

# NEBULA



*THEATRELIGHTNZ*

---

## NEBULA QUICK OPERATION

---

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**▲ or **Down**▼ to adjust the DMX address. Press **Left**◀ or **Right**▶ 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, hold **◀ + ▶ + ▲** for 2 seconds. To unlock the keypad, hold **◀ + ▶ + ▼** 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 ▲ / ▼ to select the mode, then press “*on*” (▶) 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 ALL NEBULA PARAMETERS

To reset all 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. Select “Reset Dimmers + DMX”, press “*select*” (Menu), press “*OK*” (Menu).
4. The screen shows “Resetting all Dimmer and DMX parameters”, then resets to the top menu.

---

## NEBULA TABLE OF CONTENTS

---

<b>NEBULA QUICK OPERATION .....</b>	<b>1</b>	Locking the keys	13
Setting DMX start address and locking the keys	1	Setting DMX start or patch mode	13
Setting DMX fail mode	1	Setting DMX start or patch addresses	13
Setting dimmer parameters	1	Setting DMX fail mode	14
Resetting all Nebula parameters	1	Setting DMX fail mode times	14
<b>NEBULA INTRODUCTION .....</b>	<b>1</b>	Setting dimmer test/set levels	14
<b>FRONT PANEL LEGEND .....</b>	<b>2</b>	Setting dimmer minimum levels	14
<b>NEBULA OVERVIEW .....</b>	<b>3</b>	Setting dimmer maximum levels	15
LCD display	3	Setting non-dim levels	15
Keys	3	Setting off levels	15
LEDs	3	Setting dimmer curves	15
Cooling	4	Setting proportional levels	16
Power supply	4	Setting soft-start times	16
DMX control	4	Resetting DMX and dimmer parameters	16
Remote control	5	Displaying input DMX levels	17
Dimmer parameters	5	Displaying final dimmer levels	17
Dimmer settings priority	7	Displaying temperature history	17
Levels display	8	Displaying voltage and frequency	17
Resetting Nebula default parameters	9	Calibrating voltage	17
<b>NEBULA PARAMETERS.....</b>	<b>10</b>	Displaying fan status	18
<b>DIMMER INSTALLATION.....</b>	<b>11</b>	Testing the fan	18
Supply transformer	11	<b>MAINTENANCE .....</b>	<b>19</b>
Dimmer supply cabling	11	<b>SPECIFICATIONS.....</b>	<b>20</b>
Dimmer load cabling	11	<b>DIMENSIONS.....</b>	<b>22</b>
DMX-512 installation	12	<b>GLOSSARY OF THEATRE LIGHTING TERMS .....</b>	<b>23</b>
<b>NEBULA OPERATION .....</b>	<b>13</b>	<b>INDEX.....</b>	<b>25</b>
Unlocking the keys	13		

---

## NEBULA INTRODUCTION

---

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 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.

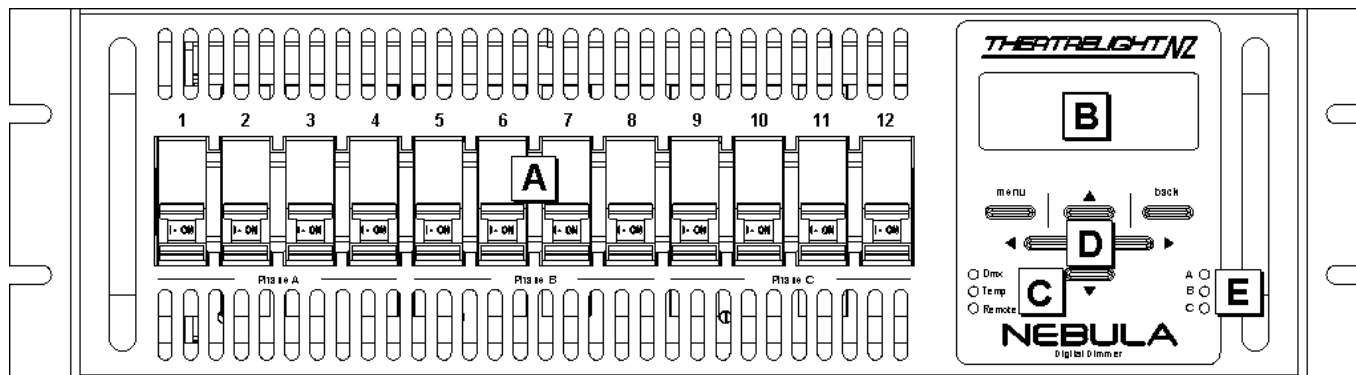
### NEBULA FEATURES

- 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

---

**FRONT PANEL LEGEND**


---



- 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

---

## NEBULA OVERVIEW

---

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 ▲, Down ▼, Left ◀, and Right ▶ 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.

## 4 NEBULA OPERATION

### **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 dimmer racks should be mounted in a position where fan noise 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

### **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.

### **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.

## 6 NEBULA OPERATION

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. 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:

## 8 NEBULA OPERATION

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.

**RESETTING NEBULA DEFAULT PARAMETERS**

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

---

## NEBULA PARAMETERS

---

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	On	Mutually exclusive with Hold mode
Fade to Black delay/fade times	Instant-30 minutes	5 mins/30 secs	
Hold Last Levels	On/Off	Off	Mutually exclusive with Fade mode
<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 = Fluor/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

---

## **DIMMER INSTALLATION**

---

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

---

## NEBULA OPERATION

---

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 ◀ + ▶ + ▼ 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 ◀ + ▶ + ▲ 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 ▲ or Down ▼ to select Start or Patch mode, then press “on” (Right ▶ ) to set the mode On.

### SETTING DMX START OR PATCH ADDRESSES

To change the DMX address/s:

1. While in the menu above press “setup” (Menu).
2. In Start Mode, press Up ▲ or Down ▼ to adjust the DMX address, Left ◀ or Right ▶ to adjust tens/hundreds.
3. In Patch Mode, press Up ▲ or Down ▼ to adjust the DMX address, Left ◀ or Right ▶ to change dimmers.

### **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).
2. Press Up▲ or Down▼ to select the mode, then press “*on*” (Right▶) 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◀ or Right▶ to select the Delay or Fade times, then press Up▲ or Down▼ to set the time.
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◀ or Right▶ to select the dimmer, Up▲ or Down▼ to adjust the level.
4. Press “*All*” (Left key) with Up▲ or Down▼ 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◀ or Right▶ to select the dimmer, Up▲ or Down▼ to adjust the level.
4. Press “*All*” (Left key) with Up▲ or Down▼ 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 ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to adjust the level.
3. Press “All” (Left key) with Up ▲ or Down ▼ 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 ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to set the level.
4. Press “All” (Left key) with Up ▲ or Down ▼ 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 ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to set the level.
4. Press “All” (Left key) with Up ▲ or Down ▼ 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 ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to set the curve.
4. Press “All” (Left key) with Up ▲ or Down ▼ 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, Fl, 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 “Off levels” (on page 3), press Menu.
3. Press Left ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to set the level.
4. Press “All” (Left key) with Up ▲ or Down ▼ 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 ◀ or Right ▶ to select the dimmer, Up ▲ or Down ▼ to adjust the time.
4. Press “All” (Left key) with Up ▲ or Down ▼ 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 Dimmers + DMX” (on page 3).
3. Press Menu: the screen asks for confirmation: press “OK” (the Menu key).
4. 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** ◀ or **Right** ▶ to select the phase, **Up** ▲ or **Down** ▼ 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.**
- Note that any changes made to Nebula parameters, or the current menu level will be saved automatically 10 minutes after the last key press.

---

## MAINTENANCE

---

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.
- 

Theatrelight contact address:

**THEATRELIGHT LTD**

PO BOX 13159

AUCKLAND, NEW ZEALAND

Phone 64-9-622-1187, 636-5805

Fax 64-9-636-5803

Web site: [www.theatrelight.co.nz](http://www.theatrelight.co.nz)

E-mail: [sales@theatrelight.co.nz](mailto:sales@theatrelight.co.nz)

---

## SPECIFICATIONS

---

### 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

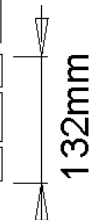
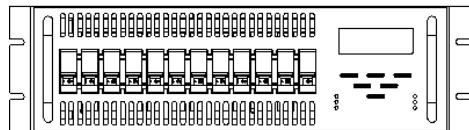
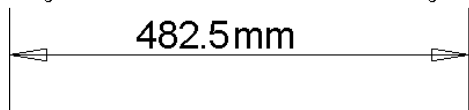
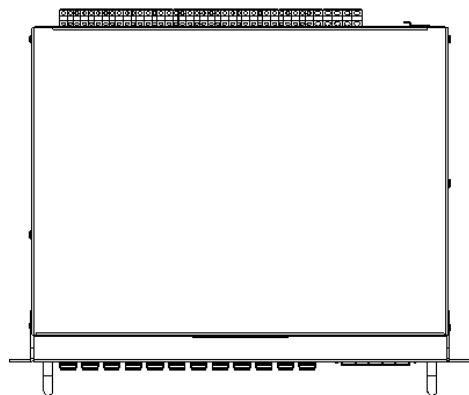
RS-485 Control Input: via RJ 45 connectors mounted on the rear panel. A 12 volt 200ma supply is provided for powering wall plate controllers.

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

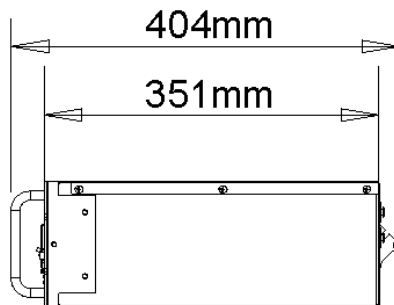
---

## DIMENSIONS

---



Weight: 16Kg



---

## GLOSSARY OF THEATRE LIGHTING TERMS

---

ADD MODE	Mode in which pressing a channel Flash key adds the channel to the other lighting.
ANALOGUE	A smooth changing voltage (as opposed to digital)
BLACKOUT	All lights out on stage.
BLIND	Not showing on stage.
BO	Blackout; all lights out on stage.
BPM	Beats per minute: applied to music rhythms.
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 new lighting on stage; the lighting state following the cue
DBO	Dead Black-out: no light on stage.
DIMMER	A power controller which changes the brilliance of lights connected to it.
DIPLESS	Applied to a cross-fade where a dimmer up at the same level on both the new and the old 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: otherwise know as 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.
FLASH KEY	Any key which flashes a channel or scene to Full. Sometimes called Bump keys (USA).
GRAND MASTER	A master fader which controls the final output levels of a lighting desk.
HTP	Highest Takes Precedence: the highest command level is used as the controlling level

## 24 NEBULA OPERATION

KILL	Turn off a light.
KILL MODE	If Kill is on, pressing a Flash key turns off all other lighting. Sometimes called Solo or Swap mode.
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	A fader which has overall control of a number of levels or some other major function.
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 row of faders representing all the channels in a scene; to set up faders in advance of a cue.
PREVIEW	To view a set of recorded levels without showing on stage.
SCENE	A recording which stores a single set of all channel 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
SEQUENCE	A repetitive pattern of lighting changes.
SHOW	A performance. In Theatrelight control panels, a Scenemaster which stores a sequence of cues.
SOFTSTART	A minimum fade up time programmed into a dimmer to enhance lamp life.
SOLO MODE	Another name for Kill mode.
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. Dimmers using triacs should be used with care on inductive loads.
USITT	United States Institute of Theatre Technicians. Arbiters of the DMX-512 standard.

---

**INDEX**


---

Calibrating voltage .....	17	LEDs .....	3
Control connections.....	21	Locking keys.....	13
Dimensions.....	22	Maintenance.....	19
Dimmer curves.....	15	Maximum levels.....	15
Dimmer parameters.....	5, 6	Minimum levels.....	14
Dimmer settings.....	10	Non-dim levels.....	15
DMX connections.....	21	Non-dim mode.....	13
DMX Fail modes.....	5	Off levels.....	15
DMX Fail Modes.....	4, 10, 13	Phase LEDs.....	3
DMX LED.....	3	Proportional levels.....	16
DMX Patch Address.....	4, 13	Remote control.....	5
DMX settings.....	10	Remote LED.....	3
DMX Start address.....	13	Reset command.....	9, 16
DMX Start Address.....	4, 13	RS-485 connections.....	21
Fan.....	4	Softstart fade times.....	7, 16
Fan status.....	18	Softstart mode.....	13
Fan testing.....	18	Specifications.....	20
Features.....	1	Temperature history.....	17
Final dimmer levels.....	17	Temperature LED.....	3, 4
Front panel legend.....	2	Test levels.....	14
Glossary.....	23	Test/set levels.....	10
Input levels.....	17	Unlocking keys.....	13
Introduction.....	1	Voltage and frequency.....	17
LCD display.....	3		