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## NEBULA QUICK OPERATION

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Press the Back key to reach the top menu—the LCD shows “**Theatrelight NZ**”. Softkeys are shown in italics eg: “**setup**”.

### SETTING DMX START ADDRESS AND LOCKING THE KEYS

If the Nebula is set to DMX Start mode, the current Start channel shows on the top menu page. To change the start address:

1. From the top menu, press **Menu** three times to arrive at the DMX Start Address menu.
2. Press **Up**5 or **Down**6 to adjust the DMX address. Press **Left**3 or **Right**4 to adjust tens and hundreds.
3. Press **Back** to return to the top menu: the screen shows “Changes saved to flash memory”.
4. To lock the keypad, hold3 +4 +5 for 2 seconds. To unlock the keypad, hold3 +4 +6 for 8 seconds.

### SETTING DMX FAIL MODE

To set the DMX Fail Mode to either “Fade to Black” or “Hold DMX levels” :

1. While in the DMX Start Address Menu above, press “*fail*” (**Menu**) to enter the DMX Fail mode menu.
2. Use the arrow keys 5 / 6 to select the mode, then press “*on*” (4 ) to set the mode On.
3. Press “*times*” (**Menu**) to enter the DMX Fade Delay/Time menu: use the arrow keys to edit the times.
4. Press **Back** to return to the top menu: the screen shows “Changes saved to flash memory”.

### SETTING DIMMER PARAMETERS

To set Test, Min, Max, Non-Dim, Off levels, Curve, Proportional levels, or Softstart time for each dimmer:

1. From the top menu, press **Menu** twice, select “**Dimmer Settings**”, press “*setup*” (**Menu**).
2. Use the arrow keys to select the parameter to adjust, then press “*setup*” (**Menu**).
3. Use the arrow keys to select the dimmer and adjust parameters, with softkeys “*flash*” and “*all*”.
4. Press **Back** to return to the top menu: the screen shows “Changes saved to flash memory”.

### RESETTING NEBULA PARAMETERS

To reset Nebula parameters:

1. From the top menu, press **Menu** twice, select “**Dimmer Settings**”, press “*setup*” (**Menu**).
2. Use the arrow keys to select “**Reset Commands**” (line 9), press “*setup*” (**Menu**).
3. Use the arrow keys to select the reset mode required, press “*select*” (**Menu**), press “**OK**” (**Menu**).
4. After reset is complete, the top menu is restored.

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## NEBULA INTRODUCTION

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The Theatrelight Nebula is a general purpose 19 inch rack-mounting dimmer pack for use in TV Studios, Theatres, Concert halls, or any venue requiring an intelligent and reliable dimmer installation. The Nebula design supersedes the original Theatrelight Digital Dimmer. The new design uses the latest microprocessor and components chosen for reliability and long MTBF (Mean Time Before Failure). The isolated DMX input presents only 1/10th standard loading, reducing the possibility of DMX errors. Additionally, zero-crossover noise filters ensure correct triggering and immunity to mains interference even in the most adverse environment. The wide input voltage and frequency range afforded by Theatrelight's in-house designed switch-mode power supply allows the Nebula to work on any voltage from 90 volts AC to 265 Volts AC, and on any frequency from 45 to 65 Hertz, making it suitable for use in any country. The Nebula is also fitted with an RS485 communication system for use with other Nebulas, with remote keyplate lighting controllers, or as a control, reporting, and monitoring gateway. The Nebula is available in a number of versions: 12, 6, and 3 channel models, using SCR, IGBT, or Sinewave dimming methods. A number of different mains input and output terminations are available, and special socket versions can be made to customer order.

The Nebula software is available in a number of different software configurations according to application. A similar control system and software is also used in the following Theatrelight products: **Meteor-** a wall mounting Stage or Environmental dimmer, and **Quasar-** a 2u high rack-mounting Environmental dimmer pack for smaller installations.

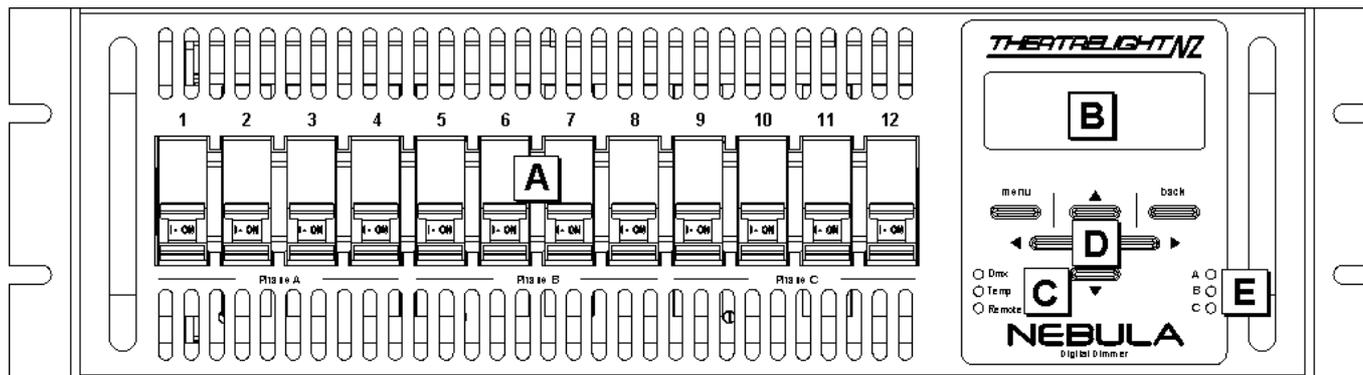
### NEBULA FEATURES

- § Simple and easy to use menu system with large 4 line, 20 character auto dimming LCD display
- § Each dimmer channel may be patched to any DMX address (including all on the same DMX address)
- § Individual Minimum, Maximum, Off, Proportional, and Test level per dimmer
- § Individual Soft-start Time and Dimmer Curve (including Non-Dim) setting per dimmer.
- § All dimmer parameters held in non-volatile flash memory
- § Temperature controlled, variable speed cooling fan for low acoustic noise and long life
- § Protection by Thermal/Magnetic circuit breakers
- § High immunity to mains interference and low DMX signal
- § Isolated, floating DMX input, 1/10th standard RS-485 load
- § Isolated, floating RS-485 control for reporting and building control applications, 1/10th standard RS-485 load

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**FRONT PANEL LEGEND**


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- A:** Thermal/Magnetic Circuit Breakers (MCBs) protect each dimmer in the event of a lamp failure or load short circuit.
- B:** 4 row x 20 character Blue LCD display with white LED backlight, with large clear characters for easy readability.
- C:** The DMX LED shows the presence of DMX signal, and any errors. The TEMP LED shows the internal temperature, while the Remote LED indicates the remote keypads are active (with appropriate software).
- D:** Simple keyboard and easy to understand menu system allow quick setup of all Nebula functions and parameters.
- E:** A B C LEDs indicate presence of mains power on each phase

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## NEBULA OVERVIEW

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The following description provides an overview of the capabilities of the Nebula.

### **LCD DISPLAY**

The 4 line, 20 character per line Blue LCD display has white LED backlighting, giving excellent contrast and readability under all lighting conditions. The brightness of the display goes to full at the first key press, and reduces after 10 minutes

### **KEYS**

The Nebula is operated by a small keypad of 6 keys. The key operation is designed to be simple and to allow the operator fast and easy access to all dimmer functions. The Menu key steps down through the menu tree, while the Back key steps back. The keys Up $\uparrow$ , Down $\downarrow$ , Left $\leftarrow$ , and Right $\rightarrow$  are used for navigation, and to adjust values. In most menus the function of the key is indicated in the bottom line of the LCD (“softkey”), making for easy understanding. If a value is changed (such as the DMX Start Address), the new value will be saved automatically to flash memory after a timeout period of 10 minutes. Alternatively the new value can be saved immediately by pressing the Back key to return to the top menu. The keys may also be locked to prevent unauthorised operation.

### **LEDS**

Front panel LEDs are provided for display of DMX signal, over-temperature indication, remote key operation, and proper mains presence on Phases A B and C. All LEDs are initially turned on at power up, before assuming their correct status.

#### **DMX LED**

The Green DMX LED is on continually On if DMX is enabled and the DMX signal is good. The LED flashes regularly if DMX is enabled but the DMX signal is disconnected. The DMX LED switches off or flashes irregularly if the DMX signal has errors, or if the DMX signal is wrongly phased. Disabling DMX sets the DMX LED off regardless of the state of the DMX signal.

#### **Remote LED**

The Amber Remote LED indicates that the Remote control keypads (available in Stage or Environ software models) are activated.

#### **Phase A B C LEDs**

Green LEDs A B C indicate presence of mains power on each phase.

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### **Temperature LED**

The Red temperature LED is normally off. In the event that the internal temperature of the Nebula reaches 50 degrees Centigrade, the LED starts blinking. The LED turns on fully when the temperature reaches 60 degrees. If the internal temperature reaches 70 degrees the Nebula forces a fade out over 7 seconds of all dimmer levels. The levels are faded in again over 7 seconds when the temperature drops below 70 degrees.

### **COOLING**

The Nebula is cooled by a long life, low voltage, speed controlled fan. Fan speed is proportional to temperature—the fan starts at half speed at 35 degrees Centigrade and increases to full speed at 45 degrees. The fan remains on for 10 minutes after load current has dropped to zero to prevent heat buildup in the case.

Air is blown into the Nebula case from the left side, and the warmed air exhausted through slots in the front panel. This arrangement allows the operator to provide a cooled and filtered air supply under pressure into a rack cabinet so as to minimise the build-up of dust in the dimmer electronics. Nebula dimmers should be mounted in a position where acoustic noise generated by the packs cannot interfere with a performance.

### **POWER SUPPLY**

The Nebula is designed to be supplied with power mains of 90 to 265 volts AC, 1, 2 or 3 phase and Neutral, 45 to 65 Hz. Do not use the Nebula on a 3 Phase Delta connection (ie with no Neutral wire). Each Nebula must be properly earthed.

### **DMX CONTROL**

DMX-512 control is commonly used in Theatre and TV for lighting control. One DMX line or “Universe” addresses a maximum of 512 dimmers. Each Nebula may be set to either DMX Start Mode or DMX Patch mode:

#### **DMX Start Mode**

In DMX Start mode, the DMX Start Number for the pack may be set to any number between 1 and 4096. The start number means the DMX address which Dimmer 1 responds to. DMX addresses of the following dimmers are then set automatically: the address of Dimmer 2 is set to the DMX Start number plus 1, and so on. The DMX address number may be chosen to be any number between 1 and 4096 to ease the task of calculating dimmer numbers in multiple DMX universe systems—the Nebula automatically subtracts multiples of 512 from any number 513 and up.

#### **DMX Patch Mode**

In DMX Patch mode, every dimmer in the pack may be set to its own DMX address. Using this built in patch system allows great flexibility in matching dimmers to loads—if a large number of loads are required to be controlled together, any number of dimmers (including all dimmers in the pack) can be controlled by a single DMX channel. As with DMX Start Mode above, The

DMX address number may be chosen to be any number between 1 and 4096 to ease the task of calculating dimmer numbers in multiple DMX universe systems.

### **DMX Disable**

DMX Start or Patch modes may be switched on or off. If both are off the Nebula then ignores all DMX control levels.

### **DMX Fail Modes**

The Nebula provides two options in case the DMX signal fails, or the DMX signal is turned off, as for example when the control panel is turned off at the end of a show. The options are

**Fade to blackout-** after a delay time, the dimmer levels are faded to blackout. Both the delay time and the fade time are programmable from Instant to 30 minutes.

**Hold last DMX levels-** the last valid DMX levels are held until the next valid DMX input, or the pack is switched off

**Fade to Preset-** after a delay time, the dimmer levels are faded to the designated Preset.

### **REMOTE CONTROL**

The dimmers of the Nebula may also be controlled by RS-485 signal when fitted with the appropriate software. In this case the Remote LED indicates that the Nebula is set to respond to remote control from wall-plates or computer.

### **DIMMER PARAMETERS**

The dimmer channels in the Nebula have a number of parameters which may be set individually for each dimmer. As incorrect setting of these parameters can prevent the Nebula from working as expected, care must be taken when setting them up.

### **Test and Set Dimmer levels**

Normally each dimmer receives control from the DMX line or RS-485 control where fitted. However the Test/Set options allow each dimmer to be set to a level which overrides the input from these sources. This override level can be set to any level between Off and Full. An "All" function allows all Test/Set levels to be faded up or down at the same time. Each dimmer can also be flashed instantly to Full for identification. The "All" function may also be used with Flash, allowing all dimmers to be flashed to Full at the same time.

The Test functions are of use during set-up to help check lamps or wiring problems without the use of a control panel. The Set function is also useful where lights such as orchestra or working lights must be left on permanently.

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### Minimum and Maximum Dimmer levels

Each dimmer may be set to its own minimum level, and its own maximum level. The "All" function allows all minimum or all maximum levels to be set at the same time.

The minimum setting can be used to keep lamp filaments warm for fast response time, or for example to maintain lighting at a minimum level of illumination, a requirement often needed by orchestra lighting and working lights.

The maximum setting can be used for example to prolong lamp life, which is very sensitive to over-voltage conditions. For this reason, the maximum setting has higher priority than the minimum setting.

As both Minimum and Maximum levels may be set to anywhere from Off to Full, care needs to be taken in setting these levels.

### Dimmer curves

Each dimmer in the Nebula may be set to a number of dimmer curves. Curves fitted as standard are:

**Incandescent:** The Incandescent dimmer curve is suitable for most Theatre and TV applications using incandescent bulbs whether normal tungsten or tungsten halogen type. The curve is specially tailored to provide linear apparent light under these conditions.

**Non-Dim:** The Non-Dim curve selection is for use with loads which must be switched on and off, such as motors, smoke machines, and other effects. Each dimmer using the Non-Dim curve switches on at a user programmable Non-Dim level (see below): any control level at this level or above will switch the dimmer to Full instantly. Once On, the dimmer will stay on until the control level goes 5% below the Non-Dim level. An "All" function allows all Non-Dim switch levels to be set at the same time. The Non-Dim facility may be combined with the Minimum and Maximum settings to switch the dimmer output between any two selected output voltages.

**Television:** A modified Incandescent dimmer curve suitable for adjusting the colour temperature of incandescent bulbs in TV or Film studios. This curve is not intended to be used as a linear dimming curve.

**Fluorescent:** This curve is suited to dimming mains ballasted fluorescent lamps fitted with filament transformers and pulse ballasts. The flicker apparent at low dim levels can be controlled by setting the Off level (see below).

**Neon:** This curve is suited to dimming neon discharge tubes fitted with pulse ballasts. The flicker apparent at low dim levels can be controlled by setting the Off level (see below).

**Linear Power:** This dimmer curve outputs linear RMS power against DMX level for use when the Nebula is used to control heating elements in ovens etc.

**Linear Phase Angle:** This dimmer curve outputs linear phase angle against DMX level.

The "All" function allows all dimmer curves to be set at the same time. Each dimmer can also be flashed instantly to Full for identification. Other curves, or custom dimmer curves may be included by arrangement with Theatrelight.

### **Non-Dim levels**

When the dimmer curve is set to Non-Dim as described above, the Non-Dim switching level may be programmed individually for each dimmer between the levels of 10 and 90%. The "All" function allows all levels to be set at the same time.

### **Off levels**

For all dimmer curves, the Off Level may be programmed individually for each dimmer. If the control level is below this level, the dimmer is off; above this level the dimmer follows the normal selected dimmer curve. The "All" function allows all levels to be set at the same time. The Off Level is of most use in controlling unwanted flicker of Fluorescent and Neon tubes at low levels.

### **Proportional Dimmer levels**

Each dimmer may be set to its own proportional level. The "All" function allows all levels to be set at the same time.

The proportional level acts as a master over the incoming dimmer control level. For example if the proportional level is set at 50%, the dimmer level will always be at half of the fader setting on the control panel. The proportion level setting may be used to balance light output of luminaires set to the same DMX address, which is useful in balancing cyclorama floodlights. The setting may also be used to proportionally control the maximum output from the dimmer for example where 110 volt Par cans are used on a 220-240 volt mains supply.

The proportional setting has a higher priority than the maximum setting. As the Proportional level may be set anywhere from Full to Zero, care needs to be taken in setting the level.

### **Softstart Fade Times**

Each dimmer may be set to its own softstart fade time. The "All" function allows all softstart times to be set at the same time. A softstart fade up limits the inrush current into cold tungsten filament bulbs. This initial current may be as much as 12 times the normal working current of the filament: limiting this current greatly prolongs lamp life.

The softstart time for each dimmer can be set from 0 to 1 second in 100 millisecond steps. A shorter time gives a faster response; a longer time gives longer lamp life. For most stage lighting requirements, a time of 200 to 400 milliseconds (0.2 to 0.4 seconds) is suitable. Longer times (up to 1 second) should be applied to larger size bulbs as used in film and TV studios to prolong lamp life. The softstart time is applied after processing of Non-Dim switch levels. This allows limiting high starting currents during start-up of cap-start motors or other capacitive loads. If this facility is not required, then Non-Dim channels should have their softstart times set to zero. Note that an initial softstart time of 2 seconds is applied to all channels after the Nebula is powered on (excepting Non-Dim channels).

### **DIMMER SETTINGS PRIORITY**

The dimmer settings described above are processed in a fixed priority. Levels are processed and passed to the dimmers in the following order of increasing priority:

**1/** The DMX control level (or the Fail DMX control level) and the Scenes or Preset levels (if fitted) for that dimmer are mixed on an HTP (Highest Takes Precedence) basis.

**2/** If the Test/Set level for the dimmer is set between Off and Full (or flashed), the Test/Set level replaces the dimmer level. If no Test level is set for that dimmer, no change is made. All Test/Set levels are disabled by the Reset command.

**3/** If the control level is below the Off Level set for that dimmer, the control level is set zero. If the control level is above the Off Level, no change is made. All Off Levels are set zero by the Reset command.

**4/** If the dimmer curve is set to Non-Dim, the control level will be switched to Full if over the Non-Dim level, and switched off if under. The Non-Dim level may be set anywhere between 10% and 90%. All Non-Dim levels are set zero by the Reset command.

**5/** If the Minimum setting for the dimmer is set above 0%, the dimmer level cannot be lower than that level. If the Minimum setting is 0% for that dimmer, no change is made to the level. All Minimum levels are set zero by the Reset command.

**6/** If the Maximum setting for the dimmer is set below 100%, the dimmer level cannot be higher than that level. If the Maximum setting is Full for that dimmer, no change is made. Giving Minimum and Maximum a higher priority than Non-Dim permits switching between any two voltages to suit the application. All Maximum levels are set Full by the Reset command.

Note that the normal Incandescent curve is used to define any Minimum or Maximum voltage limits imposed on dimmers selected to Non-Dim.

**7/** If the Proportional Level for the dimmer is set lower than 100%, the control level for that dimmer is multiplied by the Proportional level. If the Proportional Level for the dimmer is set to 100% (F), no change is made. All Proportional levels are set to 100% (F) by the Reset command.

**8/** Finally, the fade up rate of the resulting level is limited by the Softstart Time programmed for the dimmer channel. If the Softstart time is set to zero for that dimmer, no change is made to the fade up rate. The Softstart time applies only to the Up fade rate—it does not affect the Down fade rate of the control level applied to any dimmer. All Softstart times are set to 300msec by the Reset command.

**9/** The phase On time for each dimmer is then calculated from the final dimmer level according to the Dimmer Curve programmed for that dimmer. All dimmer curves are set to Incandescent by the Reset command.

## **LEVELS DISPLAY**

The LCD screen may be set to read out a number of operating conditions.

### **Input DMX levels**

The LCD screen displays the latest input DMX levels before modification by any Test, Minimum or Maximum settings etc.

### **Final Dimmer levels**

The LCD screen displays the final control level applied to the chosen dimmer curve for each dimmer. This level shows the level modified by the following settings: Test, Min, Max, Non-Dim, Off, Proportional, and Softstart.

### **Temperature history**

The LCD screen displays the following six readouts taken from a sensor in the exit air flow: the current temperature, the temperature 30 minutes ago, one hour ago, and two hours ago, the maximum temperature reached over the previous two hours, and the average temperature over the previous two hours. The timing is started from initial power on. Temperatures are in degrees Centigrade.

### **Voltage and Frequency**

The LCD screen displays the RMS voltage on Phases A, B, and C, and the frequency in Hertz of each phase. Voltages are shown to the nearest volt, and frequency to the nearest 0.1 Hz. Each phase voltage may be individually calibrated against a known accurate RMS voltmeter. Calibration levels are held in Flash memory, and not affected by any reset command.

### **Fan Status**

When set to this mode the LCD screen displays the Cooling Fan level This display also has a fan test-at-full function, and also shows the current temperature in degrees Centigrade.

### **Presets Playback levels**

When set to this mode the LCD screen displays the playback levels from Presets.

### **Fan Status**

When set to this mode the LCD screen displays the latest commands over the Remote RS-485 line. The first 21 values are displayed in hexadecimal format. This display is of use in setting up wallplates and installing remote computer control of Nebula dimmers.

## **RESETTING NEBULA DEFAULT PARAMETERS**

All Nebula parameters may be reset to default values. These default values are described in the next section.

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**NEBULA PARAMETERS**


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The range and values after Reset of the different parameters of the Nebula are described below. All parameters are held in permanent flash memory.

<b>DMX START SETTINGS</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
DMX Start Mode	On/Off, 1-4096	On, 1	Addresses over 512 have n*512 subtracted
<b>DMX PATCH SETTINGS</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
DMX Patch Mode	On/Off, 1-4096	Off, 1, 2, 3...	Addresses over 512 have n*512 subtracted
<b>DMX FAIL MODES</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
Fade to Black	On/Off	Off	
Fade to Black delay/fade times	Instant-30 minutes	5 mins/30 secs	
Hold Last Levels	On/Off	On	
Fade to Preset	On/Off, Preset 1-64	Off/Preset 64	
<b>DIMMER SETTINGS</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
Test/Set Levels	Disabled, 0-100%	Disabled	
Minimum Levels	0-100%	0%	
Maximum Levels	0-100%	100%	
Non-Dim levels	10-90%	50%	Hysteresis = +0%, -5%
Off levels	0-90%	0%	Hysteresis = +0%, -1%
Dimmer curve	In,ND,TV,FI,Ne,LP,LA	In	In = Incandescent, ND = Non-Dim
TV =TV/Film colour temp control, FI, Ne = Fluo/Neon discharge tubes, LP/LA = Linear Power/Linear Phase Angle			
Proportional Levels	0-100%	100%	
Soft Start Times	0-1.0 second	300 msec	Up time only (Down time always instant)
<b>KEY LOCK</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
Key Lock	On/Off	Off	Only accessible in Menu Level 0

<b>PRESETS SETTINGS</b>	<b>Range</b>	<b>After Reset</b>	<b>Notes</b>
Local Presets	On/Off	Off	
Remote Presets	On/Off	Off	
Dimmer Area ID	1-16	1	Sets area match per dimmer
Dimmer labels	8 alpha-numeric digits	Light 1-12	Includes U/case, L/case, and symbols
Area labels	8 alpha-numeric digits	Room 1-16	Includes U/case, L/case, and symbols
Pack Sector ID	A-P (16 sectors)	A	Sets sector match per pack
Report ID	1-250	1	For use with report software
Presets number range	1-64	Preset 1	
Presets labels	8 alpha-numeric digits	Mood 1-64	Includes U/case, L/case, and symbols
Presets dimmer levels	0-100%	0%	With "All" up/dn cmd, and store DMX cmd
Presets Up fade times	Instant to 60 minutes	10 seconds	With Up>Dn time command
Presets Down fade times	Instant to 60 minutes	10 seconds	Down starts after Delay completes
Presets Delay times	Instant to 60 minutes	1 second	Delays start of Down fade

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## **DIMMER INSTALLATION**

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The Nebula like all SCR dimmer packs is an inherent generator of EMI (electro-magnetic Interference) and requires careful installation following good wiring and earthing practice. The potential for power problems with a dimmer installation increases with the number of dimmers. Involving professional assistance with proven experience is highly recommended, as correcting problems later can be very expensive. The following points should be considered in order to achieve reliable operation, and to ensure minimum interference to other equipment such as audio and video equipment in Theatres and TV Studios:

### **SUPPLY TRANSFORMER**

1. **Locate the dimmers and the supply transformer as close together as possible.**
2. **Ensure the transformer is of the correct type and rating for the non-linear load of the dimmers you are installing.**
3. **On larger installations consider using a dedicated transformer for the dimmer installation.**

### **DIMMER SUPPLY CABLING**

1. **Keep the supply cabling between the transformer, switchboard and dimmers as short as possible.**
2. **Minimum inductance in the supply cabling is critical. Keep all phase and neutral cables tightly bunched together. On smaller installations use of neutral screen or composite cables is recommended. On larger installations ensure that all phase cables are bound close to the neutral cable(s). Avoid solid buss-bar riser systems.**
3. **Use of a neutral conductor that is at least 1.5 times the area of any phase conductor is recommended. This becomes more important in larger installations.**

### **DIMMER LOAD CABLING**

1. **Install the dimmers as close to the lighting loads as possible.**
2. **Do not use common neutrals. Each dimmer must have its own phase and neutral conductor, preferably a twisted pair.**
3. **The phase and neutral for each dimmer must be grouped together or be adjacent cores in a composite cable.**
4. **Dimmer load cables are a source of EMI interference. Keep dimmer load cables clear of all other power and data cables. Run dimmer cables in earthed metal conduit or trunking if EMI interference may be an issue.**
5. **Ensure all equipment and exposed metal is correctly earthed.**

## **DMX-512 INSTALLATION**

As the DMX512 communication system has no built error checking, the DMX512 wiring installation must follow proper practice to achieve reliable operation. The following points (but not limited to) need to be considered for any DMX512 installation.

1. **Always use a good quality shielded twisted pair cable suitable for the DMX512/RS485 communications standard ANSI E1.11-2004.**
2. **Although a DMX512 data link only requires one twisted pair plus the shield, it is recommended that DMX512 cables be two twisted pairs and shield and that all five pins of the XLR connector be wired.**
3. **Ensure the correct 5 pin XLR connectors are used and that they are wired correctly.**
4. **Never allow the shield to be connected to earth, XLR metal body or any other metal object except when done by a manufacturer within a DMX512 device.**
5. **Never disconnect the shield at one or both ends of a DMX512 cable.**
6. **DMX512 wiring must be a daisy chain, starting at the control console and looping from device to device. The signal must not have any splits or T connections, except when using an electronic splitter.**
7. **The last device in the line should be terminated with a 120 ohm resistor.**
8. **In permanent installations keep DMX512 cabling at least 600mm away from power and dimmer load cables.**
9. **Preferably run the DMX512 cabling in earthed metal conduit or trunking.**
10. **Whilst the DMX512/RS485 standard allows for up to 32 devices on a line, keep the number well below this to ensure reliability.**
11. **The use of electronic DMX512 splitters is recommended. These allow the signal to split into several legs, making cabling simpler and ensuring that failure of one device or cable does not fail the whole system.**

DMX512 splitters re-shape and buffer the received DMX. Isolated splitters also help to prevent issues caused by earth loops and heavy loading. Electronic splitters may be cascaded. Theatrelight DMX Splitters are available as an 8 channel 19 inch, 1 U rack mounting configuration, or as a 4 channel stand-alone portable version

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## NEBULA DIMMER OPERATION

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The examples below assume a start from the top menu level—pressing the Back key several times always goes to top menu: the screen shows “**Theatrelight NZ**”, together with the model, number of channels, the software version, and the current DMX Start number. If the keys are locked, the LCD will show “Keys Locked”.

### UNLOCKING THE KEYS

The keys may be unlocked as follows:

1. **To unlock the keypad, hold  $\text{3} + \text{4} + \text{6}$  until the message “Keys Locked” disappears (about 8 seconds).**
2. **Release all keys: the screen shows “Changes saved to flash memory”.**

### LOCKING THE KEYS

After changing any settings, you can disable the keys to prevent unauthorised changes as follows.

1. **Press the Back key several times to reach the top menu. This also saves the latest changes.**
2. **To lock the keypad, hold  $\text{3} + \text{4} + \text{5}$  until the message “Keys Locked” appears (about 2 seconds).**
3. **Release all keys: the screen shows “Changes saved to flash memory”.**

### SETTING DMX START OR PATCH MODE

The current DMX mode (Start Mode or Patch Mode) is shown on the top menu. To set DMX Start Mode :

1. **From the top menu, press Menu twice.**
2. **Press Up  $\text{5}$  or Down  $\text{6}$  to select Start or Patch mode, then press “on” (Right  $\text{4}$  ) to set the mode On.**

### SETTING DMX START OR PATCH ADDRESSES

To change the DMX address/s (the DMX mode must be selected “On” to edit the address):

1. **While in the menu above press “setup” (Menu).**
2. **In Start Mode, press Up  $\text{5}$  or Down  $\text{6}$  to adjust the DMX address, Left  $\text{3}$  or Right  $\text{4}$  to adjust tens/hundreds.**
3. **In Patch Mode, press Up  $\text{5}$  or Down  $\text{6}$  to adjust the DMX address, Left  $\text{3}$  or Right  $\text{4}$  to change dimmers.**

### SETTING DMX FAIL MODE

To set the DMX Fail Mode:

1. **While In the DMX Start Address Menu above, press “fail” (Menu).**
2. **Press Up  $\text{5}$  or Down  $\text{6}$  to select the mode, then press “on” (Right  $\text{4}$  ) to set the mode On.**

## **SETTING DMX FAIL MODE TIMES**

To set the DMX Fail Mode times:

1. While In the Fail Mode Menu above, press “*times*” (Menu).
2. Press Left $\overline{3}$  or Right $\overline{4}$  to select the Delay or Fade times, then press Up $\overline{5}$  or Down $\overline{6}$  to set the time.
3. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

## **SETTING DMX FAIL PRESET**

To set the DMX Fail Preset number:

1. While In the Fail Mode Menu above, press “*times*” (Menu).
2. Press Left $\overline{3}$  or Right $\overline{4}$  to select “Fade to Preset”, then press Up $\overline{5}$  or Down $\overline{6}$  to set the preset.
3. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

## **SETTING DIMMER TEST/SET LEVELS**

Test/Set levels take over control from any input DMX or other control level. To set Test/Set levels for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Test/set dimmers”, press Menu.
3. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to adjust the level.
4. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all test levels.
5. Press “Flash” (Menu key) to flash the dimmer if required to identify the channel.
6. Press “All” (Left key) with “Flash” (Menu key) to flash all dimmers.
7. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

## **SETTING DIMMER MINIMUM LEVELS**

To set Minimum levels for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Min levels setup”, press Menu.
3. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to adjust the level.
4. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all levels.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **SETTING DIMMER MAXIMUM LEVELS**

To set Maximum levels for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
1. Select “Max levels setup”, press Menu.
2. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to adjust the level.
3. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all levels.
4. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **SETTING NON-DIM LEVELS**

To set Non-Dim levels for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Non-Dim levels” (on page 2), press Menu.
3. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to set the level.
4. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all dimmers.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **SETTING OFF LEVELS**

To set Off levels for each dimmer:

1. In Menu Level 0, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Off levels” (on page 2), press Menu.
3. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to set the level.
4. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all dimmers.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **SETTING DIMMER CURVES**

To set the Dimmer Curve for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Dimmer curve setup” (on page 2), press Menu.
3. Press Left $\overline{3}$  or Right $\overline{4}$  to select the dimmer, Up $\overline{5}$  or Down $\overline{6}$  to set the curve.
4. Press “All” (Left key) with Up $\overline{5}$  or Down $\overline{6}$  to adjust all curves.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

Dimmer curves available are In = Incandescent, ND = Non-Dim, TV =Television/Film colour temp control, FI, Ne = Fluorescent, Neon discharge tubes, LP = Linear Power, LA = Linear Phase Angle.

### **SETTING PROPORTIONAL LEVELS**

To set Proportional levels for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Proportional levels” (on page 3), press Menu.
3. Press Left $\mathcal{3}$  or Right $\mathcal{4}$  to select the dimmer, Up $\mathcal{5}$  or Down $\mathcal{6}$  to set the level.
4. Press “All” (Left key) with Up $\mathcal{5}$  or Down $\mathcal{6}$  to adjust all dimmers.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **SETTING SOFT-START TIMES**

To set Soft-start times for each dimmer:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Soft-start setup” (on page 3), press Menu.
3. Press Left $\mathcal{3}$  or Right $\mathcal{4}$  to select the dimmer, Up $\mathcal{5}$  or Down $\mathcal{6}$  to adjust the time.
4. Press “All” (Left key) with Up $\mathcal{5}$  or Down $\mathcal{6}$  to adjust all times.
5. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

### **RESETTING DMX AND DIMMER PARAMETERS**

To reset all DMX and dimmer parameters:

1. From the top menu, press Menu twice, select “Dimmer Settings”, press Menu.
2. Select “Reset commands” (on page 3).
3. Press Menu, then select the required reset mode using Up $\mathcal{5}$  or Down $\mathcal{6}$ .
4. Press Menu: the screen asks for confirmation: press “OK” (the Menu key).
5. The screen shows “Resetting all Dimmer and DMX parameters”, then restarts the dimmer pack.

### **DISPLAYING INPUT DMX LEVELS**

To display the input DMX levels for each dimmer:

1. From the top menu, press Menu once, select “Input DMX levels”, press Menu.

2. The display will remain set, and restore after power up.
3. Or else press **Back** to reach the top menu.

### **DISPLAYING FINAL DIMMER LEVELS**

To display the final dimmer levels for each dimmer:

1. From the top menu, press **Menu** once, select “**Final Dimmer levels**”, press **Menu**.
2. The display will remain set, and restore after power up.
3. Or else press **Back** to reach the top menu.

### **DISPLAYING TEMPERATURE HISTORY**

To display the temperature history for the dimmer pack:

1. From the top menu, press **Menu** once, select “**Temperature History**” (page 2), press **Menu**.
2. The display will remain set, and restore after power up.
3. Or else press **Back** to reach the top menu.

### **DISPLAYING VOLTAGE AND FREQUENCY**

To display the voltage and frequency of phases A, B, and C:

1. From the top menu, press **Menu** once, select “**Voltage and Frequency**” (page 2), press **Menu**.
2. The display will remain set, and restore after power up.
3. Or else press **Back** to reach the top menu.

### **CALIBRATING VOLTAGE**

To calibrate the voltage readout of phases A, B, and C:

1. While in the “**Voltage and Frequency**” menu above, press “**cal**” (**Menu**).
2. Press **Left** **3** or **Right** **4** to select the phase, **Up** **5** or **Down** **6** to adjust the voltage display.
3. To save the new calibration values immediately press **Back** until you reach the top menu: the screen shows “**Changes saved to flash memory**”.

### **DISPLAYING FAN STATUS**

To display the fan status/test screen:

1. From the top menu, press **Menu** once, select “**Fan Status**” (page 2), press **Menu**.
2. The display will remain set, and restore after power up.

3. Or else press Back to reach the top menu.

### **TESTING THE FAN**

To test the fan at full speed:

1. While in the Fan Status Menu above, press “test” (Menu).
2. The fan goes to full speed as long as the key is pressed
3. The display will remain set, and restore after power up.
4. Or else press Back to reach the top menu.

### **DISPLAYING PRESETS PLAYBACK LEVELS**

To display playback levels from the Presets:

1. From the top menu, press Menu once, select “Presets P/B Levels” (page 3), press Menu.
2. The display will remain set, and restore after power up.
3. Or else press Back to reach the top menu.

### **DISPLAYING REMOTE CONTROL DATA**

To display the first 21 hexadecimal values received or transmitted on the RS-485 data line:

1. From the top menu, press Menu once, select “TLNet Receive Data” or “TLNet Transmit Data” (page 3), press Menu.
2. The display will remain set, and restore after power up.
3. Or else press Back to reach the top menu.

- § Note that any changes made to Nebula parameters, or the current menu level will be saved automatically 10 minutes after the last key press.

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## NEBULA ENVIRONMENTAL PRESETS OPERATION

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The Environ software is designed so the Nebula may be used as an environmental light controller in hotels, building foyers, showrooms, restaurants and other public areas, and as an integrated lighting control in larger buildings and office blocks. In such venues, dimmers need to be programmed to light particular **areas** with a number of different level settings or **presets**. Frequently the areas need to **linked** together so that a number of areas can be controlled at the same time from just one wallplate or other controller. Additionally in larger venues, a **sector**—a group of lighting areas such as all the areas in a multifunction room—requires to be controlled separately from other sectors. Environ software allows each Nebula dimmer to be set to any one of 64 preset levels in any one of 16 areas, while each Nebula dimmer pack can set to any one of 16 sectors—a total of 256 separate sector/area groups of lights. Link commands from wallplates enable linking of any combination of 16 areas within a sector for overall control by a single wallplate. Additionally any combination of 16 sectors can also be controlled in a similar manner.

Each of the 64 Presets (each of 3, 6 or 12 dimmer levels according to model) has the following attributes:

- Each preset has an up, down and delay fade time from Instant to 60 minutes
- Each preset has an editable label of 8 alpha-numeric characters
- Local setting of each dimmer level in each preset, including local record from DMX levels, or levels sourced from a previously copied Preset
- Remote record of Blackout or Full levels, or mixed DMX and Preset levels
- Each dimmer in a Nebula may be set to an Area ID of 1 to 16 so that it responds only to a similar coded command
- Each dimmer and area in a Nebula may be given a separate name of 8 alpha-numeric characters
- Each Nebula dimmer pack may be set to a Sector ID of 1 to 16 so that it responds only to a similar coded command
- Dipless crossfade fade of all dimmers to any preset from 1 to 64 from local pushbutton
- Dipless crossfades of sector/area matching dimmers to any preset from 1 to 64 from remote sector/area command. Mid-scale fade resolution is 4 microseconds (>11 bit) for smooth fades
- Each Nebula may be given a Report ID number from 1 to 250 per sector for use with Theatrelight Reporting software
- Continuous readout of all live Preset levels, current dimmer/preset settings, and transmitted and received remote control data commands

The examples below assume a start from the top menu level—pressing the Back key several times always goes to top menu: the screen shows “**Theatreight NZ**”, together with the model, number of channels, the software version, and the current DMX Start number.

### **SETTING LOCAL PRESETS ON/OFF**

To set the local Presets playback on or off:

1. **From the top menu, press Menu twice.**
2. **Press Up<sup>5</sup> or Down<sup>6</sup> to select “Local Presets” (on page 2), then press “on” (Right<sup>4</sup>) or “off” (Left<sup>3</sup>) to set the Presets playback On or Off.**
3. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

### **SETTING REMOTE PRESETS ON/OFF**

To set Remote Presets playback on or off (for use with other Nebulas and Theatreight Wallplate controllers):

1. **From the top menu, press Menu twice.**
2. **Press Up<sup>5</sup> or Down<sup>6</sup> to select “Remote Presets” (on page 2), then press “on” (Right<sup>4</sup>) or “off” (Left<sup>3</sup>) to enable or disable Remote Presets playback. The Remote LED lights when Remote Presets are enabled.**
3. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

### **SETTING UP DIMMER AREA ID**

To set an area ID for each dimmer (for use with other Nebulas and with Theatreight Wallplate controllers):

1. **From the top menu, press Menu twice.**
2. **Press Up<sup>5</sup> or Down<sup>6</sup> to select “Setup Area ID” (on page 2), press Menu.**
3. **With the cursor over the Dimmer-Area ID, press <sup>5</sup> or Down<sup>6</sup> to view the current area settings for each dimmer. The displayed format is Dimmer—Area.**
4. **To edit the area settings for that dimmer, press Menu, then press Up<sup>5</sup> or Down<sup>6</sup> to allocate the dimmer to a new area.**
5. **Press Right<sup>4</sup> or Left<sup>3</sup> to select other dimmers, Up<sup>5</sup> or Down<sup>6</sup> to change the dimmers area ID.**
6. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

### **SETTING UP DIMMER AND AREA NAMES**

To set dimmer and area names:

1. **From the top menu, press Menu twice.**

2. Press Up<sup>5</sup> or Down<sup>6</sup> to select “Setup Area ID” (on page 2), press Menu.
3. With the cursor over the Dimmer-Area ID, press Menu.
4. Press Right<sup>4</sup> or Left<sup>3</sup> to select the dimmer-area to edit, then press Menu.
5. The new menu shows the dimmer and area numbers, with their current names, with the cursor over the start of the Dimmer name.
6. Press Up<sup>5</sup> or Down<sup>6</sup> to select the alpha numeric-character from the list below.
7. Press Left<sup>3</sup> or Right<sup>4</sup> to select the text position for the character.
8. While in text edit mode the function of the Menu key changes to Upper/Lower case: press the Menu key to swap the letter from lower to upper case.
9. To edit the area name, press Right<sup>4</sup> or Left<sup>3</sup> until the cursor is over the Area name, then repeat steps 5 to 8 above.
10. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

The order of the alpha-numeric characters is as follows.

<<<<< Up<sup>5</sup> key action      Down<sup>6</sup> key action >>>>>

**Upper case characters:** (Space)ABCDEFGHIJKLMNPOQRSTUVWXYZ! "#\$%&'()\*+,-./

**Lower case characters:** (Space)abcdefghijklmnopqrstu vwxyz0123456789:;<=>

Note that lower case is the default case. A space can always be found easily at the top of the list—hold Up<sup>5</sup> for 1 or 2 seconds until the space appears (this also resets to lower case)

### **SETTING UP PACK SECTOR AND REPORT ID**

To set the pack sector ID (for use with other Nebulas and with Theatrelight Wallplate controllers), and pack Report ID (for use with Theatrelight Reporting software):

1. From the top menu, press Menu twice.
2. Press Up<sup>5</sup> or Down<sup>6</sup> to select “Setup Area ID” (on page 2), press Menu.
3. Press Right<sup>4</sup> or Left<sup>3</sup> so the cursor is over the Sector ID number.
4. Press <sup>5</sup> or Down<sup>6</sup> to set the Sector ID to a value between “A” and “P” (16 Sectors).
5. Press Right<sup>4</sup> or Left<sup>3</sup> so the cursor is over the Report ID number.
6. Press <sup>5</sup> or Down<sup>6</sup> to set the Report ID to a value between 1 and 250.
7. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

## SETTING PRESET LEVELS

To set levels for each of the 64 Presets:

1. From the top menu, press Menu twice.
2. Press Up5 or Down6 to select “Local Presets” (on page 2), then press Menu.
3. Press Up5 or Down6 to select the Scene number you want to edit, then press Menu.
4. Press Left3 or Right4 to select the dimmer, Up5 or Down6 to adjust the Preset level.
5. Hold Left3, then press Right4 (“04 F”) to toggle the level On or Off.
6. Press “All” (Left key) with Up5 or Down6 to adjust all levels of the Preset.
7. With the cursor over “dmx” press Up5 to load current DMX values to the Preset (the “dmx” letters change to “DMX” while this is enabled)
8. Press Down6 or Left3 or Right4 to cancel DMX levels.
9. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

## SETTING PRESET LABELS

Each Preset may be given an 8 letter name or label to help identify its function. To set the Preset label:

1. Go to the Presets Edit menu (see step 3 above).
2. Press Left3 while the cursor is over the Dimmer 1 level—the cursor jumps to the start of the Preset label.
3. Press Up5 or Down6 to select the alpha numeric-character from the list below
4. Press Left3 or Right4 to select the text position for the character
5. While in text edit mode the function of the Back key changes to Upper/Lower case: press the Back key to swap the letter from lower to upper case.
6. To complete the label (and re-enable the Back function), press Right4 until the cursor is over the Dimmer 1 level.
7. Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.

The order of the alpha-numeric characters is as follows.

<<<<< Up5 key action      Down6 key action >>>>>

**Upper case characters:** (Space)ABCDEFGHIJKLMN O PQRST UVWXYZ ! " # \$ % & ' ( ) \* + , - . /

**Lower case characters:** (Space)abcdefghijklmnopqr stuvwxyz0123456789 : ; < = >

Note that lower case is the default case. A space can always be found easily at the top of the list—hold Up<sup>5</sup> for 1 or 2 seconds until the space appears (this also resets to lower case)

### **SETTING PRESET FADE TIMES**

To set up Presets fade-times:

1. **From the top menu, press Menu twice.**
2. **Press Up<sup>5</sup> or Down<sup>6</sup> to select “Local Presets” (on page 2), then press Menu.**
3. **Press Up<sup>5</sup> or Down<sup>6</sup> to select the Preset number you want to edit, then press Menu.**
4. **Press “times” (Menu).**
5. **Press Left<sup>3</sup> or Right<sup>4</sup> to select Up, Down, or Delay time, then press Up<sup>5</sup> or Down<sup>6</sup> to set the time.**  
Up, Down, and Delay times can be set from Instant to 60 minutes.
6. **Press “All” (Left key) with Up<sup>5</sup> or Down<sup>6</sup> to adjust the times of all Presets.**
7. **Press “Up>Dn” (Menu) to set the Preset Down fade time the same as the Up fade time**
8. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

### **PLAYING BACK PRESETS**

To playback all local Preset levels at their fade-times:

1. **From the top menu, press Menu twice.**
2. **Press Up<sup>5</sup> or Down<sup>6</sup> to select “Local Presets” (on page 2), then press Menu.**
3. **Press Up<sup>5</sup> or Down<sup>6</sup> to select the Preset number you want to playback, then press “Go” (Right<sup>4</sup>)**

**All** dimmers (regardless of area setting) are faded to the new preset levels at the preset fade-times—the progress of the fade is displayed in the LCD. If the Remote LED is lit, the Nebula issues a “Fade area match dimmers to Preset” command on the data network to **all** areas on other sector matching Nebulas (indicated by the Remote LED flashing). Presets will not play back if Local Presets is set Off.

4. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

The new preset number is also displayed on the top level menu page. The display flashes while the preset is fading. If Remote Presets is enabled, this display shows the preset number of the latest received matching area “Fade area match dimmers to Preset” commands from other Nebulas, Theatrelight Wallplates, or remote computer.

## COPYING AND PASTING PRESETS

All levels, labels, and fade times of a Preset may be copied to another preset number as follows:

1. **From the top menu, press Menu twice.**
2. **Press Up5 or Down6 to select “Local Presets” (on page 2), then press Menu.**
3. **Press Up5 or Down6 to select the Preset number you want to copy, then press “copy” (Left3)**  
The display flashes “paste”, together with the scene number of the copied scene
4. **Press Up5 or Down6 to select the Scene number you want to paste into, then press “paste” (Left3)**
5. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

## EDITING CURRENT DIMMER PRESETS

Remote commands instruct each sector/area matching dimmer to fade to a particular Preset. These latest Preset settings for each dimmer may be viewed, and the Preset number, levels and fade-times edited directly as follows:

1. **From the top menu, press Menu twice.**
2. **Press Up5 or Down6 to select “Remote Presets” (on page 2), then press Menu.**
3. **The display show the dimmers with the currently selected preset number underneath.**
4. **Press Left3 or Right4 to select the dimmer, Up5 or Down6 to change the current Preset.**
5. **To edit Preset levels and fade times from this menu, press Menu (“edit”)**
6. **The new menu is the Preset Edit menu as detailed in “Setting Preset Levels” and subsequent instructions above. You can now edit all levels, times and the labels of the Preset.**
7. **Pressing Back will return you to the Current Dimmer Presets menu to edit other Presets.**
8. **Press Back until you reach the top menu: the screen shows “Changes saved to flash memory”.**

The display is updated with each remote command, and it may be used as a live check of the latest preset settings for each dimmer,

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## REMOTE PRESETS CONTROL

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Nebulas (and Meteors and Quasars) fitted with Environ mode software can be connected together (and to Theatrelight Wallplates) using TLNet, Theatrelight's reliable slow speed RS-485 data standard.

### **COMMUNICATION**

The TLNet communication system works at 9600 baud to RS485 standard. This slow speed method is chosen to provide the maximum in reliability and noise resistance over the very long runs of cable used in large buildings and industrial environments. In addition, the data packet is kept as short as short as possible to minimise the possibility of collision.

### **RS-485 TRANSCEIVER**

Nebula dimmers and Theatrelight Wallplates use a special half-duplex RS-485 transceiver rated at one tenth normal RS-485 unit load. This means over 400 Nebula dimmer packs and/or Wallplates can be connected to the same data line before loading degrades the driver signal significantly. The transceiver chips also have a high common mode range, a very high input impedance, and low power consumption. The chip also features a high internal ESD (ElectroStatic Discharge) tolerance, which is further enhanced by additional surge arrestors external to the chip. As a guideline, the cable run should be limited to 2 kilometres, and the total number of Nebulas and Wallplates on a single data line to 200 without using data buffers. In any event, at the completion of all larger installations, the data line should always be inspected with an oscilloscope to confirm that the data signal has good edges and is free of noise and reflections.

### **POWER SUPPLY**

A 12 volt supply is carried over the TLNet data cable to supply remote Wallplates where used. Each Nebula has a 12 volt, 200 mill-amp constant current source, allowing every Nebula to drive up to 100 Wallplates. Normal Wallplate power requirements is 12 volts, with a total load of just 1.5ma per Wallplate (one LED on). Each Wallplate has its own regulator, allowing reliable operation at supply levels down to 6 volts.

### **CONNECTION AND WIRING**

Nebula dimmer packs and Theatrelight Wallplates are designed to be connected together using CAT 5 cable, the standard cable used for Ethernet wiring. Every Nebula and Wallplate is fitted with an RJ45 socket, allowing the use of a standard Ethernet crimping tool for fitting an RJ45 plug to the CAT 5 cable. The wiring of the cable to the RJ45 sockets is also exactly as used for a straight-through Ethernet installation as follows:

1- Orange/white ----->>			1
2- Orange ----->>			2
3- Green/white ----->>			3
4- Blue ----->>			4
5- Blue/white ----->>			5
6- Green ----->>			6
7- Brown/white ----->>			7
8- Brown ----->>			8

Nebula dimmers and Wallplates must be wired in a continuous daisy chain, starting at the dimmer rack, and looping from device to device. The data line must not have any splits, and should preferably be continuous with the fewest possible joins in the line. Short “T” connections of 300mm may be used to connect to each Nebula or Wallplate. Longer “T” connections should be avoided as they contribute reflections and noise. Keep the data cable at least 600mm away from power and dimmer load cables, preferably in an earthed metal conduit or trunking.

For convenience in initial installation and testing, each Nebula and Wallplate is also fitted with a loop-through RJ45 connector. However the loop-through method of wiring should not be used on any permanent installation as every connection contributes a possible failure point. The most reliable method of connection is to tap a short break-out of length say 300 mm onto the data cable *without cutting or nicking the main data cable*. As CAT 5 cable is usually composed of solid rather than stranded conductors, the cable should be subjected to as little flexing as possible during installation.

High quality RJ45 connectors should be used to ensure a secure connection for each Nebula or Wallplate onto the common data line. On long runs, the last devices at opposite ends of the data line must be terminated with a 120 ohm resistor to keep reflections and noise to a minimum.

### **THEATRELIGHT WALLPLATES**

The Theatrelight Wallplate is a simple 6 key intelligent lighting controller for use with Theatrelight Dimmers such as Nebula, Meteor and Quasar. The Wallplate is designed to be mounted in a standard 86mm square back box. The Wallplate is available in white or black. It is fitted with 6 push buttons, each key backlit with a blue LED. Other colour LEDs can be supplied to customer specification. Key legend can be engraved and paint filled, or laser etched to customer specification. Wallplates can also be silk-screened in wear resistant epoxy ink for larger order quantities.

### **WALLPLATE ELECTRONICS**

Each Wallplate is run by an ultra low power microprocessor, which scans the keys and pre-set dipswitch settings, drives the LEDs, and transmits the appropriate commands to the data bus. The microprocessor also receives and interprets commands sent by other Wall plates or Nebulas such as scene, area, link, and master commands. All commands whether

from its own keys or from remote Wallplates are stored in flash memory after a short time interval, so that at power-on, each Wallplate wakes up in the state it was in when it was turned off. For further details, and for help setting up a system with Nebula dimmers, refer to the Theatrelight Wallplate Operator's Manual on [www.theatrelight.co.nz](http://www.theatrelight.co.nz).

### **REMOTE CONTROLLED PRESETS**

To link a number of Nebulas together for remote control of Presets over a large number of dimmers, each Nebula must be connected to the common TLNet data cable. Then each Nebula must be set up as follows

1. **Each Nebula must be set with Local Presets and Remote Presets On.**
  2. **Each dimmer in the Nebula must be set to an Area ID which matches the remote command, whether from other Nebulas, Theatrelight Wallplates, or remote computer.**
  3. **Each Nebula must be set to a Sector ID which matches the remote command, whether from other Nebulas, Theatrelight Wallplates, or remote computer.**
  4. **Each preset in each Nebula must be programmed for its correct playback levels and fade times.**
- § *Environ mode Nebula dimmer packs are designed to be used in a TLNet system. For more information on TLNet wiring and communication standards, and controlling Nebula dimmers with Theatrelight Wallplates, please refer to the Theatrelight Wallplate Operator's Manual*

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## MAINTENANCE

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To keep your Nebula working well take note of these points:

- § Keep the dimmer pack in a clean air environment: dust is detrimental to electronic insulation and fan life.
  - § Ventilate dimmer cabinets and dimmer rooms adequately: heat is detrimental to electronic components.
  - § Use a damp cloth to keep the dimmer pack clean. Do not use solvents, or solvent based pens.
  - § Touring dimmer packs should travel in a sturdy road case with adequate protection from dust and vibration.
  - § Use rear support plates on each dimmer pack when touring.
  - § Take care that all power connections are firmly screwed down when operating the dimmer pack.
  - § Ensure the dimmer packs are properly earthed to a low impedance earth system.
  - § Use DMX splitters/reconditioners to ensure a clean DMX signal.
  - § Terminate the last pack in the DMX line with a 120 ohm resistor for reliable operation.
- 

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## SPECIFICATIONS

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### CONSTRUCTION

Epoxy powder coat over zinc plated steel case. Legend silk-screened in solvent and abrasion resistant two pot epoxy ink.

### FORM

3u high, 19 inch rack wide, with removable mounting wings. Rear support wings are available for touring cabinets

### ELECTRONICS

Flash microprocessor with internal EEPROM for long life storage of all parameters. Digitally controlled SCR, IGBT or Sinewave dimming module fitted depending on model. The internal Switch Mode power supply is rated at 90 vac to 265 vac, 45 to 65 hertz, and uses long-life 105 degree rated capacitors.

### LCD DISPLAY

4 line, 20 character display, STN Blue with auto-dimming super-bright white LED backlight.

### PUSH BUTTONS

“Alps” brand computer keys with custom moulded keycaps.

### MCBs

6KA rated MCBs provide full overload and short-circuit protection of power devices.

### FILTERING

Iron powder toroidal chokes for linear current rise and minimum EMI. Theatrelight can provide filtering to customer standard on request.

### COOLING

Long life low voltage speed controlled fan. Fan speed is proportional to temperature.

### DMX CONNECTION

USITT DMX-512 1990 Digital multiplex system requiring twin twisted shielded cable approved for RS-422/485 of up to 600 metres. Dimmer refresh rate is every 22 milliseconds. Each Nebula presents 1/10<sup>th</sup> normal RS-485 unit load, allowing reliable DMX operation.

**DMX SPLITTERS**

DMX-512 splitters can be supplied by Theatrelight for larger installations. The splitter re-shapes and buffers the received DMX and drives a number of isolated floating DMX transmitters. Splitters may be cascaded. Theatrelight DMX Splitters are available in an 8 channel 19 inch, 1 U rack mounting configuration, or as a 4 channel stand-alone portable version.

**POWER SUPPLY**

Input: 90 to 265 volts AC, 1, 2 or 3 phase and Neutral, 45 to 65 Hz. Power consumption at no load is less than 5 watts.

**EXTERNAL CONNECTIONS**

Output: 12 channel, 6 and 3 channel versions. with SCR, IGBT or Sinewave modules.

Terminations: Moving cage terminals, or cable input with socket outputs depending on model and destination country. Socapex output versions available. Special socket versions may be made to customer order.

DMX Control Input: DMX-512 via gold plated 5 Pin XLR In/Thru connectors

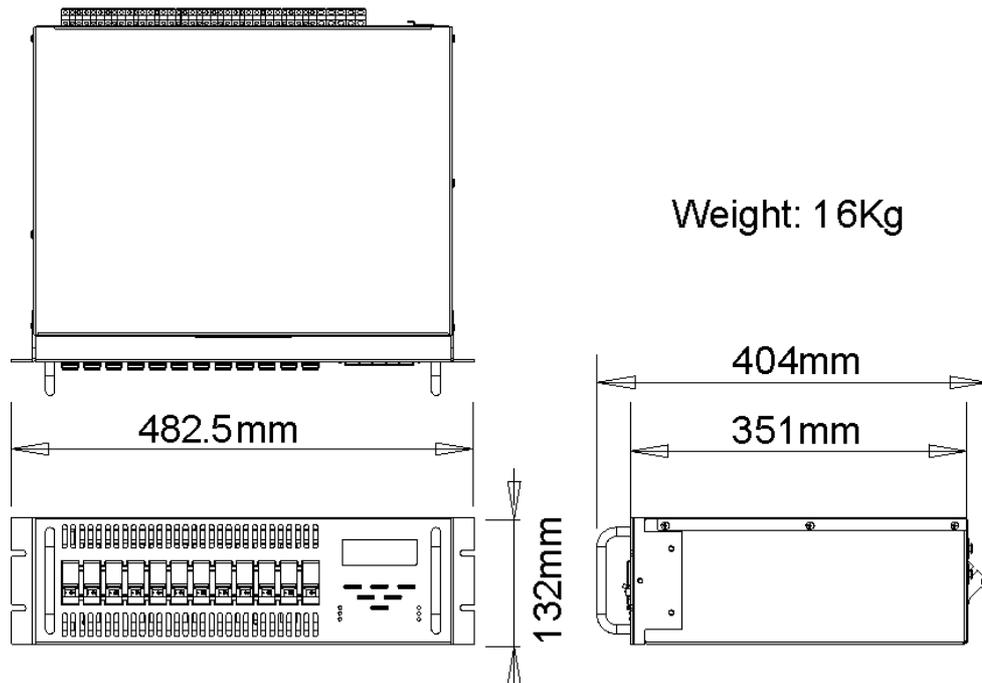
RS-485 Control Input: via RJ 45 connectors mounted on the rear panel. A 12 volt 200ma supply is provided for powering wall plate controllers.

Diagnostic socket: Front panel socket for programming and diagnostic purposes (Theatrelight technicians use only).

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## DIMENSIONS

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**GLOSSARY**

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AREA	An area lit by one or more dimmers.
AREA CODE	An address code which controls dimmers set to the same area number.
BLACKOUT	All lights out.
CHANNEL	One of the controlled output lines from a lighting desk; or a dimmer channel.
CHASE	A repetitive pattern of lighting changes.
CROSS-FADE	A smooth change from one lighting state to another.
CUE	An action or time event which results in a lighting change; also the lighting state following the cue
DBO	Dead Black-out: no light on stage.
DIMMER	A power controller which changes the brightness of lights connected to it.
DIPLESS	Applied to a cross-fade where a dimmer set at the same level on both the incoming and outgoing lighting states does not change level during the cross-fade.
DMX-512	A method of transmitting dimmer levels digitally over a two wire cable. (Digital MultipleX, 512 dimmers)
EEPROM	Electrically Erasable Programmable Read Only Memory: Flash Memory.
EMI	Electro-Magnetic Interference. Electrical noise.
ERASE	To clear and reset the memory.
FADER	A slider control.
FADE TIME	The time taken to complete a fade from full off to full on.
HTP	Highest Takes Precedence: the highest command level is used as the controlling level
LCD	Liquid Crystal Display
LED	Light Emitting Diode.
LEVEL	The brightness of a dimmer as a number from 0 (off), to 10 (full on), or from 0% to 100%.
LTP	Latest Takes Precedence: the latest command level is used as the controlling level
MASTER	Overall control of a number of levels or other major function.

## 34 NEBULA OPERATION

MCB	Miniature Circuit Breaker- a re-settable current protection device.
MIMIC DISPLAY	A display often using Light Emitting Diodes (LEDs).
NON-DIM	A dimmer set to Non-dim acts like a switch: on or off
PRESET	A set of dimmer levels; on a control panel, a row of faders representing the channels in a scene.
PREVIEW	To view a set of recorded levels without showing on stage.
SCENE	A set of dimmer levels.
SCENEMASTER	A master fader which controls the playback of a scene of recorded levels.
SCR	Silicon Controlled Rectifier. A unidirectional power switch used in dimmers
SECTOR	A set of areas (qv).
SECTOR CODE	An address code which controls dimmer packs set to the same sector number.
SEQUENCE	A repetitive pattern of lighting changes.
SHOW	A sequence of cues.
SOFTSTART	A minimum fade up time programmed into a dimmer to enhance lamp life.
SNAP FADE	An instant change from one lighting state to another.
STEP	To change from one scene or cue to another. Also, one scene of a Show or Chase.
TRIAC	A bi-directional power switch. Triac dimmers should be used with care on inductive and capacitive loads.
USITT	United States Institute of Theatre Technicians. Arbiters of the DMX-512 standard.

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