground** or other metal objects to prevent DMX 512 interference. The lamp power is protected by a special internal fuse that will interrupt power to the lamp while retaining isolated DMX 512 power in case of a lamp short. Consoles equipped with a Revision C or above processor card, have a built in dimmer to vary the worklight intensity. The dimmer control is accessed via Modify Wheel 1 from the main menu. Function Button 1 toggles the Wheel's operation from Scene Fade (Fd:) to Worklight Dimmer (Wk:). The dimmer can be varied from 0 - 100%.
21. *LCD Contrast Adjust* Located between Modify Wheels 2 and 3 is a small hole. This hole provides access to a trim pot which is used to vary the contrast of the LCD. Although the LCD has been adjusted from the factory, you may need to adjust it. Use a small flat blade screw driver to carefully make adjustments.

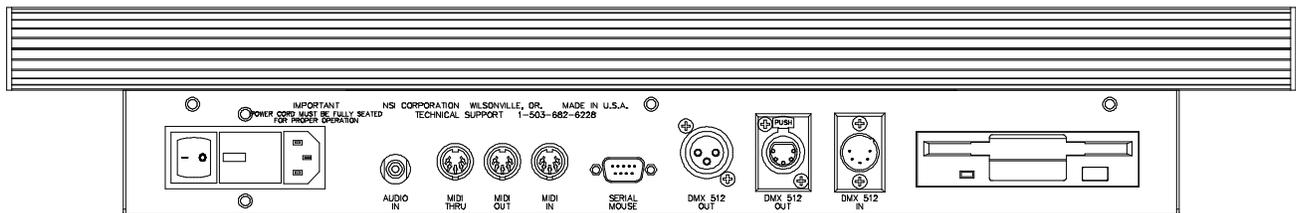
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## *Panel Test*

If you encounter a problem with a front panel control, you can place the console in Panel Test mode which runs a diagnostic routine for debugging the front panel hardware. Simply turn the console on while holding down the four Page buttons. Once active, the test mode will sequence the front panel LED's so that you can check for any outages. Pressing a button or moving the Joystick will display its' name on the LCD. Likewise, moving a Modify Wheel will increment and decrement a number on the LCD. To clear the Test Mode, you must turn the console off.

## Rear Panel

1. *Power In* Connect female end of the supplied AC power cable to the power input connector on the rear panel of the MLC 16. Connect the male end to a source of AC power. Use the power switch located next to the power input connector to turn the console on. The power inlet has a removable cover which allows reconfiguring for 240 VAC operation.
2. *Audio input* This phono jack will accept audio signals for controlling some console functions.
3. *MIDI In/Out/Thru* These 5 pin DIN connectors are for connecting to a MIDI sequencer or other MIDI controller.
4. *Serial Mouse* Connect a Microsoft compatible serial mouse or trackball to this connector to control pan and tilt. The serial port can also be used to import Fixture Definitions whenever the Fixture Definition Menu is active.
5. *DMX512 Output* A DMX512 output using a 3 pin XLR is provided to ease interconnecting to equipment that uses this style of connector.
6. *DMX512 Output* Control to fixtures and/or devices is provided through this connector. Its 5 pin XLR connector conforms to the USITT standard.
7. *DMX512 Input* DMX512 from another console can be input into the MLC 16, combined with its' outputs and passed through it. Alternately, it can be used to trigger programmed events.
8. *Disk Drive* This optional 3 1/2" DOS compatible disk drive is used to save console programming and acts as a means to transfer programming from one console to another.



## 3 Setup Guide

### *General*

The Setup mode can be used to change the console's configurable functions. These functions make it possible for the user to tailor the console to the needs of today's diverse array of DMX 512 controlled devices.

To activate the setup mode, first tap the "Edit" button. A menu of edit items will be shown on the LCD display. Tap the button above the item "Setup". From here the choice can be made between Console oriented setup utilities such as Maximum Dimmers, Fixture oriented utilities such as Device Definition or if installed, Disk Drive utilities.

### *Fixture*

#### *Assign Fixture*

The 16 Fixture buttons need to be assigned to device personalities. Select the Fixture Assign setup mode from the Fixture Setup menu. From here you can view the current assignment of each fixture. Turn the far left Modify Wheel to sequence through the fixture numbers or just press the Fixture button desired. If a button has not been assigned a device, the display will read "No Assignment".

To change an assignment, press the fourth Function button above the words "Select Edit". Both the device name and starting channel assignments will be encased in brackets indicating that they can be changed using the Modify Wheel located below each entry. Turn the wheel below the device name until the desired device is displayed. Then use the wheel located under the channel entry to select the starting dimmer channel.

Individual continuous traits of an assigned fixture can be inverted from the Assign Fixture menu. This will allow traits of a device assigned to more than one Fixture button to operate opposite from each other. To make changes first select the fixture. Then select "Inverts" with Modify Wheel 4. Use Modify Wheel 2 to select the trait. Finally, use Function button 4 to select "Edit" and Modify Wheel 3 to change the state of the inversion. Only Continuous traits can be inverted. The inversion is in addition to any defined within the device definition and will uninvert any trait that is inverted in the definition. For example, if Pan is inverted in the definition of a device and then inverted again at assignment, it will operate as if it were not inverted at all.

*Assign an Intellabeam to Fixture button 10. Make its' base address 52 and invert Tilt.*

\* Tap the "Edit" button.

\* Tap Function button 4 for "Setup".

\* Tap Function button 2 for "Fixture".

\* Tap Function button 3 for "Assign".

\* Turn Modify Wheel 1 until Fixture 10 is displayed or simply press the Fixture 10 button.

\* Tap Function button 4 to "Select Edit".

\* Turn Modify Wheel 2 until "Intellabeam" is displayed.

\* Turn Modify Wheel 3 until channel 52 is displayed.

\* Tap Function button 4 to "Select Save".

\* Turn Modify Wheel 4 until "Inverts" is displayed.

\* Tap Function button 4 to "Select Inverts".

\* The display will show Pan as the first trait that can be inverted. Turn Modify Wheel 2 until the Tilt trait is displayed.

\* Tap Function button 4 to "Select Edit".

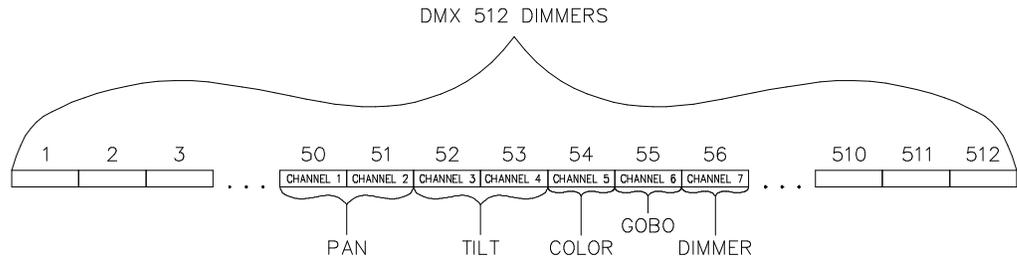
\* Turn Modify Wheel 3 until "Yes" is displayed.

\* Tap Function button 4 to "Select Save".

\* The Intellabeam is now assigned. Tap Blackout to exit.

*Define Fixture*

One of the keys to the ease of use of the MLC 16 is the ability to define personalities for fixtures or devices you wish to control. Instead of having to remember that a fixture starts on channel 50 and that the dimmer trait is the seventh channel of the fixture, making it channel 56, you simply have to press the assigned Fixture button and rotate the Modify Wheel labeled Dimmer until the desired value has been reached.

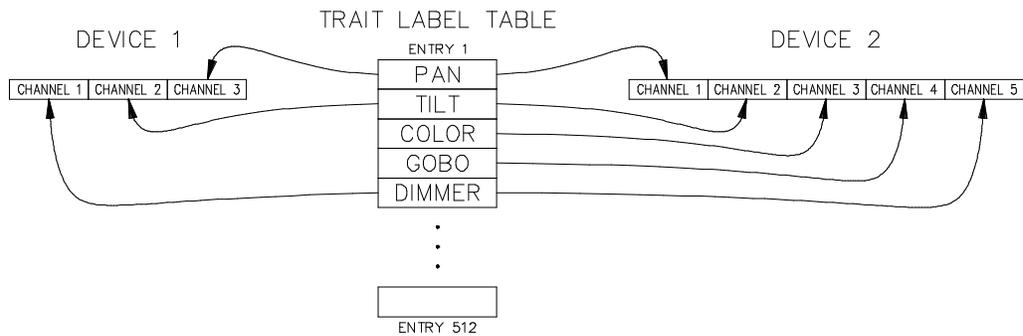


Chances are that the devices you will be using will already be defined within the MLC 16. If not, or if you want to create a new device of say multiple fog machines or PAR fixtures, you will need to use the Fixture Definition setup mode. From here you can enter a unique name for the device and then define the personality traits of each channel.

To enter the name of a new device, make sure that the selection above Modify Wheel 1 reads "New". If not, turn the wheel clockwise until it does. Then press the Function button above. You will then be able to enter the name using the the two center Modify Wheels. Use wheel 2 to move the cursor and use wheel 3 to change character. Once the name has been entered, press the far right Function button labeled "Select Save".

Next the personality traits can be added. Turn wheel 4 until "Traits" is displayed, then press the above Function button. The display will prompt for the type of trait. You can choose between Continuous, Indexed, Union or End Union. Continuous traits are those that move continuously from a minimum value to a maximum value. Indexed traits do not move continuously. Instead, discrete values are assigned to each index along with a unique label. These are most often used to describe the positions of such things as Gobo and Color Wheels. Unions are made of combinations of both Continuous and Indexed traits. An example of a Union would be a Color Wheel which uses a continuous range of DMX 512 values for spins and then discrete values for fixed color positions. The End Union trait is used to flag the end of the Union structure. For example, if you were to define a color wheel as described above, you would first insert a Union trait, then insert Continuous and Discrete traits as needed followed by the End Union trait.

Several attributes can be assigned to the traits once the type has been determined. The first is a label which can be up to eight characters long. There is a table of 512 labels to select from. Not all are predefined. Those that are can be sequenced through by selecting "Edit" from the display and rotating the Modified Wheel below the label name. Once the label has been selected tap Function button 4 to save it or rotate Modify Wheel 4 until "Cancel" is displayed to cancel the change. While editing a label as described above, the selected label from the table can be modified. Rotate the wheel until "Edit" is displayed and then tap the Function button. You will then be able to use the center Modify Wheels to edit the label just as is done for the device name. **Keep in mind that changing the label contents will change the label for any other trait of any device using this table entry.** Finally a new label can be created by selecting "New". An empty entry in the table will be selected and presented for editing on the display.



Once the label has been selected, the other parameters of the trait can be edited. Use Modify Wheel 2 to sequence through them. The first parameter actually shows the trait's type and can not be edited. It is shown for reference only. For Continuous traits you can modify Channel offset, Size of the Data, Invert, X axis, Y axis, Blackout, Default, Maximum and Minimum. Indexed parameters are Channel, X axis, Y axis, Blackout, Default, Number of Indexes, Index Label and Index Value. A discussion of each type of parameter follows.

Channel offset determines which channel of the DMX512 stream should be used for this trait. This is a relative number which is added on to the base address of the device once it is assigned to a Fixture button. **Note: If Fixture 1 is assigned to DMX512 channel 20 and a trait is assigned to channel 1, it will end up being assigned to channel 20 not 21.**

Size of data determines whether the trait will use one or two channels of the DMX512 stream. Choices are "8 Bit" or "16 Bit". 16 bit is mostly used for Pan and Tilt of high resolution fixtures.

Sometimes it is nice to be able to invert a continuous trait such as pan so that it moves the direction that the Joystick moves. Select "Yes" if you would like to invert the trait. Note: Inverting can also be done at assignment time on a per assignment basis.

If a trait is to be assigned to the X or Y axis, select "Yes" for these parameters. More than one trait of a device may be assigned to either axis and a single trait can be assigned to both axes.

If the Blackout parameter is activated, the trait will be set to the assigned Blackout Value whenever the Blackout button is pressed.

When first selecting a fixture, it's trait can be any value. Default values for each trait can be assigned so that tapping the Default button will immediately cause the default value to be applied whenever a fixture is active.

Continuous traits can be assigned a maximum and minimum value. This is useful when a device does not use the full range of DMX512 values. It is also useful when a continuous trait is part of a Union.

Indexed traits are made of index values. Each index can be assigned a specific label just as each trait can be assigned a specific label. First enter in the number of indexes that will be used by the trait, then enter each label and value for each index. Any of these values can be changed at any time. The index labels are stored separate from the table of Trait labels, thus providing another 512 labels to choose from or create.

The following example defines a device called Scanner. It uses five traits: Pan, Tilt, Color, Gobo and Dimmer. Pan and Tilt are 16 bit and therefore use two channels of DMX512 each. The Color trait includes four colors on a wheel; White, Red, Blue and Yellow. The colors can be individually accessed with these respective DMX512 ranges: 0 - 20, 21 - 50, 51 - 80 and 81 - 99. The wheel can also be scrolled continuously through the range 100 - 200. The Gobo trait is also a wheel and has six positions: Open, Stars, Circle, Triangle, Dot and Leaf. No scroll range is provided for the Gobo wheel. The six position ranges are 0 - 50, 51 - 80, 81 - 110, 111 - 140, 141 - 170 and 171 - 255. The final trait is Dimmer and is defined such that 0 is off and 255 is full on. Channel assignments are as follows: 1-Pan, 3-Tilt, 5-Color, 6-Gobo and 7-Dimmer. For simplicity, let us assume that all labels are already defined within the console except for Leaf.

*Definition  
Example*

*Define a device called Scanner.*

*\* Tap the "Edit" button.*

*\* Tap Function button 4 for "Setup".*

*\* Tap Function button 2 for "Fixture".*

*\* Tap Function button 2 for "Define".*

*\* Turn Modify Wheel 4 until "New" is displayed.*

*\* Tap Function button 4 to "Select New".*

*\* Enter the name "Scanner" with Modify Wheels 2 and 3. Modify wheel 2 moves the cursor and Modify wheel 3 changes the character.*

```
= Fixture:<Scanner          >      Select =
           Cursor          Modify      Save
```

*\* Once the name is complete as shown above, tap Function button 4 to "Select Save".*

*\* Now turn Modify Wheel 4 until "Traits" is displayed.*

*\* Tap Function button 4 to "Select Traits".*

Since there are no traits yet defined for Scanner, the MLC 16 assumes that you want to add one. Therefore the display will now prompt for the type of trait to be added as seen below.

```
= Fixture: Scanner          Select
           Type: Continuous      Ok
```

Continuous is the default type. We will define Pan as our first trait and since it is a continuous type, we can simply say OK to the prompt.

*Define Pan*

*\* Tap Function button 4 to "Select OK".*

```
= Fixture: Scanner          Select
   Trait: 1   Label: Pan      Edit
```

The display is now showing trait 1 labeled as "Pan". If your console shows a different label, skip ahead to the Tilt defining section for instructions on changing the label name.

We now need to make changes to the attributes of the Pan trait to make it work as we would expect.

*\* Turn Modify Wheel 2 until "Channel:" is displayed.*

The channel will already be defaulted to 1 so no change needs to be made.

*\* Turn Modify Wheel 2 until "Size:" is displayed above it.*

= Fixture: Scanner	Select
Trait 1      Size: 8 Bit	Edit

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "16 Bit" is displayed above it.*

*\* Tap Function button 4 to "Select Save".*

= Fixture: Scanner	Select
Trait 1      Size: 16 Bit	Edit

We have now defined the Pan trait as 16 bit. Next we need to assign the trait to the back and forth movement of the Joystick.

*\* Turn Modify Wheel 2 until "X Axis:" is displayed above it.*

= Fixture: Scanner	Select
Trait 1      X Axis: No	Edit

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "Yes" is displayed above it.*

*\* Tap Function button 4 to "Select Save".*

= Fixture: Scanner	Select
Trait 1      X Axis: Yes	Edit

The next few attributes; Y Axis, B/O, BoValue and Master can be left at their default values. The next attribute to set is a default value for Pan. When first accessing the pan and tilt of a fixture, it is convenient to center the mirror or yoke. A 16 bit number can vary between 0 and 65,535. Half way between is about 32,768. This is the value we will assign to the Default attribute.

*\* Turn Modify Wheel 2 until "Default:" is displayed above it.*

*\* Tap Function button 4 to "Select Edit"*

*\* Turn Modify Wheel 3 until 32,768 is displayed above it.*

*\* Tap Function button 4 to "Select Save".*

The final two attributes, Max and Min, should already be set to 65,535 and 0 respectively and do not need modification.

### Define Tilt

The Tilt trait is defined the same as Pan except that the label is different, the channel is 3 instead of 1 and we will assign it to the Y Axis not the X Axis.

*\* Turn Modify Wheel 4 until "Insert" is displayed.*

*\* Again, Tilt is a continuous type as Pan is, so tap Function button 4 to "Select OK".*

=	Fixture: Scanner	Select
	Trait: 2      Label: Pan	Edit

We now need to change the "Pan" label to "Tilt"

- \* Tap Function button 4 to "Select Edit".
- \* Turn Modify Wheel 3 until "Tilt" is displayed above it. The labels are alphabetized.
- \* Tap Function button 4 to "Select Save".

=	Fixture: Scanner	Select
	Trait: 2      Label: Tilt	Edit

Next make the trait channel 3.

- \* Turn Modify Wheel 2 until "Channel" is displayed.
- \* Tap Function button 4 to "Select Edit".
- \* Turn Modify Wheel 3 until 3 is displayed above it.
- \* Tap Function button 4 to "Select Save".

To complete Tilt, change the size to 16 Bit, the Y Axis from No to Yes and Default to 32,768 as we did with Pan.

### Define Color

Since the Color trait consists of both Index and Continuous types we will define it using a Union trait. The Union trait itself simply acts as a header to group Continuous and Indexed types together. The end of the group is marked by an End Union trait. **Always be sure to include an End Union trait with a Union trait or unpredictable behavior could be experienced.**

- \* Turn Modify Wheel 4 until "Insert" is displayed above it.
- \* Tap Function button 4 to "Select Insert".

=	Fixture: Scanner	Select
	Type: Continuous	Ok

- \* Turn Modify Wheel 3 until "Union" is displayed above it.

=	Fixture: Scanner	Select
	Type: Union	Ok

- \* Tap Function button 4 to "Select OK".

The Union trait has a limited set of attributes. They include Label, Channel, B/O, BoValue and Default. Change the label to Color and the channel to 5. Leave the rest of the attributes at their default values.

Now let's define the indexed portion of the Color trait.

- \* Turn Modify Wheel 4 until "Insert" is displayed above it.
- \* Tap Function button 4 to "Select Insert".
- \* Turn Modify Wheel 3 until "Indexed" is displayed above it.

=	Fixture: Scanner	Select
	Type: Indexed	Ok

- \* Tap Function button 4 to "Select OK".

Change the label to Color and the channel to 5. Leave X Axis, Y Axis, B/O, BoValue and Default as they are. Next we need to input the total number of indexes and then enter the index labels and respective values.

*\* Turn Modify Wheel 2 until "Indexes" is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 Indexes: 1	Edit

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "4" is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 Indexes: <4 >	Save

*\* Tap Function button 4 to "Select Save".*

The MLC 16 has now allocated memory for four indexes within this trait. All index labels and values will default to the first label in the index table (White with factory defaults) and zero. The index labels are indicated on the display as "IL" followed by the index number. The index values are indicated as "IV" followed by the index number. Since the first color is White and a value of zero will select white on the fixture, let's move on to index number 2, Red.

*\* Turn Modify Wheel 2 until "IL 2" is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 IL 2: White	Edit

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "Red" is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 IL 2: <Red >	Save

*\* Tap Function button 4 to "Select Save".*

*\* Turn Modify Wheel 2 until "IV 2" is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 IV 2: 0	Edit

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "30" (an arbitrary number between the range of 21 - 50) is displayed above it.*

= Fixture: Scanner	Select
Trait: 4 IV 2: <30 >	Save

*\* Tap Function button 4 to "Select Save".*

Continue the above procedure for the last two colors, Blue and Yellow.

The second part of the Union grouping is the continuous wheel movement.

*\* Turn Modify Wheel 4 until "Insert" is displayed above it.*

*\* Tap Function button 4 to "Select Insert".*

```

= Fixture: Scanner                               Select
                                     Type: Continuous       Ok
    
```

*\* Tap Function button 4 to "Select OK".*

The label of a continuous trait within a union grouping is used to create a value label beneath the trait label on the LCD. This label is followed by a number indicating where within the range it is currently set. **Note that labels should be 4 characters or less so that a space and up to 3 numbers will fit within the 8 characters allocated for a trait value.** Let's use the label "Clr".

Change the label to Clr and the channel to 5.

We now need to set the range of values for which this trait is valid. Use the Max and Min attributes.

*\* Turn Modify Wheel 2 until "Max" is displayed above it.*

```

= Fixture: Scanner                               Select
Trait: 5      Max:    255                         Edit
    
```

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "200" is displayed above it.*

```

= Fixture: Scanner                               Select
Trait: 5      Max:    <200>                       Save
    
```

*\* Tap Function button 4 to "Select Save".*

*\* Turn Modify Wheel 2 until "Min" is displayed above it.*

```

= Fixture: Scanner                               Select
Trait: 5      Min:    0                           Edit
    
```

*\* Tap Function button 4 to "Select Edit".*

*\* Turn Modify Wheel 3 until "100" is displayed above it.*

```

= Fixture: Scanner                               Select
Trait: 5      Min:    <100>                       Save
    
```

*\* Tap Function button 4 to "Select Save".*

To complete the Color trait we need to add an End Union trait.

*\* Turn Modify Wheel 4 until "Insert" is displayed above it.*

*\* Tap Function button 4 to "Select Insert".*

*\* Turn Modify Wheel 3 until "End Union" is displayed above it.*

```

= Fixture: Scanner                               Select
                                     Type: End Union       Ok
    
```

*\* Tap Function button 4 to "Select OK".*

Change the label to "Color". The label for an End Union trait has no functionality, however it is good practice to give it the same name as the Union trait.

*Define Gobo*

The Gobo trait should be defined as an Indexed type. Define it just as the Indexed part of the Color trait was defined. Remember to change the label to Gobo, the channel to 6 and the number of indexes to six. As was pointed out at the start of this example, we are assuming that all labels are already predefined except for the Gobo Leaf. Let's go through the steps to input it.

\* Turn Modify Wheel 2 until "IL 6:" is displayed above it.

= Fixture: Scanner	Select
Trait: 7 IL 6: White	Edit

\* Tap Function button 4 to "Select Edit".

\* Turn Modify Wheel 4 until "New" is displayed above it.

= Fixture: Scanner	Select
Trait: 7 IL 6: <White >	New

\* Tap Function button 4 to "Select New".

= Fixture: Scanner	Select
Trait: 7 IL 6: <_ >	Save

\* Use Modify Wheel 2 to move the cursor within the editing field and Modify Wheel 4 to change the character.

= Fixture: Scanner	Select
Trait: 7 IL 6: <Leaf >	Save

\* Tap Function button 4 to "Select Save".

The console will freeze for a few seconds while the new label is saved and the table is resorted. Once the editing field disappears you may proceed.

*Define Dimmer*

Our final trait is Dimmer. Insert it after the Gobo trait. Change the label to Dimmer and the channel to 7. Since we want to have both the Master Wheel and the Blackout button to affect this trait we need to set these attributes within the Dimmer trait.

\* Turn Modify Wheel 2 until "B/O:" is displayed above it.

= Fixture: Scanner	Select
Trait: 8 B/O: No	Edit

\* Tap Function button 4 to "Select Edit".

\* Turn Modify Wheel 3 until "Yes" is displayed above it.

= Fixture: Scanner	Select
Trait: 8 B/O: <Yes>	Save

\* Tap Function button 4 to "Select Save".

Since a value of zero turns off the dimmer, we can leave the Blackout Value (BoValue) at zero.

\* Turn Modify Wheel 2 until "Master:" is displayed above it.

= Fixture: Scanner	Select
Trait: 8 Master: No	Edit

\* Tap Function button 4 to "Select Edit".

\* Turn Modify Wheel 3 until "Yes" is displayed above it.

= Fixture: Scanner	Select
Trait: 8 Master: <Yes>	Save

\* Tap Function button 4 to "Select Save".

We have now completed the Scanner definition. Tap Blackout to exit the definition mode and assign the device to a fixture button to try it.

*Assign Group*

Each of the 4 Group buttons can be assigned to any of the preassigned Fixture buttons. Each Group button then becomes a kind of virtual fixture with the combined common traits and indexed labels of all the assigned fixtures. **Note: Trait labels and index labels are case sensitive. Therefore care should be used when defining labels if grouping is to be used.** Whenever a Group is active, the common traits of the fixtures can be changed in unison from a single control. To create a Group, activate the Assign Group Setup mode. From there use Modify Wheel 1 to sequence through the groups. The currently assigned fixtures are shown with an "X" under the number of each Fixture. The following display example shows Group 2 with Fixtures 2, 6, 10 and 14 assigned to it.

= Group	1234567890123456	Select =
2	X X X X	Edit

To make changes to the assignments, press Function button 4 to select "Edit". Use Modify Wheel 2 to move the cursor to the Fixture to change. Turn Modify Wheel 3 clockwise to include the Fixture or counter clockwise to exclude it. If the Fixture button does not have a personality assignment, it cannot be assigned to the Group. To save the changes, press Function button 4 to select "Save". To cancel changes, turn Modify Wheel 4 until "Cancel" is displayed. Then press Function button 4.

*Test*

The Test mode allows accessing dimmer channels directly. This is useful when the traits of a device are not known or if index values need to be determined. Use Function buttons 2 and 3 to decrease and increase the dimmer channel numbers by 1 and Function buttons 1 and 4 to decrease and increase the dimmer channels by 10. The Modify Wheels will vary the level of the dimmer channel numbered above it.

*Console*

There are multiple console setup menus. You can page through them by tapping the More button. Items can be modified by tapping the fourth function button labeled "Select Edit".

*Maximum Dimmers*

The MLC 16 can output up to 512 dimmers. However, most of the time, less are needed. Reduce the Maximum Dimmers to the number needed to keep console from outputting needless information. The number can not be reduced below 48 to maintain compatibility with some existing equipment.

*Interbyte Delay*

Some devices cannot keep up with DMX512 at full speed. This usually is exhibited as a momentary glitch since the device has missed some data and therefore uses incorrect values. Putting additional time between each byte transmitted usually can alleviate this problem. If you are experiencing intermittent control problems, try varying the Interbyte Delay. A zero value indicates no delay while a value of 256 is the maximum delay (about 200 uSec).

**Caution: Large values will seriously effect the efficiency of the console, especially with large numbers of output dimmers. Therefore, first try the maximum value to see if the problem is alleviated. If so, then reduce the value as low as possible while still achieving the benefits.**

*DMX 512  
Input Mode*

DMX512 input into the MLC 16 can be used in two different ways: Pass Thru and 9 Channel mode. Pass Thru merges the input DMX512 with the output of the MLC 16 in a greatest level takes precedence fashion. 9 Channel mode allows 9 channels to be used to turn on any Scene, Pattern or Show by interpreting the values as a binary code. Levels above 50% are considered a logical 1 while values below 50% are considered a logical 0. A zero value causes a blackout to occur. Scenes, Patterns and Shows each have an On Command and an Off Command. The Scenes are mapped to values 1 - 24 (on) and 145 - 168 (off), the Patterns to 25 - 120 (on) and 170 - 264 (off) and the Shows to 121 - 144 (on) and 265 - 288 (off). For example, to turn on Pattern 40 (Playback 16 of Page 2), the 9 channels should form this binary pattern 000000100 (only the seventh channel of the 9 channel frame is on, the other 8 channels are off). Note that the lowest channel number represents the least significant bit of the binary number. A complete set of tables detailing the channel values for each event can be found in the Table Chapter at the end of this manual.

*DMX 512  
Input Start  
Channel*

This is the starting channel used for 9 Channel DMX512 inputting. Use Function button 4 to Edit and Save changes and Modify Wheel 3 to make changes while in the editing mode.

*MIDI Channel*

All MIDI commands sent and received by the MLC 16 use this channel number. It can be set from 1 to 16.

*MIDI  
Assignments*

Each Scene, Pattern and Show along with the Blackout button, can have a one or two MIDI command sequences assigned to it. The commands can consist of any combination of Note On, Note Off, Program Change and Control Change commands. Note that there are separate on and off sequences for each memory, but only one sequence for the Blackout button. To select the item to edit, rotate Modify Wheel 1. To view the second command, rotate Modify Wheel 2 clockwise. Once you have selected the item to edit, tap Function button 4. Three fields will be surrounded by brackets. The first field is the command name. Use Modify Wheel 1 to change it to any command or select None so that no command is used. The second field contains the commands number. This can a value between 0 and 127. Use Modify Wheel 2 to change its value. The third field contains the value for Note and Control Change commands. Use Modify Wheel 3 to edit it. Values can be from 0 to 127. If you rotate past 127, "Any" is selected. This indicates that the value is not used and that any value will cause the event to trigger.

*EXAMPLE: Assign the following sequence, Control Change 1 with any value followed by Program Change 3, to turn Show 3 on.*

- \* *First select Show 3 On by turning Modify Wheel 1 until it is displayed.*
- \* *Tap Function button 4 to select edit.*
- \* *Turn Modify Wheel 1 until "Control" is displayed in the first edit field.*
- \* *Turn Modify Wheel 2 until the number 1 appears in the second edit field.*
- \* *Turn Modify Wheel 3 until "Any" appears in the third edit field.*
- \* *Tap Function button 4 to save the changes.*
- \* *Turn Modify Wheel 2 clockwise to display the second MIDI command.*
- \* *Tap Function button 4 to select edit.*
- \* *Turn Modify Wheel 1 until "Program" is displayed in the first edit field.*
- \* *Turn Modify Wheel 2 until the number 3 appears in the second edit field.*
- \* *Tap Function button 4 to save the changes.*

*EXAMPLE: Assign Blackout to be activated whenever a Note On command with a note number of 64 and a value of 0 is received.*

*\* First select Blackout by turning Modify Wheel 1 until it is displayed.*

*\* Tap Function button 4 to select edit.*

*\* Turn Modify Wheel 1 until "Note On" is displayed in the first edit field.*

*\* Turn Modify Wheel 2 until the number 64 appears in the second edit field.*

*\* Turn Modify Wheel 3 until the number 0 appears in the third edit field.*

*\* Tap Function button 4 to save the changes.*

*\* Turn Modify Wheel 2 clockwise to display the second MIDI command.*

*\* Tap Function button 4 to select edit.*

*\* Turn Modify Wheel 1 until "None" is displayed in the first edit field.*

*\* Tap Function button 4 to save the changes.*

For a complete listing of default MIDI assignments see the "Tables" chapter.

<i>Record Lock</i>	Activating the record lock will make all record and editing functions for Scenes, Patterns and Shows inaccessible.
<i>Setup Lock</i>	When the Setup Lock is enabled, the user must enter a 4 digit code to enter the Setup modes. The code is "ABCD".
<i>Fixture Lock</i>	When the Fixture Lock is enabled, the user must enter a 4 digit code to enter the Fixture Setup modes. The code is "abcd".
<i>Clear All</i>	Use this mode to clear all Scene, Pattern and Show memory.
<i>Clear Scenes</i>	Clears all Scene memory.
<i>Clear Patterns</i>	Clears all Pattern memory.
<i>Clear Shows</i>	Clears all Show memory.
<i>Clear Fixtures</i>	Clears the Fixture Library. All Fixture and Group assignment are deleted.
<i>Init Fixtures</i>	Clears the Fixture Library and reloads it with the factory default library. All Fixture and Group assignments are deleted.

---

## *Disk*

Consoles equipped with a disk drive will have a "Disk" setup entry in addition to "Fixture" and "Console". Disk drive utilities include Format, Delete, Load and Save. Any and/or all console programming can be saved and loaded from the disk in either binary or ASCII format. Since the disk format used is MSDOS compatible, the ASCII formatted files can very useful for offline editing. A fixture's definition can be written on a computer with a word processor or text editor and then loaded into the console via the disk drive. Scene and Pattern Step levels are saved in fixture definition form rather than raw numbers. This makes changing the color of a fixture from blue to red as easy as typing in the new label (of course the label will need to match those defined in the fixture's definition). The console takes care of the translation as the file is loaded into the console.

*Format* This utility is used to format a new disk as an MSDOS compatible disk. Most disks are sold preformatted and will not require this operation.

*Delete* Individual disk files can be deleted with this utility. Use Modify Wheels 2 or 3 to scroll through the directory of files. Once the file is selected, press Function Button 4 once to select the file for deleting, and then once more for confirmation.

*Load*

Use this utility to load a file from a disk. Once the directory has been loaded, select the file to be loaded with Modify Wheels 2 or 3. Use Function Button 4 to initiate loading. A series of dots will chase on the display to indicate the loading progress. When the loading dots are removed from the display and the file name is again displayed, the file load is complete.

If an ASCII file contains any Device Definitions, you will be prompted as to whether the current library should first be deleted. Select Yes with Function Button 3 and No with Function Button 4. Normally you would delete the current library only if the file contains a new full library. If you simply are adding a new device you should select No. Keep in mind that the Device Library is shipped from the factory full. If new devices are added, you should first remove some of the devices you will not be using. The Device Definition Library disk included with this manual has all the devices in the console library plus additional ones. It can be used to reload the deleted devices if they are needed later on.

If an ASCII file contains information which is not understood, an error message is displayed. The error is shown in the form of a number. This is the line number that the error occurs. The only way an error should occur from a file that was written by the console is if the file refers to fixture definitions or assignments that do not currently exist in the console. If the file was written offline, it is probably the result of improper syntax.

*Save*

Several different file types can be saved to disk. These include the ASCII types All, Configs, Fixtures, Scenes, Patterns and Shows and a Binary type. The ASCII types have the advantage of easy offline editing, but with exception of All, have the disadvantage of requiring the console to have the same fixture assignments when loading that existed when the file was saved. For this reason, **it is recommended that backup files be of the Binary type.**

Each of the ASCII types contain different information. The Configs type include all the console setup values (Max Dimmers, Interbyte Delay, DMX 512 Input mode and Start Channel, MIDI Channel and Assignments, and Memory Locks) and the Fixture and Group assignments. The Fixture type contains the complete Device Library. Scene, Pattern and Show types contain the programming of only those recorded. For example, if only Patterns 1 and 5 are recorded, they will be the only entries in the saved file. The advantage of this is two fold. The first is reduced file size. The other is ability to write a Pattern on a text editor and then load it in via the disk drive without affecting any of the other existing Pattern programming. The final ASCII format is All. It contains all the information that is included in all of the other ASCII file types. This is a reasonable backup file, but will not affect any Scene, Pattern, Show, Fixture or Group assignments that are not included in the file (they were not recorded or assigned when the file was written).

The Binary file type saves an exact image of all 512K bytes of the Flash EPROM. Since there is no translation to ASCII or any other format, this is the best backup file type. When a binary file is loaded all existing programming will be lost.

Once Save has been selected and the directory is fully loaded, the display will have three fields to work with. The first field and first step is to use Modify Wheel 1 to select the file type. Then use Modify Wheel 2 or 3 to scroll through the file names currently on the root of the disk. Modify Wheel 4 is used to toggle between OK and New for initiating file saving. Selecting OK will allow you to overwrite an existing file, while selecting New will allow you to create a new file under a new name. If OK is selected, you will be prompted as to whether a file overwrite is desired. If New is selected, use Modify Wheel 2 to move the cursor within the editing field and use Modify Wheel 3 to change the character at the cursor position.

See the chapter "ASCII Disk Formats" for details on writing your own files.

**EXAMPLE:** Save a file of type Scenes under the file name Scenes.

\* Place a High Density Double Sided formatted disk in the MLC disk drive.

- \* *Tap the Edit button.*
- \* *Tap Function Button 4 for Setup.*
- \* *Tap Function Button 4 again for Disk.*
- \* *Tap Function Button 4 again for Save.*
- \* *Wait while the directory loads.*
- \* *Turn Modify Wheel 1 clockwise until Scenes is displayed.*
- \* *Turn Modify Wheel 4 clockwise until New is displayed.*
- \* *Tap Function Button 4 to select New.*
- \* *Enter the file name "Scene" using Modify Wheel 2 to position the cursor within the editing field and Modify Wheel 3 to change the character at the cursor.*
- \* *Once the file name has been entered, tap Function Button 4 to start the save.*
- \* *The file save is complete when the chasing saving dots complete and the new file name is displayed in its place.*

**EXAMPLE:** *Overwrite an existing file with a binary type.*

- \* *Place a High Density Double Sided formatted disk in the MLC disk drive.*
- \* *Tap the Edit button.*
- \* *Tap Function Button 4 for Setup.*
- \* *Tap Function Button 4 again for Disk.*
- \* *Tap Function Button 4 again for Save.*
- \* *Wait while the directory loads.*
- \* *Turn Modify Wheel 1 clockwise until Binary is displayed.*
- \* *Tap Function Button 4 to select OK.*
- \* *The display will request confirmation of an overwrite. Tap Function Button 4 to confirm.*
- \* *The file save is complete when the chasing saving dots complete and the overwritten file name is displayed in its place.*

## 4

# Operation Guide

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### *General*

The MLC 16 Intelligent Lighting Console provides control of up to 16 different fixtures. Any device that can be controlled via DMX512 can be accessed. A rich Device Definition Language (DDL) has been developed for the MLC 16, enabling virtually any fixture personality to be defined. Many popular personalities have already been defined within the console's nonvolatile flash memory. Accessing a fixture is made simple through the use of the 16 Fixture Select buttons, the 2x40 character LCD and the 4 Rotary Encoders.

Playback is organized into 3 types of memories; Scenes, Patterns and Shows. Scenes are static memories that can be recalled at any time to either set the look of the stage or to modify a portion of it. Patterns consist of linked memories with Fade times and Hold times. As with a Scene, the Pattern can control the whole stage or just parts of it. For example, one pattern can control just color while another running at the same time, can control pan and tilt. Shows link patterns together to form complex events that can be activated with the press of a single button.

The hierarchical order of control is, from highest to lowest; Fixtures, Scenes, Patterns and Shows. This means that a Fixture button can take total control of any or all parts of a device. Likewise, a Scene can take control of any parts of an active pattern or show (but not an active Fixture button). This hierarchy makes it easy to create very flexible memories which can be layered in different combinations to create various looks.

---

### *Operation*

#### *Fixtures*

The Fixture section provides a pushbutton per device. Any of the up to 64 different fixture personalities can be assigned to each of the 16 Fixture buttons. To activate a fixture simply press the button so that the LED above it lights red. While the button is being held down the name of the device personality will be displayed on the LCD. Once active, the traits of the personality assigned to the button are shown on the LCD, four at a time along with current value displayed either numerically or as a label. To modify a trait, simply turn the modify wheel clockwise to increase or counter clockwise to decrease the value.

Since most fixtures have more than four traits, a More button has been included just below the Modify Wheels. Pressing the button will cause the next set of traits to be displayed. Once the last of the traits have been reached, pressing the More button will cause the first traits to be displayed again.

Traits can be assigned to either axis of the Joystick (Pan and Tilt are common uses for this feature). If this is the case, these traits will be modified whenever the joystick is operated. The Joystick is a contact closure device. As such, moving the stick up, down, right or left will close that respective contact. Built into the firmware of the MLC 16 is an acceleration curve which causes the amount of change to increase the longer the contact is held closed. Small taps to the contact will change the trait by single increments useful in fine tuning, while holding the contact closed will cause the changes to happen much faster allowing for quick, coarser movements.

Traits assigned to the Joystick can also be controlled with a Microsoft compatible mouse or trackball connected to the Serial Mouse port. Very flexible control of the two axes can be achieved using such a device. **At the time of this writing, Logitech devices are not compatible because of a timing discrepancy with the Microsoft standard.**

When activating a fixture with no Patterns or Shows active, each trait of the fixture is assigned to be controlled through the Modify Wheels and the Joystick. Activating a Pattern or Show will have no affect on that fixture. In addition, any fixtures previously accessed without first being deactivated by dousing its LED, will also not be affected. For example, if Fixture 1 is activated by pressing its button and then deactivated by pressing the button again, then Fixture 2, 3 and 4 are activated without deactivating any of them first, activating a Pattern with Fixtures 1, 2, 3 and 4 recorded into it will only affect Fixture 1 since 2, 3, and 4 have not yet been released.

To determine whether a Fixture Personality Trait is attached to a Modify Wheel, simply view the Trait on the LCD display. If the value is followed by an asterisk the wheel has control. If you wish to release control of all the Traits of a Fixture without turning it off, press and hold the More button for about a second. You will see the asterisk disappear from the trait values when the release takes affect.

When a Fixture button is activated while a Pattern or Show is running, the traits are not "grabbed" by the wheels until the wheel is first moved. As a result, the fixture will not come to a halt when the button is pressed. In addition, individual traits can be modified on the fly. For example, if an active Pattern is cycling through the colors and one of the fixtures involved is activated, the color of that fixture could be forced to stay on one color simply by dialing it in with Modify Wheel. To make the change even more seamless, activate the Blind function before making the modification. Then the changes made will not be transferred to stage until the Go button is pressed.

*Scenes* Whenever the Scene LED is lit, the 24 Playback buttons are in Scene mode. Each scene is a static memory used to control various aspects of the overall stage look. To activate a Scene, simply tap the Scene button. If there is something recorded into it, the LED above the button will lite green indicating that all the channels recorded into this Scene are now controlled by this memory. If another recorded Scene button is pressed, one of two things will happen to any other Scene LED's that may be currently on. Either they will go out or they will turn orange. If a LED goes out, it indicates that the Scene no longer controls any of the channels recorded into it. If the LED turns orange, the act of activating the new Scene has taken control of some but not all of the channels recorded into the Scene. This gives the Scene section a Last Action takes Precedence operation style.

You can use the Scenes to set the look of the entire stage with a single press of a button or since you can selectively choose which device traits are recorded into each Scene, you can use a Scene to modify just the color or gobo of some of the fixtures while some other Scene, Pattern or Show continues to control the rest of the stage.

*Patterns* Patterns take the idea of static Scenes a step further. They allow stage looks to be linked together at programmable times creating complex movements and effects on stage.

There are 4 pages of of patterns for a total of 96. Use the Page buttons to select the page desired. Then press any of the 24 Playback buttons to activate the pattern.

*Shows* Shows allow patterns to be linked in any order, one after another. You can determine how many times each pattern will cycle and how many times the entire show will cycle from 1 to 255 times. To activate a Show, first make sure that the Show LED is lit and then tap any of the Playback buttons.

*Blind* The Blind button is used in conjunction with the Go button to make modifications to devices using the Fixture buttons without the changes affecting the stage until the Go button is pressed. This allows several changes to be made to any or all of the assigned Fixture buttons and then transferring the changes all at once to the stage. Pressing the Blind button again so that it's LED goes out will cancel the modifications without affecting the stage.

*Fade* When the LCD is at the main menu, Modify Wheel 1 changes the Scene fade time. Fading in affects all fading channels while fading out only affects a channel assigned to the master. That way only the intensity is faded out, not motor positions.

*Audio* When audio is input into the MLC 16, the gain is controlled with Modify Wheel 3 when the LCD is at the main menu. Higher values increase the gain.

*Master* The master affects any trait that has been assigned to it. See the section "Define Fixture" in the chapter "Setup Guide" for details on how to assign a trait to the master. The master can be adjusted with Modify Wheel 4 when the LCD is at the main menu.

# 5 Programming Guide

## General

To initiate programming, first tap the Record button. This will lite the Record LED indicating that the program mode is active. Also, the LCD display will prompt to select an item to program. Tap the playback button to be programmed (Scene, Pattern, or Show) or tap a Function button to select the type of memory to program. All programming is stored in non-volatile memory which retains information for at least 10 years, even when power is removed.

## Programming

### Programming Scenes

To program a Scene, first set the look on stage using the Fixture buttons and any previously recorded Scenes. Once the stage is set just press the Record Button followed by the Scene Playback button (make sure that the Scene LED is lit). The stage look has now been recorded and can be recalled by tapping the Playback button.

Each time the console is powered, the programming mode is defaulted to "Trait All". If it is desirable to program only certain Traits into the scene, such as colors or gobos, you must change the programming mode to "Traits Select". To make the change, first enter the Record mode by tapping the Record button. Then tap Function button 1 to select Scene programming. From this menu turn Modify Wheel 4 to change between "Trait All" and "Trait Select".

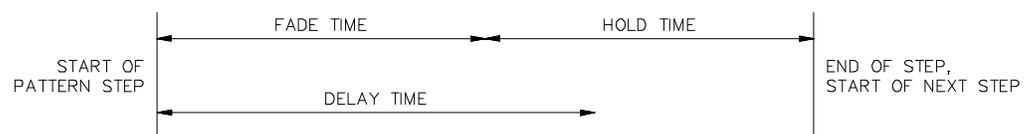
When "Trait Select" is chosen, only those traits captured (indicated by an asterick beside a trait value when a fixture is selected) will be recorded. Whenever a fixture is selected with no Pattern or Show active, all traits for that fixture will be immediately captured. To release the capture, press and hold the More button for about a second. The astericks will disappear indicating that the capture has been removed. Capture the desired traits by turning it's Modify Wheel or moving the Joystick.

Keep in mind that once all Fixture buttons are off, they no longer control the stage and will not record into the Scene. Because of this, do not turn off a Fixture button first before activating another. Instead, press the next Fixture button, letting it kill the current one. If you do accidentally release all the Fixtures, you can quickly regain control by just tapping each Fixture button you want controlled in the Scene.

### Programming Patterns

To initiate the programming of a pattern, first tap the Record button so that the LED above it lights. Then press the Playback button of the Pattern you wish to program (make sure that the correct Page LED is lit). If the Pattern has been previously programmed, the display will prompt as to whether to delete the programming. If you select Yes or if there is no previous programming, the display will prompt for the times (Fade, Hold and Delay) of the first step. Use the Modify Wheel below each time to change it to the value desired.

The Fade time is the time in which the Continuous channels will fade from their current positions to the positions of this step. The Hold time is the time that the faded channels will hold their positions after the fade is complete. After the Hold time has timed out, the next step of the Pattern will execute. The Delay time starts at the beginning of the step and determines when Indexed channels will change. This gives the ability to delay such things as color wheel movements until later in the step rather than right at the beginning.



Once the times have been entered, use the Fixture buttons and the Scenes to create the stage look to be recorded into the step. The same selected trait control is possible when forming the step levels as can be done with the Scenes. For example, a Pattern can be programmed with only Pan and Tilt movements which can be overlaid with another that controls only color movements. Change from "Trait All" to "Trait Select" at the Record Pattern menu to activate this mode for Pattern programming.

When all the times and levels have been added the step is ready to be recorded. Use the Record button to record the step or if the Time menu is active (Fixture buttons are not active) tap Function button 4. The step number being created but not yet recorded is displayed above Modify Wheel 4 when the Time menu is active. **Note: During Pattern programming, releasing all fixtures will not release control of the traits. This allows the programmer to switch between the Time menu and the Fixture menu without losing any captures.**

Continue this process until all the steps are recorded. Exit the Record mode by tapping Blackout.

*Editing Patterns*

Once a Pattern has been recorded, modifications can be made to it through the Edit mode. First tap the Edit button. Then, making sure the proper Pattern Page is active, tap the Pattern button of the pattern to be edited. The times for the first step will be displayed and the recorded levels will be output to stage. Modify Wheel 4 is used to move from step to step. Use Modify Wheels 1 - 3 to change times and the Fixture buttons to modify fixture traits. Tap the More button to display "Insert" or "Delete" selections for inserting and deleting steps. To record a modified step, tap either the Record button or Function button 4. Tap Blackout to exit the editing mode.

*Real Time Record*

It is not always easy to know exactly what times are going to be best when programming a Pattern. Using the Real Time Recording mode, the programmer can modify the times of a prerecorded Pattern in real time while, for example, the music that the Pattern will be used for is playing.

To activate the mode, first tap the Record button. Then tap the Function button above "Pattern" on the LCD display. Using Modify Wheel 3 select the Pattern number and then Tap the Function button above "Real Time". Use the Go button to start the selected Pattern running. A timer on the LCD display will start to run. When you feel it is time to move to the next step, press Go again. The elapsed time will be used to relatively modify the stored times. Continue this process until all the steps have been sequenced through. The Real Time Recording mode will extinguish itself once the last step is complete.

*Programming Shows*

The Patterns that have been programmed into the console can be linked together to form Shows. There are 24 Shows that can be recorded. First press the Record button. Then, making sure that the Show LED is lit, press the Playback button of the Show you wish to record. The Display will prompt for Pattern number, Pattern loop count and Show loop count. Use the Modify Wheels to change the numbers to those desired and tap the fourth function button above the display to record the first step. Continue this process until the entire Show is programmed. Tap Blackout to exit the recording mode.

## 6

## ASCII Disk Formats

### *General*

ASCII formats (standard text files) allow data to be easily read and modified on a computer using a text editor. However, in order for the information to be easily understood by the console, certain rules need to be followed. These rules form the syntax that is used by the MLC 16 to describe it's programming. By following these rules, you can write your own programming or device definitions offline on a computer and load them into the console through the optional disk drive at your convenience.

The general syntax for ASCII formats is as follows:

- 1: Only one command per line.
- 2: Lines are terminated by either a carriage return or carriage return/line feed combination.
- 3: All commands start with a Keyword. Keywords can be prefaced by spaces or tabs.
- 4: Keywords are not case sensitive.
- 5: All Keywords, except "End", are followed by a value. The Keyword and value are separated by a space(s).
- 6: Any text following a semicolon is ignored. This allows a file created with a text editor to contain comments. Note that comments are not retained within the console.

### *Device Definition Language*

The Device Definition Language (DDL) is used to describe an object's personality which will be controlled by the MLC 16. Devices can include intelligent lighting fixtures, fog machines, traditional luminerie/color scroller combinations or simply a series of dimmer channels. Through the use of DDL, the MLC 16 can present the individual attributes or traits of the personality with descriptive labels rather than simple channel numbers as you would with a standard lighting console.

Device Definitions can be programmed into the MLC 16 in three different ways. The first is to program it directly on the console through the Fixture Define utility of the Setup Menu. The other two make use of text files using DDL. These text files can be input into the console in two different ways; through the Mouse (RS-232) port or via the disk drive. The only difference between a file input via RS-232 versus one input through the disk drive is that the file input via RS-232 requires that the last line of the file contains the key word "End" exclusively. This flags the console that the file is complete. Without the "End" keyword, the last trait of the definition is lost.

Keyword	Valid Values	Description	Example
Device	16 character text string	Defines the name of the device.	Device Scanner
Trait	8 character text string	Defines the text label of the trait.	Trait Pan
Type	Union, EndUnion, Continuous, Indexed	Defines the type of the trait.	Type Indexed
Channel	1 - 256	Defines the channel offset of the trait.	Channel 8

Size	8Bit, 16Bit	Defines the trait as 8 bit or 16 bit. Only used in continuous types.	Size 8Bit
Invert	Yes, No	Causes the joystick or a wheel to work opposite of normal when controlling the trait.	Invert Yes
XAxis	Yes, No	Assigns the trait to the horizontal movement of the joystick.	XAxis Yes
YAxis	Yes, No	Assigns the trait to the horizontal movement of the joystick.	YAxis No
Black	Yes, No	Assigns the trait to the Blackout button.	Black No
BoValue	8 Bit : 0 - 255 16 Bit: 0 - 65,535	Defines the value that the Blackout button assigns to the trait.	BoValue 0
Master	Yes, No	Assigns the trait to the Master Wheel.	Master No
Default	8 Bit: 0 - 255 16 Bit: 0 - 65,535	Defines the value that the Default button assigns to the trait.	Default 128
Maximum	8 Bit: 0 - 255 16 Bit: 0 - 65,535	Defines the maximum value of a continuous trait.	Maximum 255
Minimum	8 Bit: 0 - 255 16 Bit: 0 - 65,535	Defines the minimum value of a continuous trait.	Minimum 0
Index	8 character text string followed by a comma and a value ranging from 0 - 255.	Defines the text label and its value of an index entry of an indexed type trait.	Index Red,30
End	None	Defines the end of the file. Only required for RS-232 input files.	End

A new device definition is initiated and named with the "Device" keyword. Keywords on following lines define the traits of the device. Each trait can be one of 4 types; Continuous, Indexed, Union or EndUnion. Use Continuous types for traits, such as Pan or Dimmer, that use the full range of DMX512 values. Use Indexed types for traits that only use specific DMX512 values or use a ranges of values that cause no change to the trait. Examples of Indexed types include Color or Gobo wheels.

The last two types, Union and EndUnion, form a pair which, used together, frame a sequence of Continuous and Indexed types. This sequence allows a single trait to take on the characteristics of both Continuous and Indexed types. A common example of a Union structure would be a Color wheel which provides a continuous movement range and also a "snap to color" indexed range. Once assigned and activated, the MLC 16 will compare the current value of the trait to values defined by the traits within the Union/EndUnion structure until a match is found. If no match is found, the actual value, placed in brackets, is displayed. Rotating the wheel that controls the Union trait will sequence through the values of the current trait in the structure. Once the last value is reached and the wheel is rotated again, control is transferred to the next trait in the structure. This passing of control from one trait to trait continues until the end of the structure is reached.

*DDL Example*

Following is an example of an intelligent device called "Scanner". It has 5 traits; Pan, Tilt, Color, Gobo and Dimmer. Pan, Tilt and Dimmer are Continuous examples. Gobo is an Indexed type example. Color is defined such that there are four values (0,30,60,90) that position the wheel to specific colors and a range of values (100-255) that continuously moves the wheel through all the colors. By using a Union/EndUnion trait type combination, we can maintain all the functionality on one wheel. An Indexed type is used within the Union/EndUnion structure to define the four color positions with descriptive labels (White, Red, Blue and Yellow), followed by a Continuous type which defines the continuous scrolling of the wheel.

*Device Name* Device Scanner

*Pan* Trait Pan  
Type Continuous  
Channel 1  
Size 8Bit  
Invert No  
XAxis Yes  
YAxis No  
Black No  
BoValue 0  
Master No  
Default 128  
Maximum 255  
Minimum 0

*Tilt* Trait Tilt  
Type Continuous  
Channel 2  
Size 8Bit  
Invert No  
XAxis No  
YAxis Yes  
Black No  
BoValue 0  
Master No  
Default 128  
Maximum 255  
Minimum 0

*Color* Trait Color  
Type Union  
Channel 3  
Black No  
BoValue 0  
Default 0

Trait Color  
Type Indexed  
Index White,0  
Index Red,30  
Index Blue,60  
Index Yellow,90

Trait Clr  
Type Continuous  
Maximum 255  
Minimum 100

Trait Color  
Type EndUnion

```
Gobo      Trait Gobo
          Type Indexed
          Channel 4
          Black No
          BoValue 0
          Default 0
          Index Open,0
          Index Stars,30
          Index Circle,60
          Index Triangle,90
          Index Dot,120
          Index Dots,150
```

```
Dimmer   Trait Dimmer
          Type Continuous
          Channel 5
          Size 8Bit
          Invert No
          XAxis No
          YAxis No
          Black Yes
          BoValue 0
          Master Yes
          Default 255
          Maximum 255
          Minimum 0

          End
```

Traits are displayed on the LCD of the MLC 16 in the order that they are defined. Traits assigned to either axis of the Joystick are not displayed. It is possible, however, to define more than one trait for the same channel. This can be useful if you would like to have Pan and Tilt on both the LCD and the Joystick. Simply define two Pan traits and two Tilt traits. Set them up exactly the same except that one is assigned to the Joystick and one is not.

Following is a diagram of what the LCD will show if the above definition is assigned and activated with a Fixture button with all output channels currently set to zero.

Color	Gobo	Dimmer
White*	Open*	0*

The asterisks indicate that the traits are captured.

If the Color trait had been set to a value that is not defined by the Union structure, the console will display the actual value encased in brackets as shown.

Color	Gobo	Dimmer
>20<*	Open*	0*

A Continuous type within a Union/EndUnion structure uses its label as part of the trait's value label. This makes identifying multiple Continuous trait within one Union/EndUnion trait possible. Labels should be kept to a maximum of 4 characters since an offset value is displayed after the label to indicate the position within the range. In this example, the LCD will display "Color", the Union label, on the top line of the LCD. "Clr", the Continuous label, is displayed just below the trait label followed by a number starting at 1 and continuously incrementing to 156 ( $\max(255) - \min(100) + 1 = 156$ ).

Focusing attention back to our example, once Modify Wheel 1 has been used to change the Color trait to "Yellow", turning it once more clockwise will cause control to be transferred to the Continuous portion of the Union/EndUnion structure. The display will then look like this.

Color	Gobo	Dimmer
Clr 1*	Open*	0*

*Configuration  
 Formats*

Keyword	Valid Values	Description	Example
FixAssign	1 - 16 followed by a device name, comma and channel offset.	Assigns devices to Fixture buttons.	FixAssign 1 Dimmer,30
Group	1 - 4	Establish Group number for group assigning.	Group 3
GroupFix	1 - 16	Defines a Fixture button to a Group.	GroupFix 15
MaxDims	49 - 512	Maximum number of Dimmers output.	MaxDims 200
InterB	0 - 256	DMX512 interbyte delay.	InterB 0
DmxInMod	Off, PassThru, 9Channel	DMX512 Input mode.	DmxInMod Off
DmxInCh	1 - 504	Starting channel for 9 Channel DMX512 Input.	DmxInCh 1
Rlock	Yes, No	Record Lock.	Rlock Yes
Slock	Yes, No	Setup Lock.	Slock No
Flock	Yes, No	Fixture Lock.	Flock No
MidiCh	1 - 16	MIDI channel	MidiCh 5
MidiScn	1 - 24	Establish Scene number for MIDI command assigning.	MidiScn 10

MidiPat	1 - 96	Establish Pattern number for MIDI command assigning.	MidiPat 2
MidiShw	1 - 24	Establish Scene number for MIDI command assigning.	MidiShw 1
On	Non, Noff, CC: followed by a comma, followed by a number 0 - 127, followed by a comma, followed by a value 0 - 127 or "Any". PC: followed by a comma, followed by a number 0 - 127.	Assign a MIDI On command to a MIDI event.	On Non,0,Any
Off	Non, Noff, CC: followed by a comma, followed by a number 0 - 127, followed by a comma, followed by a value 0 - 127 PC: followed by a comma, followed by a number 0 - 127.	Assign a MIDI Off command to a MIDI event.	Off PC,127

*Scene Formats*

Keyword	Valid Values	Description	Example
Scene	1 - 24	Establish Scene number to be programmed.	Scene 1
Traits	All, Select	Determines whether all traits or only those referenced are flagged for control.	Traits All
Fixture	1 - 16	Establish Fixture number for which following trait values are to be applied.	Fixture 3

T:	Trait label followed by a comma, followed by a valid numerical value or label.	Assigns a trait value to a Scene channel.	T: Color, Yellow
----	--	---	------------------

Following is an example of a Scene file in ASCII format. Assume that the Scanner definition established in the DDL section has been assigned to Fixture buttons 1 and 2.

```
Scene 1
Traits All
Fixture 1 ;Scanner
T: Pan,150
T: Tilt,30
T: Color,White
T: Gobo,Open
T: Dimmer,255
Fixture 2 ;Scanner
T: Pan,100
T: Tilt,75
T: Color,White
T: Gobo,Open
T: Dimmer,255
```

```
Scene 2
Traits All
Fixture 1 ;Scanner
T: Pan,200
T: Tilt,187
T: Color,White
T: Gobo,Open
T: Dimmer,255
Fixture 2 ;Scanner
T: Pan,120
T: Tilt,25
T: Color,White
T: Gobo,Open
T: Dimmer,255
```

```
Scene 9
Traits Select
Fixture 1 ;Scanner
T: Color,Red
Fixture 2 ;Scanner
T: Color,Red
```

```
Scene 10
Traits Select
Fixture 1 ;Scanner
T: Color,Blue
Fixture 2 ;Scanner
T: Color,Blue
```

```
Scene 11
Traits Select
Fixture 1 ;Scanner
T: Color, Yellow
Fixture 2 ;Scanner
T: Color, Yellow
```

Scenes 1 and 2 program all traits for the two Scanners. Scenes 9 - 11 program only color and can be used to modify the color of Scene 1 or 2. All other traits will remain unchanged. The ";Scanner" string after the Fixture number is a comment for reference and is output from the console.

*Pattern  
Formats*

Keyword	Valid Values	Description	Example
Pattern	1 - 96	Establish Pattern number to be programmed.	Pattern 80
Step	1 - 800	Establish Step number to be programmed.	Step 1
Traits	All, Select	Determines whether all traits or only those referenced are flagged for control.	Traits Select
Fade	0 - 27:00.0	Determines the Pattern Step Fade time.	Fade 1.0
Hold	0 - 27:00.0	Determines the Pattern Step Hold time.	Hold 1:00.0
Delay	0 - 27:00.0	Determines the Pattern Step Delay time.	Delay 0
Fixture	1 - 16	Establish Fixture number for which following trait values are to be applied.	Fixture 5
T:	Trait label followed by a comma, followed by a valid numerical value or label.	Assigns a trait value to a Pattern step channel.	T: Pan,150

Following is an example of a Pattern file in ASCII format. Assume that the Scanner definition established in the DDL section has been assigned to Fixture buttons 1 and 2.

```
Pattern 1
Step 1
Traits All
Fade 1.0
Hold 0
Delay 0
Fixture 1 ;Scanner
T: Pan,25
T: Tilt,30
T: Color,Clr 100
T: Gobo,Dots
T: Dimmer,255
Fixture 2 ;Scanner
T: Pan,240
T: Tilt,30
T: Color,Yellow
T: Gobo,Dots
T: Dimmer,255
```

```
Step 2
Traits All
Fade 1.0
Hold 0
Delay 0
Fixture 1 ;Scanner
T: Pan,150
T: Tilt,100
T: Color,Clr 100
T: Gobo,Dots
T: Dimmer,255
Fixture 2 ;Scanner
T: Pan,150
T: Tilt,100
T: Color,Yellow
T: Gobo,Dots
T: Dimmer,255
```

```
Step 3
Traits All
Fade 1.0
Hold 0
Delay 0
Fixture 1 ;Scanner
T: Pan,240
T: Tilt,30
T: Color,Clr 100
T: Gobo,Dots
T: Dimmer,255
Fixture 2 ;Scanner
T: Pan,25
T: Tilt,30
T: Color,Yellow
T: Gobo,Dots
T: Dimmer,255
```

*Show Formats*

Keyword	Valid Values	Description	Examples
Show	1 - 24	Establish Pattern number to be programmed.	Show 24
Loop	1 - 250, Infinite	Determines the number of times the Show will loop until it extinguishes itself.	Loop Infinite
Step	1 - 24	Establish Step number to be programmed.	Step 1
PatNum	1 - 96	Determines the Pattern number that will run during a Show step.	PatNum 10
Times	1 - 250	Determines the number of times the Pattern will loop within the Show step.	Times 5

Following is an example of a Pattern file in ASCII format. This Show has 4 steps and will loop through them 10 times before extinguishing itself. Step 1 runs Pattern 1 four times, step 2 runs Pattern 2 five times, step 3 runs Pattern 80 two hundred times and step 4 runs Pattern 20 ten times.

Pattern 1  
Loop 10

Step 1  
PatNum 1  
Times 4

Step 2  
PatNum 2  
Times 5

Step 3  
PatNum 80  
Times 200

Step 4  
PatNum 20  
Times 10

# 7

## Troubleshooting

---

### Checklist

*Console will not power up.*

- Check AC power to the console.
- Is the power switch on.
- A fuse in the power input connector may be burned out.

*Console seems to function, but devices do not respond.*

- Make sure address setting on the device matches that assigned on the console.
- Check for a bad control cable by replacing it.
- Some 3 pin receivers have swapped pins 2 and 3 from norm. You may need to swap these pins in the control cable or reconfigure the internal pin headers for reversed DMX512. See the "3 Pin XLR Pin Reversal" chapter for details on internal pin reversal.
- Make sure the last device in the cable link has been terminated with a terminating resistor.

*Device responds erratically.*

- The device may have multiple operating modes and is set to one that is different than the one defined within the MLC 16. To determine which mode to use for the device, see the addendum of currently defined devices.
- Make sure the last device in the cable link has been terminated with a terminating resistor.
- An excessively long Interbyte Delay may be set.
- You may need a higher grade cable.

*Control exists over a Device, but it does not light.*

- The Grand Master may be at minimum.
- Some Devices need to have its' lamp struck after power up via the DMX512 control signal. "Lamp On" is usually an item found under the "Special" trait.
- Check the fixture's lamp.

*Main LCD menu reads "!Fixture Overlap Error!".*

- Fixture button assignments have been made that have resulted in traits from one device to be assigned to the same output channels as traits from another device. Remember that devices almost always will control more than one output channel. Therefore, starting channel assignments will not be consecutive channel numbers..

*Main LCD menu reads "!Group Mismatch Error!".*

- A Group button has been assigned Fixture buttons that have devices assigned that have no common trait labels. For it to be useful, a Group should be assigned so that there is at least one common trait label between all Fixture buttons assigned to it.

- 
- |   |  |
|---|--|
| <i>Console locks up at power up.</i>  | <ul style="list-style-type: none"><li>• Try powering the console while holding down these four buttons; Hold, Audio, Tap and Blackout. If this alleviates the lockup, it likely that a Device definition assigned to a Fixture button is corrupted. You may be able to fix the definition within the Fixture Definition menu. A common mistake when modifying device definitions is to create a Union trait without an End Union trait.</li></ul>  |
| <i>Scene LED lights momentarily when button is pressed but then goes out.</i> | <ul style="list-style-type: none"><li>• The scene has not been programmed or has been programmed in Select mode with no traits captured. Reprogram the Scene.</li></ul>  |
| <i>Pattern LED will not turn on.</i>  | <ul style="list-style-type: none"><li>• The Pattern has not been programmed.</li><li>• The LED may be out. Try the Panel Test to verify.</li></ul>   |
| <i>Pattern runs for a while and then turns off.</i>                           | <ul style="list-style-type: none"><li>• The Pattern has a step recorded with no trait included. This can result during editing of a Pattern if a step is inserted and then not recorded.</li></ul>   |
| <i>Pressing a Pattern button causes the console to lock up.</i>               | <ul style="list-style-type: none"><li>• The Pattern data structure is corrupted. Reprogram the Pattern.</li></ul>  |
| <i>Worklight does not light.</i>  | <ul style="list-style-type: none"><li>• The worklight dimmer may be at minimum. From the main LCD menu, tap the Function button above the fade rate (Fd:). The display should now show the worklight level (Wk:). Make sure it is at 100.</li><li>• The internal pico fuse has blown. Call your local dealer for replacement.</li></ul>  |
| <i>The console locks up while saving a file to disk.</i>                      | <ul style="list-style-type: none"><li>• There may be a corrupted Pattern or Device Definition. Check for corrupted Patterns by activating each one. If the console locks up when activating a particular pattern, fix it by recording over it. If the Patterns are fine, try checking for a corrupted Device Definition by saving a Scene file. If it saves successfully, there is a good chance one of the Device Definitions has been corrupted. See the Setup Guide for instructions on reinitializing the Fixture Library.</li></ul> |



## 8

## Reset and Memory Clear

---

### *Reset and Memory Clear*

The following procedure causes the entire memory of the console to be cleared and factory default parameters to be installed. **Warning!! All programming will be lost along with Fixture Definitions. Use this procedure only if the console is known to have corrupted memory and that memory clearing from the Console Setup menu does not solve the problem.**

1. Turn off power.
2. Hold down the four Function buttons above the LCD display.
3. Turn power switch on while holding the buttons down.
4. Release buttons after the LCD initializes.

It will take approximately 40 seconds for the memory to clear and initialize.

# 9

## Tables

### *DMX Input Blackout*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Blackout									

\* = channel at full, all others at minimum

*DMX Input  
Scenes 1-24  
On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Scene 1 On	*								
Scene 2 On		*							
Scene 3 On	*	*							
Scene 4 On			*						
Scene 5 On	*		*						
Scene 6 On		*	*						
Scene 7 On	*	*	*						
Scene 8 On				*					
Scene 9 On	*			*					
Scene 10 On		*		*					
Scene 11 On	*	*		*					
Scene 12 On			*	*					
Scene 13 On	*		*	*					
Scene 14 On		*	*	*					
Scene 15 On	*	*	*	*					
Scene 16 On					*				
Scene 17 On	*				*				
Scene 18 On		*			*				
Scene 19 On	*	*			*				
Scene 20 On			*		*				
Scene 21 On	*		*		*				
Scene 22 On		*	*		*				
Scene 23 On	*	*	*		*				
Scene 24 On				*	*				

\* = channel at full, all others at minimum

*DMX Input  
Scenes 1-24  
Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Scene 1 Off	*				*			*	
Scene 2 Off		*			*			*	
Scene 3 Off	*	*			*			*	
Scene 4 Off			*		*			*	
Scene 5 Off	*		*		*			*	
Scene 6 Off		*	*		*			*	
Scene 7 Off	*	*	*		*			*	
Scene 8 Off				*	*			*	
Scene 9 Off	*			*	*			*	
Scene 10 Off		*		*	*			*	
Scene 11 Off	*	*		*	*			*	
Scene 12 Off			*	*	*			*	
Scene 13 Off	*		*	*	*			*	
Scene 14 Off		*	*	*	*			*	
Scene 15 Off	*	*	*	*	*			*	
Scene 16 Off						*		*	
Scene 17 Off	*					*		*	
Scene 18 Off		*				*		*	
Scene 19 Off	*	*				*		*	
Scene 20 Off			*			*		*	
Scene 21 Off	*		*			*		*	
Scene 22 Off		*	*			*		*	
Scene 23 Off	*	*	*			*		*	
Scene 24 Off						*		*	

\* = channel at full, all others at minimum

*DMX Input  
Patterns 1-24  
On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 1 On	*			*	*				
Pattern 2 On		*		*	*				
Pattern 3 On	*	*		*	*				
Pattern 4 On			*	*	*				
Pattern 5 On	*		*	*	*				
Pattern 6 On		*	*	*	*				
Pattern 7 On	*	*	*	*	*				
Pattern 8 On						*			
Pattern 9 On	*					*			
Pattern 10 On		*				*			
Pattern 11 On	*	*				*			
Pattern 12 On			*			*			
Pattern 13 On	*		*			*			
Pattern 14 On		*	*			*			
Pattern 15 On	*	*	*			*			
Pattern 16 On				*		*			
Pattern 17 On	*			*		*			
Pattern 18 On		*		*		*			
Pattern 19 On	*	*		*		*			
Pattern 20 On			*	*		*			
Pattern 21 On	*		*	*		*			
Pattern 22 On		*	*	*		*			
Pattern 23 On	*	*	*	*		*			
Pattern 24 On					*	*			

\* = channel at full, all others at minimum

*DMX Input  
Patterns 25-48  
On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 25 On	*				*	*			
Pattern 26 On		*			*	*			
Pattern 27 On	*	*			*	*			
Pattern 28 On			*		*	*			
Pattern 29 On	*		*		*	*			
Pattern 30 On		*	*		*	*			
Pattern 31 On	*	*	*		*	*			
Pattern 32 On				*	*	*			
Pattern 33 On	*			*	*	*			
Pattern 34 On		*		*	*	*			
Pattern 35 On	*	*		*	*	*			
Pattern 36 On			*	*	*	*			
Pattern 37 On	*		*	*	*	*			
Pattern 38 On		*	*	*	*	*			
Pattern 39 On	*	*	*	*	*	*			
Pattern 40 On							*		
Pattern 41 On	*						*		
Pattern 42 On		*					*		
Pattern 43 On	*	*					*		
Pattern 44 On			*				*		
Pattern 45 On	*		*				*		
Pattern 46 On		*	*				*		
Pattern 47 On	*	*	*				*		
Pattern 48 On				*			*		

\* = channel at full, all others at minimum

*DMX Input  
Patterns 49-72  
On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 49 On	*			*			*		
Pattern 50 On		*		*			*		
Pattern 51 On	*	*		*			*		
Pattern 52 On			*	*			*		
Pattern 53 On	*		*	*			*		
Pattern 54 On		*	*	*			*		
Pattern 55 On	*	*	*	*			*		
Pattern 56 On					*		*		
Pattern 57 On	*				*		*		
Pattern 58 On		*			*		*		
Pattern 59 On	*	*			*		*		
Pattern 60 On			*		*		*		
Pattern 61 On	*		*		*		*		
Pattern 62 On		*	*		*		*		
Pattern 63 On	*	*	*		*		*		
Pattern 64 On				*	*		*		
Pattern 65 On	*			*	*		*		
Pattern 66 On		*		*	*		*		
Pattern 67 On	*	*		*	*		*		
Pattern 68 On			*	*	*		*		
Pattern 69 On	*		*	*	*		*		
Pattern 70 On		*	*	*	*		*		
Pattern 71 On	*	*	*	*	*		*		
Pattern 72 On						*	*		

\* = channel at full, all others at minimum

*DMX Input  
Patterns 73-96  
On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 73 On	*					*	*		
Pattern 74 On		*				*	*		
Pattern 75 On	*	*				*	*		
Pattern 76 On			*			*	*		
Pattern 77 On	*		*			*	*		
Pattern 78 On		*	*			*	*		
Pattern 79 On	*	*	*			*	*		
Pattern 80 On				*		*	*		
Pattern 81 On	*			*		*	*		
Pattern 82 On		*		*		*	*		
Pattern 83 On	*	*		*		*	*		
Pattern 84 On			*	*		*	*		
Pattern 85 On	*		*	*		*	*		
Pattern 86 On		*	*	*		*	*		
Pattern 87 On	*	*	*	*		*	*		
Pattern 88 On					*	*	*		
Pattern 89 On	*				*	*	*		
Pattern 90 On		*			*	*	*		
Pattern 91 On	*	*			*	*	*		
Pattern 92 On			*		*	*	*		
Pattern 93 On	*		*		*	*	*		
Pattern 94 On		*	*		*	*	*		
Pattern 95 On	*	*	*		*	*	*		
Pattern 96 On				*	*	*	*		

\* = channel at full, all others at minimum

*DMX Input  
Patterns 1-24  
Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 1 Off	*			*		*		*	
Pattern 2 Off		*		*		*		*	
Pattern 3 Off	*	*		*		*		*	
Pattern 4 Off			*	*		*		*	
Pattern 5 Off	*		*	*		*		*	
Pattern 6 Off		*	*	*		*		*	
Pattern 7 Off	*	*	*	*		*		*	
Pattern 8 Off					*	*		*	
Pattern 9 Off	*				*	*		*	
Pattern 10 Off		*			*	*		*	
Pattern 11 Off	*	*			*	*		*	
Pattern 12 Off			*		*	*		*	
Pattern 13 Off	*		*		*	*		*	
Pattern 14 Off		*	*		*	*		*	
Pattern 15 Off	*	*	*		*	*		*	
Pattern 16 Off				*	*	*		*	
Pattern 17 Off	*			*	*	*		*	
Pattern 18 Off		*		*	*	*		*	
Pattern 19 Off	*	*		*	*	*		*	
Pattern 20 Off			*	*	*	*		*	
Pattern 21 Off	*		*	*	*	*		*	
Pattern 22 Off		*	*	*	*	*		*	
Pattern 23 Off	*	*	*	*	*	*		*	
Pattern 24 Off							*	*	

\* = channel at full, all others at minimum

*DMX Input  
Patterns 25-48  
Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 25 Off	*						*	*	
Pattern 26 Off		*					*	*	
Pattern 27 Off	*	*					*	*	
Pattern 28 Off			*				*	*	
Pattern 29 Off	*		*				*	*	
Pattern 30 Off		*	*				*	*	
Pattern 31 Off	*	*	*				*	*	
Pattern 32 Off				*			*	*	
Pattern 33 Off	*			*			*	*	
Pattern 34 Off		*		*			*	*	
Pattern 35 Off	*	*		*			*	*	
Pattern 36 Off			*	*			*	*	
Pattern 37 Off	*		*	*			*	*	
Pattern 38 Off		*	*	*			*	*	
Pattern 39 Off	*	*	*	*			*	*	
Pattern 40 Off					*		*	*	
Pattern 41 Off	*				*		*	*	
Pattern 42 Off		*			*		*	*	
Pattern 43 Off	*	*			*		*	*	
Pattern 44 Off			*		*		*	*	
Pattern 45 Off	*		*		*		*	*	
Pattern 46 Off		*	*		*		*	*	
Pattern 47 Off	*	*	*		*		*	*	
Pattern 48 Off				*	*		*	*	

\* = channel at full, all others at minimum

*DMX Input  
Patterns 49-72  
Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 49 Off	*			*	*		*	*	
Pattern 50 Off		*		*	*		*	*	
Pattern 51 Off	*	*		*	*		*	*	
Pattern 52 Off			*	*	*		*	*	
Pattern 53 Off	*		*	*	*		*	*	
Pattern 54 Off		*	*	*	*		*	*	
Pattern 55 Off	*	*	*	*	*		*	*	
Pattern 56 Off						*	*	*	
Pattern 57 Off	*					*	*	*	
Pattern 58 Off		*				*	*	*	
Pattern 59 Off	*	*				*	*	*	
Pattern 60 Off			*			*	*	*	
Pattern 61 Off	*		*			*	*	*	
Pattern 62 Off		*	*			*	*	*	
Pattern 63 Off	*	*	*			*	*	*	
Pattern 64 Off				*		*	*	*	
Pattern 65 Off	*			*		*	*	*	
Pattern 66 Off		*		*		*	*	*	
Pattern 67 Off	*	*		*		*	*	*	
Pattern 68 Off			*	*		*	*	*	
Pattern 69 Off	*		*	*		*	*	*	
Pattern 70 Off		*	*	*		*	*	*	
Pattern 71 Off	*	*	*	*		*	*	*	
Pattern 72 Off					*	*	*	*	

\* = channel at full, all others at minimum

*DMX Input  
Patterns 73-96  
Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Pattern 73 Off	*				*	*	*	*	
Pattern 74 Off		*			*	*	*	*	
Pattern 75 Off	*	*			*	*	*	*	
Pattern 76 Off			*		*	*	*	*	
Pattern 77 Off	*		*		*	*	*	*	
Pattern 78 Off		*	*		*	*	*	*	
Pattern 79 Off	*	*	*		*	*	*	*	
Pattern 80 Off				*	*	*	*	*	
Pattern 81 Off	*			*	*	*	*	*	
Pattern 82 Off		*		*	*	*	*	*	
Pattern 83 Off	*	*		*	*	*	*	*	
Pattern 84 Off			*	*	*	*	*	*	
Pattern 85 Off	*		*	*	*	*	*	*	
Pattern 86 Off		*	*	*	*	*	*	*	
Pattern 87 Off	*	*	*	*	*	*	*	*	
Pattern 88 Off									*
Pattern 89 Off	*								*
Pattern 90 Off		*							*
Pattern 91 Off	*	*							*
Pattern 92 Off			*						*
Pattern 93 Off	*		*						*
Pattern 94 Off		*	*						*
Pattern 95 Off	*	*	*						*
Pattern 96 Off				*					*

\* = channel at full, all others at minimum

*DMX Input Shows 1-24 On*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Show 1 On	*			*	*	*	*		
Show 2 On		*		*	*	*	*		
Show 3 On	*	*		*	*	*	*		
Show 4 On			*	*	*	*	*		
Show 5 On	*		*	*	*	*	*		
Show 6 On		*	*	*	*	*	*		
Show 7 On	*	*	*	*	*	*	*		
Show 8 On								*	
Show 9 On	*							*	
Show 10 On		*						*	
Show 11 On	*	*						*	
Show 12 On			*					*	
Show 13 On	*		*					*	
Show 14 On		*	*					*	
Show 15 On	*	*	*					*	
Show 16 On				*				*	
Show 17 On	*			*				*	
Show 18 On		*		*				*	
Show 19 On	*	*		*				*	
Show 20 On			*	*				*	
Show 21 On	*		*	*				*	
Show 22 On		*	*	*				*	
Show 23 On	*	*	*	*				*	
Show 24 On					*			*	

\* = channel at full, all others at minimum

*DMX Input  
Shows 1-24 Off*

	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9
Show 1 Off	*			*					*
Show 2 Off		*		*					*
Show 3 Off	*	*		*					*
Show 4 Off			*	*					*
Show 5 Off	*		*	*					*
Show 6 Off		*	*	*					*
Show 7 Off	*	*	*	*					*
Show 8 Off					*				*
Show 9 Off	*				*				*
Show 10 Off		*			*				*
Show 11 Off	*	*			*				*
Show 12 Off			*		*				*
Show 13 Off	*		*		*				*
Show 14 Off		*	*		*				*
Show 15 Off	*	*	*		*				*
Show 16 Off				*	*				*
Show 17 Off	*			*	*				*
Show 18 Off		*		*	*				*
Show 19 Off	*	*		*	*				*
Show 20 Off			*	*	*				*
Show 21 Off	*		*	*	*				*
Show 22 Off		*	*	*	*				*
Show 23 Off	*	*	*	*	*				*
Show 24 Off						*			*

\* = channel at full, all others at minimum

*Default MIDI  
Blackout*

	Command 1	Num	Value	Command 2	Num	Value
Blackout	Program	114		None		

*Default MIDI  
 Scenes 1-24  
 On*

	Command 1	Num	Value	Command 2	Num	Value
Scene 1 On	Program	64		Program	0	
Scene 2 On	Program	64		Program	1	
Scene 3 On	Program	64		Program	2	
Scene 4 On	Program	64		Program	3	
Scene 5 On	Program	64		Program	4	
Scene 6 On	Program	64		Program	5	
Scene 7 On	Program	64		Program	6	
Scene 8 On	Program	64		Program	7	
Scene 9 On	Program	64		Program	8	
Scene 10 On	Program	64		Program	9	
Scene 11 On	Program	64		Program	10	
Scene 12 On	Program	64		Program	11	
Scene 13 On	Program	64		Program	12	
Scene 14 On	Program	64		Program	13	
Scene 15 On	Program	64		Program	14	
Scene 16 On	Program	64		Program	15	
Scene 17 On	Program	64		Program	16	
Scene 18 On	Program	64		Program	17	
Scene 19 On	Program	64		Program	18	
Scene 20 On	Program	64		Program	19	
Scene 21 On	Program	64		Program	20	
Scene 22 On	Program	64		Program	21	
Scene 23 On	Program	64		Program	22	
Scene 24 On	Program	64		Program	23	

*Default MIDI  
Scenes 1-24  
Off*

	Command 1	Num	Value	Command 2	Num	Value
Scene 1 Off	Program	70		Program	0	
Scene 2 Off	Program	70		Program	1	
Scene 3 Off	Program	70		Program	2	
Scene 4 Off	Program	70		Program	3	
Scene 5 Off	Program	70		Program	4	
Scene 6 Off	Program	70		Program	5	
Scene 7 Off	Program	70		Program	6	
Scene 8 Off	Program	70		Program	7	
Scene 9 Off	Program	70		Program	8	
Scene 10 Off	Program	70		Program	9	
Scene 11 Off	Program	70		Program	10	
Scene 12 Off	Program	70		Program	11	
Scene 13 Off	Program	70		Program	12	
Scene 14 Off	Program	70		Program	13	
Scene 15 Off	Program	70		Program	14	
Scene 16 Off	Program	70		Program	15	
Scene 17 Off	Program	70		Program	16	
Scene 18 Off	Program	70		Program	17	
Scene 19 Off	Program	70		Program	18	
Scene 20 Off	Program	70		Program	19	
Scene 21 Off	Program	70		Program	20	
Scene 22 Off	Program	70		Program	21	
Scene 23 Off	Program	70		Program	22	
Scene 24 Off	Program	70		Program	23	

*Default MIDI  
 Patterns 1-24  
 On*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 1 On	Program	65		Program	0	
Pattern 2 On	Program	65		Program	1	
Pattern 3 On	Program	65		Program	2	
Pattern 4 On	Program	65		Program	3	
Pattern 5 On	Program	65		Program	4	
Pattern 6 On	Program	65		Program	5	
Pattern 7 On	Program	65		Program	6	
Pattern 8 On	Program	65		Program	7	
Pattern 9 On	Program	65		Program	8	
Pattern 10 On	Program	65		Program	9	
Pattern 11 On	Program	65		Program	10	
Pattern 12 On	Program	65		Program	11	
Pattern 13 On	Program	65		Program	12	
Pattern 14 On	Program	65		Program	13	
Pattern 15 On	Program	65		Program	14	
Pattern 16 On	Program	65		Program	15	
Pattern 17 On	Program	65		Program	16	
Pattern 18 On	Program	65		Program	17	
Pattern 19 On	Program	65		Program	18	
Pattern 20 On	Program	65		Program	19	
Pattern 21 On	Program	65		Program	20	
Pattern 22 On	Program	65		Program	21	
Pattern 23 On	Program	65		Program	22	
Pattern 24 On	Program	65		Program	23	

*Default MIDI  
Patterns 25-48  
On*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 25 On	Program	66		Program	0	
Pattern 26 On	Program	66		Program	1	
Pattern 27 On	Program	66		Program	2	
Pattern 28 On	Program	66		Program	3	
Pattern 29 On	Program	66		Program	4	
Pattern 30 On	Program	66		Program	5	
Pattern 31 On	Program	66		Program	6	
Pattern 32 On	Program	66		Program	7	
Pattern 33 On	Program	66		Program	8	
Pattern 34 On	Program	66		Program	9	
Pattern 35 On	Program	66		Program	10	
Pattern 36 On	Program	66		Program	11	
Pattern 37 On	Program	66		Program	12	
Pattern 38 On	Program	66		Program	13	
Pattern 39 On	Program	66		Program	14	
Pattern 40 On	Program	66		Program	15	
Pattern 41 On	Program	66		Program	16	
Pattern 42 On	Program	66		Program	17	
Pattern 43 On	Program	66		Program	18	
Pattern 44 On	Program	66		Program	19	
Pattern 45 On	Program	66		Program	20	
Pattern 46 On	Program	66		Program	21	
Pattern 47 On	Program	66		Program	22	
Pattern 48 On	Program	66		Program	23	

*Default MIDI  
 Patterns 49-72  
 On*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 49 On	Program	67		Program	0	
Pattern 50 On	Program	67		Program	1	
Pattern 51 On	Program	67		Program	2	
Pattern 52 On	Program	67		Program	3	
Pattern 53 On	Program	67		Program	4	
Pattern 54 On	Program	67		Program	5	
Pattern 55 On	Program	67		Program	6	
Pattern 56 On	Program	67		Program	7	
Pattern 57 On	Program	67		Program	8	
Pattern 58 On	Program	67		Program	9	
Pattern 59 On	Program	67		Program	10	
Pattern 60 On	Program	67		Program	11	
Pattern 61 On	Program	67		Program	12	
Pattern 62 On	Program	67		Program	13	
Pattern 63 On	Program	67		Program	14	
Pattern 64 On	Program	67		Program	15	
Pattern 65 On	Program	67		Program	16	
Pattern 66 On	Program	67		Program	17	
Pattern 67 On	Program	67		Program	18	
Pattern 68 On	Program	67		Program	19	
Pattern 69 On	Program	67		Program	20	
Pattern 70 On	Program	67		Program	21	
Pattern 71 On	Program	67		Program	22	
Pattern 72 On	Program	67		Program	23	

*Default MIDI  
Patterns 73-96  
On*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 73 On	Program	68		Program	0	
Pattern 74 On	Program	68		Program	1	
Pattern 75 On	Program	68		Program	2	
Pattern 76 On	Program	68		Program	3	
Pattern 77 On	Program	68		Program	4	
Pattern 78 On	Program	68		Program	5	
Pattern 79 On	Program	68		Program	6	
Pattern 80 On	Program	68		Program	7	
Pattern 81 On	Program	68		Program	8	
Pattern 82 On	Program	68		Program	9	
Pattern 83 On	Program	68		Program	10	
Pattern 84 On	Program	68		Program	11	
Pattern 85 On	Program	68		Program	12	
Pattern 86 On	Program	68		Program	13	
Pattern 87 On	Program	68		Program	14	
Pattern 88 On	Program	68		Program	15	
Pattern 89 On	Program	68		Program	16	
Pattern 90 On	Program	68		Program	17	
Pattern 91 On	Program	68		Program	18	
Pattern 92 On	Program	68		Program	19	
Pattern 93 On	Program	68		Program	20	
Pattern 94 On	Program	68		Program	21	
Pattern 95 On	Program	68		Program	22	
Pattern 96 On	Program	68		Program	23	

*Default MIDI  
 Patterns 1-24  
 Off*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 1 Off	Program	71		Program	0	
Pattern 2 Off	Program	71		Program	1	
Pattern 3 Off	Program	71		Program	2	
Pattern 4 Off	Program	71		Program	3	
Pattern 5 Off	Program	71		Program	4	
Pattern 6 Off	Program	71		Program	5	
Pattern 7 Off	Program	71		Program	6	
Pattern 8 Off	Program	71		Program	7	
Pattern 9 Off	Program	71		Program	8	
Pattern 10 Off	Program	71		Program	9	
Pattern 11 Off	Program	71		Program	10	
Pattern 12 Off	Program	71		Program	11	
Pattern 13 Off	Program	71		Program	12	
Pattern 14 Off	Program	71		Program	13	
Pattern 15 Off	Program	71		Program	14	
Pattern 16 Off	Program	71		Program	15	
Pattern 17 Off	Program	71		Program	16	
Pattern 18 Off	Program	71		Program	17	
Pattern 19 Off	Program	71		Program	18	
Pattern 20 Off	Program	71		Program	19	
Pattern 21 Off	Program	71		Program	20	
Pattern 22 Off	Program	71		Program	21	
Pattern 23 Off	Program	71		Program	22	
Pattern 24 Off	Program	71		Program	23	

*Default MIDI  
Patterns 25-48  
Off*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 25 Off	Program	72		Program	0	
Pattern 26 Off	Program	72		Program	1	
Pattern 27 Off	Program	72		Program	2	
Pattern 28 Off	Program	72		Program	3	
Pattern 29 Off	Program	72		Program	4	
Pattern 30 Off	Program	72		Program	5	
Pattern 31 Off	Program	72		Program	6	
Pattern 32 Off	Program	72		Program	7	
Pattern 33 Off	Program	72		Program	8	
Pattern 34 Off	Program	72		Program	9	
Pattern 35 Off	Program	72		Program	10	
Pattern 36 Off	Program	72		Program	11	
Pattern 37 Off	Program	72		Program	12	
Pattern 38 Off	Program	72		Program	13	
Pattern 39 Off	Program	72		Program	14	
Pattern 40 Off	Program	72		Program	15	
Pattern 41 Off	Program	72		Program	16	
Pattern 42 Off	Program	72		Program	17	
Pattern 43 Off	Program	72		Program	18	
Pattern 44 Off	Program	72		Program	19	
Pattern 45 Off	Program	72		Program	20	
Pattern 46 Off	Program	72		Program	21	
Pattern 47 Off	Program	72		Program	22	
Pattern 48 Off	Program	72		Program	23	

*Default MIDI  
 Patterns 49-72  
 Off*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 49 Off	Program	73		Program	0	
Pattern 50 Off	Program	73		Program	1	
Pattern 51 Off	Program	73		Program	2	
Pattern 52 Off	Program	73		Program	3	
Pattern 53 Off	Program	73		Program	4	
Pattern 54 Off	Program	73		Program	5	
Pattern 55 Off	Program	73		Program	6	
Pattern 56 Off	Program	73		Program	7	
Pattern 57 Off	Program	73		Program	8	
Pattern 58 Off	Program	73		Program	9	
Pattern 59 Off	Program	73		Program	10	
Pattern 60 Off	Program	73		Program	11	
Pattern 61 Off	Program	73		Program	12	
Pattern 62 Off	Program	73		Program	13	
Pattern 63 Off	Program	73		Program	14	
Pattern 64 Off	Program	73		Program	15	
Pattern 65 Off	Program	73		Program	16	
Pattern 66 Off	Program	73		Program	17	
Pattern 67 Off	Program	73		Program	18	
Pattern 68 Off	Program	73		Program	19	
Pattern 69 Off	Program	73		Program	20	
Pattern 70 Off	Program	73		Program	21	
Pattern 71 Off	Program	73		Program	22	
Pattern 72 Off	Program	73		Program	23	

*Default MIDI  
Patterns 73-96  
Off*

	Command 1	Num	Value	Command 2	Num	Value
Pattern 73 Off	Program	74		Program	0	
Pattern 74 Off	Program	74		Program	1	
Pattern 75 Off	Program	74		Program	2	
Pattern 76 Off	Program	74		Program	3	
Pattern 77 Off	Program	74		Program	4	
Pattern 78 Off	Program	74		Program	5	
Pattern 79 Off	Program	74		Program	6	
Pattern 80 Off	Program	74		Program	7	
Pattern 81 Off	Program	74		Program	8	
Pattern 82 Off	Program	74		Program	9	
Pattern 83 Off	Program	74		Program	10	
Pattern 84 Off	Program	74		Program	11	
Pattern 85 Off	Program	74		Program	12	
Pattern 86 Off	Program	74		Program	13	
Pattern 87 Off	Program	74		Program	14	
Pattern 88 Off	Program	74		Program	15	
Pattern 89 Off	Program	74		Program	16	
Pattern 90 Off	Program	74		Program	17	
Pattern 91 Off	Program	74		Program	18	
Pattern 92 Off	Program	74		Program	19	
Pattern 93 Off	Program	74		Program	20	
Pattern 94 Off	Program	74		Program	21	
Pattern 95 Off	Program	74		Program	22	
Pattern 96 Off	Program	74		Program	23	

*Default MIDI Shows 1-24 On*

	Command 1	Num	Value	Command 2	Num	Value
Show 1 On	Program	69		Program	0	
Show 2 On	Program	69		Program	1	
Show 3 On	Program	69		Program	2	
Show 4 On	Program	69		Program	3	
Show 5 On	Program	69		Program	4	
Show 6 On	Program	69		Program	5	
Show 7 On	Program	69		Program	6	
Show 8 On	Program	69		Program	7	
Show 9 On	Program	69		Program	8	
Show 10 On	Program	69		Program	9	
Show 11 On	Program	69		Program	10	
Show 12 On	Program	69		Program	11	
Show 13 On	Program	69		Program	12	
Show 14 On	Program	69		Program	13	
Show 15 On	Program	69		Program	14	
Show 16 On	Program	69		Program	15	
Show 17 On	Program	69		Program	16	
Show 18 On	Program	69		Program	17	
Show 19 On	Program	69		Program	18	
Show 20 On	Program	69		Program	19	
Show 21 On	Program	69		Program	20	
Show 22 On	Program	69		Program	21	
Show 23 On	Program	69		Program	22	
Show 24 On	Program	69		Program	23	

*Default MIDI Shows 1-24 Off*

	Command 1	Num	Value	Command 2	Num	Value
Show 1 Off	Program	75		Program	0	
Show 2 Off	Program	75		Program	1	
Show 3 Off	Program	75		Program	2	
Show 4 Off	Program	75		Program	3	
Show 5 Off	Program	75		Program	4	
Show 6 Off	Program	75		Program	5	
Show 7 Off	Program	75		Program	6	
Show 8 Off	Program	75		Program	7	
Show 9 Off	Program	75		Program	8	
Show 10 Off	Program	75		Program	9	
Show 11 Off	Program	75		Program	10	
Show 12 Off	Program	75		Program	11	
Show 13 Off	Program	75		Program	12	
Show 14 Off	Program	75		Program	13	
Show 15 Off	Program	75		Program	14	
Show 16 Off	Program	75		Program	15	
Show 17 Off	Program	75		Program	16	
Show 18 Off	Program	75		Program	17	
Show 19 Off	Program	75		Program	18	
Show 20 Off	Program	75		Program	19	
Show 21 Off	Program	75		Program	20	
Show 22 Off	Program	75		Program	21	
Show 23 Off	Program	75		Program	22	
Show 24 Off	Program	75		Program	23	

*Pattern  
 Number  
 Conversion*

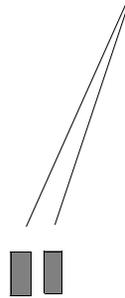
Pattern	Page	PlayBack									
1	1	1	25	2	1	49	3	1	73	4	1
2	1	2	26	2	2	50	3	2	74	4	2
3	1	3	27	2	3	51	3	3	75	4	3
4	1	4	28	2	4	52	3	4	76	4	4
5	1	5	29	2	5	53	3	5	77	4	5
6	1	6	30	2	6	54	3	6	78	4	6
7	1	7	31	2	7	55	3	7	79	4	7
8	1	8	32	2	8	56	3	8	80	4	8
9	1	9	33	2	9	57	3	9	81	4	9
10	1	10	34	2	10	58	3	10	82	4	10
11	1	11	35	2	11	59	3	11	83	4	11
12	1	12	36	2	12	60	3	12	84	4	12
13	1	13	37	2	13	61	3	13	85	4	13
14	1	14	38	2	14	62	3	14	86	4	14
15	1	15	39	2	15	63	3	15	87	4	15
16	1	16	40	2	16	64	3	16	88	4	16
17	1	17	41	2	17	65	3	17	89	4	17
18	1	18	42	2	18	66	3	18	90	4	18
19	1	19	43	2	19	67	3	19	91	4	19
20	1	20	44	2	20	68	3	20	92	4	20
21	1	21	45	2	21	69	3	21	93	4	21
22	1	22	46	2	22	70	3	22	94	4	22
23	1	23	47	2	23	71	3	23	95	4	23
24	1	24	48	2	24	72	3	24	96	4	24



# 10

## 3 Pin XLR Pin Reversal

Pins 2 and 3 of the 3 pin XLR can be swapped internally on the main processing board. This can be useful if the device being controlled uses this configuration. Make sure to move both pin jumpers.



# 11 Specifications

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## *Console Specifications*

Control Channels	512
Maximum fixtures	16
Memory Scenes	24
Patterns	96 - 800 steps total
Shows	24 - 24 steps each
Memory	Non-volatile FEPRM (at least 10 year retention)
Dimmer Output	DMX 512
Dimmer Input	DMX 512
MIDI	In/Out/Thru
Disk Drive	3 1/2" MSDOS compatible 1.44 MByte HD only
Input Power	85 - 135 Volts AC 185 - 250 Volts AC 50 - 60 Hz
Input Power Fuses	250VAC, 800MA
Approx. Dimensions (HxWxD)	4" x 24" x 15"
Weight (lbs)	12

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## Warranty

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*NSI  
Corporation  
Limited  
Warranty*

NSI Corporation warrants new electronics products to be free from defective materials and workmanship for a period of one (1) year from the date of purchase to the original owner when purchased from an authorized NSI dealer.

The purchaser is responsible for completing and mailing to NSI, within 15 days of purchase, the warranty registration card enclosed with each product. NSI products that have been subject to accident, alteration, abuse, or defacing of the serial number are not covered by this warranty. The normal wear and tear of items such as knobs, jacks, and switches are not covered under this warranty.

If your NSI product requires service during the warranty period, NSI will repair or replace, at its option, defective materials provided you have identified yourself as the original owner of the product to NSI or any authorized NSI dealer. Transportation charges to and from an authorized dealer or the NSI factory for repair shall be the responsibility of the owner. All products returned to NSI must have factory authorization for return prior to shipping.

NSI Corporation is not liable for any incidental or consequential damages resulting from defect or failure other than repairs of the NSI product subject to the terms of this warranty. This warranty gives you specific legal rights, and you may have other rights which vary from state to state. This warranty is expressly in lieu of all other agreements and warranties expressed or implied except as may be otherwise required by law.