



SineWave Power Module User Manual

V1.6

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Introduction

Congratulations...

on the purchase of an ETC PowerModule Distributed Sinewave Dimmer. PowerModule continues ETC's tradition of providing the highest quality products for the entertainment lighting market.

Using this Manual

This manual describes the general operation and programming information for the PowerModule distributed dimmer. Maintenance and servicing details are available in separate manuals. Owing to the range of options available, this user manual may describe features which are not directly relevant to a specific model.

The following symbols are used in this manual to alert you to a danger or important information.



Note: Notes are helpful hints and information that is supplemental to the main text.



CAUTION: A static touch caution statement indicates situations where there may be undefined or unwanted consequences of an action, potential for data loss or and equipment problem due to static shock.



CAUTION: A Caution statement indicates situations where there may be undefined or unwanted consequences of an action, potential for data loss or and equipment problem.



WARNING: *A warning statement indicates situations where damage may occur, people may be harmed, or there are serious or dangerous consequences of an action.*



WARNING: ***RISK OF ELECTRIC SHOCK!** This warning statement indicates situations where there is a risk of electric shock.*

Overview

Products

This handbook describes the operation and programming of the ETC PowerModule range of Isine dimmers incorporating Sinewave dimming technology. Sinewave dimming produces a pure sinewave output for a lighting load. The intensity of the light is controlled by the amplitude of the sinewave. Other dimmer technologies (traditional phase control and IGBT reverse-phase) control the lights intensity by chopping the mains waveform, which can cause acoustic noise and electrical interference problems.

The dimmers covered by this handbook are:

7520A1001	SH1-2SF	SineWave Shuttle Module	1x2.5kW
7520A1015	SH1-5SF	SineWave Shuttle Module	1x5kW
7520A1002	PM2-2SF	SineWave Power Module	2x2.5kW
7520A1003	PM4-2SF	SineWave Power Module	4x2.5kW
7520A1004	PM2x5SF	SineWave Power Module	2x5kW
7520A1005	PM12kW	SineWave Power Module	1x12kW (discontinued)
7520A1006	PM1-5SF	SineWave Power Module	1x5kW (discontinued)
7520A1007	PM6-2SF	SineWave Power Module	6x2.5kW
7520A1008	PM3-5SF	SineWave Power Module	3x5kW
7520A1009	PM2-2/5SF	SineWave Power Module	2x2.5/1x5kW
7520A1010	PM6-2/5SF -CYC	SineWave Power Module	6x2.5/3x5kW switchable with relay
7520A1011	PM6-2/5SF	SineWave Power Module	6x2.5/3x5kW switchable
7520A1012	SC2-2SF	SineWave Suit Case Module	2x2.5kW
7520A1013	SC1-5SF	SineWave Suit Case Module	1x5kW
7520A1014	SC2-2/5SF	SineWave Suit Case Module	2x2.5kW/1x5kW switchable

Sinewave dimmer technology

The PowerModule range of dimmers represents the most advanced dimming system available today. The advantages of Isine dimming technology, as developed by ETC in its Isine design, deliver low-noise, high power dimming capability with advanced electronic measurement and control to accommodate variations in the power supply and load conditions. The dimmers will automatically compensate for poor mains regulation, and will respond to short-circuits faster than any mechanical protection device.

Distributed dimming

The high efficiency (low heat dissipation) of the dimmer circuit, combined with its compact design, electronic protection and sophisticated status reporting system, makes the PowerModule ideally suited to distributed dimming schemes where a central dimmer room is unavailable or undesirable.

Key features of Isine system

The Isine system offers low-noise dimming (both acoustic noise from lamp and dimmer as well as electrical interference are reduced), control of a wide range of load types, and sophisticated control options for the broadest range of applications. Each dimmer channel can be individually programmed either at the dimmer itself, or remotely from a PC, and once programmed, the dimmer can operate simply and transparently whilst being protected against inadvertent adjustments.

Ethernet connectivity

Ethernet-enabled Power Modules support DMX over Ethernet via Streaming ACN (ESTA ANSI BSR1.31) and provide extensive configuration and reporting facilities via DimStat.

Unpacking and Installation

Unpacking & checking

The PowerModule is self-contained and only requires mounting components (hook clamps or similar and a safety bond), and a suitable mains input connector. The PowerModule is packed to withstand

normal transportation, but before operating the unit, check there is no sign of transit damage which could affect the operation and safety of the dimmer.

Positioning

The PowerModule is an extremely versatile dimmer, and can be located in a variety of positions. It is designed for natural convection cooling, hanging by suspension clamps and care must be taken to ensure adequate ventilation around the case. Note that full-power operation is only possible if the PowerModule is suspended in free air. If it is used on the ground there may be insufficient ventilation for continuous service at full power.



Caution: Should the PowerModule overheat in this condition, an internal detection circuit will report an overheat condition and will progressively reduce power until a normal operating temperature has been reached.

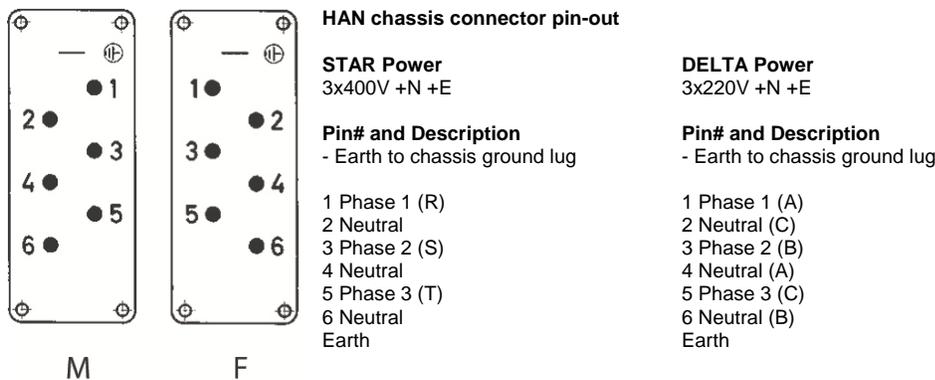
Connections

Mains Connection

If the PowerModule is fitted with a cable then attach a suitable connector to the cable. If the PowerModule is fitted with a connector then provide a suitable power cable with mating connector. All connections should be made by qualified personnel.



WARNING: RISK OF ELECTRIC SHOCK



DMX data signals

All Power Modules are controlled by DMX 512 connected by a shielded two-pair high-speed data cable with XLR 5-pin connectors (male = input; female = output).

Pin connections:

1	0V shield
2	DMX -
3	DMX +
4	DimSTAT -
5	DimSTAT +

The DMX network supports up to 31 Power Modules connected to one line. For larger installations, where more DMX lines are required, the use of a DMX booster/splitter is recommended. Any booster/splitter used must support bi-directional data on pins 4 and 5 for Serial DimStat to operate.

Suitable boosters include ETC Part #:

7580A1-9815-D	DMX BOOSTER 10 WAY DIMSTAT
7580A1-9815	DMX BOOSTER 10 WAY 19INCH

Termination is required for both DMX and DimStat data on all networks. The last output socket in the line should be terminated with two 120Ω 1/4 Watt resistors, one connected between pins 1 & 2 (DMX) and one connected between pins 4 & 5 (DimStat).

A 'dummy plug' XLR male connector with termination resistors is recommended.

Ethernet Connection

A standard RJ45 connector is provided for connection to an Ethernet network.

Basic Navigation

PowerModule User Interface



Indicators

“ON” LED

Illuminates blue when power is applied, and the RCBO or MCB is switched on. Blinks during boot and firmware update.

“DMX” LED

Illuminates red continuously when valid DMX is present and flashes when there is no DMX signal.

ENT & Arrow Buttons

ENT

(ENTer) confirms a configuration step and records the information in the memory.

↑ Up

Higher level menu feature or move cursor up in display screen or number increment.

↓ Down

Lower level menu feature or move cursor down in display screen or number decrement.

← Left

Move cursor left in display screen.

→ Right

Move cursor right in display screen.

Menu Buttons

DMX

Selects the DMX address of each channel.

INST

INSTall . Sets Power Module global options:

- Line voltage, frequency and maximum current
- DimSTAT communication address
- DMX failure options
- DMX backup levels
- DMX addressing mode (individual or start address)
- Channel configuration mode (individual or joined)
- Sleep mode
- Voltage regulation
- Current limit
- Minimum level reset (preheat off when DMX is not present)
- Voltage calibration
- Factory reset
- Channel information
- Password set-up
- Dimmer hardware configuration
- Ethernet settings

CHAS (with LED)

CHASe. Provides access to the built-in chase effects system for stand-alone display effects. The LED illuminates when the module is in the 'chase' mode.

CONF

CONFigure. Access to a sub-menu to set the detailed configuration of dimmer channels, including:

- MAX
 - MAXimum. Sets the maximum output level from 30% to 100%, individually or combined.
- MIN
 - MINimum. Sets the minimum output level from 0% to 29.9%, individually or combined.
- T-IN
 - Response time to fade in from 0.00 secs to 99.9 secs.
- T-OUT
 - Response time to fade out from 0.00 secs to 99.9 secs.
- CURVE
 - Dimmer law selection
- I/O

- Non-Dim, On/off switch operation
- PRIORITY
 - Priority channel (the last to be reduced if the maximum preset current is exceeded by the module)
- MODE
 - Start mode (normal, soft start, burst, proportional, blink)

MAN

MANual provides manual control of each channel for circuit testing and focussing.

EXIT

Returns to the opening screen menu option without recording changes.

PWR

Show information about the power supply of the Power Module

INFO

INFOrmation provides a display of the nominal supply voltage, current, frequency, Ethernet settings and firmware version.

CHK (with LED)

CHECK displays a log of any circuit or dimmer faults. LED illuminates if an error occurs.

Configuration Procedures

General Configuration Information

Navigation through the menus

The cursor buttons are used to move around the menu screens, and to activate a set-up option or parameter prior to adjustment. When a parameter or option is selected, it is shown in square brackets, e.g. [240] and it is this item which you are changing on the screen. When you press ENT to confirm a change, the screen will show:



DATA IS STORED
IN MEMORY

Passwords

For clarity, the following sections which describe programming activities do not refer to the entry of passwords.

Passwords are included to prevent unauthorised access to the DMX, CONFigure and INSTall menu trees. The passwords are 4-digit numbers with a factory default of 0000 (no password necessary).

It is possible to have the same password for all, or separate passwords for each menu tree. If any of the protected menus is selected, the next screen requests a password and the screen will show:



PASSWORD ????
ENTER ←↑↓

Passwords are entered by pressing the relevant → and ← cursor buttons to select the digit, and the ↑ and ↓ cursor buttons to choose the number.
Press ENT when all digits are correct to access the menu.

Channel Configuration

All dimmer-specific configuration may be set either individually, or all dimmers may be configured to behave identically depending on whether the Channel Config setting has been set to 'SINGLE or 'JOINED'.

Front Panel Controls

All of the performance and control characteristics, measurements and status reports, are available from the front panel controls and LCD screen. When power is applied and the MCB or RCBO is switched on, the power LED will illuminate. The DMX LED will illuminate if a valid DMX signal is present. During the power-up reset process, the LCD display shows identification details and the software version before displaying the output screen:



L: UAxUBx
CH: 123456 DAxDSx

This display shows the channel levels using bar graphs at the top left, the number of bars shown relates to the number of dimmers in the PowerModule - either 1, 2, 4 or 6.



Note: An “x” adjacent to the DMX or DimStat input label shows that it is inactive, and a tick shows that it is active.

Initial Settings

The channels in PowerModule dimmers can be configured either individually for each dimmer or combined for all dimmers in the module.

Similarly, DMX Addressing can be either a Start address for the module, or Single to allow individual addressing of the dimmers.

See Channel Configuration or DMX Addressing for details.

Response to DMX Loss

The PowerModule is equipped with a choice of responses to the failure of the DMX signal. The dimmers can be set to hold the last good level, fade to zero over 5 seconds, or fade to a preset memory setting.

DMX Loss Configuration:

1. Press INST.
2. Press or to choose GENERAL SETTINGS menu. Press ENT.
3. Press or to choose DMX FAIL menu. Press ENT.

4. The screen shows:

```
GENERAL
DMX FAIL [RESET]
```

5. Use ↑ or ↓ to select one of the 3 options available:
RESET: sets all dimmers to zero after 5 seconds
HOLD: maintains the last valid DMX levels until DMX is restored
BACKUP: selects dimmer levels programmed with the PRESETS memory function
6. Press ENT to leave the menu and record the changes or EXIT (to leave the previous settings unchanged).



Note: If BACKUP has been chosen, you should also set the DMX backup preset.

Setting DMX Backup Preset

1. Press INST.
2. Press ↑ or ↓ to choose DMX BACKUP menu. Press ENT.
3. The screen shows:

```
BACK% : [000] 000
CHAN . :   1   2
```

4. Use → or ← to select a channel.
5. Press ↑ or ↓ to adjust the backup level.
6. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

DMX Minimum Reset (Auto Preheat Off)

When a Preheat has been set for some channels using the Channel Min function, DMX Minimum Reset will turn these channels completely off when DMX is not present.

i.e. when the control desk is switched off, but the dimmers remain on.

Setting DMX Minimum Reset

1. Press INST.
2. Press or to choose GENERAL SETTINGS menu.
3. Press ENT.
4. Press ↑ or ↓ to choose MINIMUM RESET menu. Press ENT.
5. The screen shows:

```
GENERAL
MIN.RESET [OFF]
```

6. Use ↑ or ↓ to select either on (dimmer preheat switches off when DMX is removed) or OFF (preheat runs continuously).
7. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Serial DimSTAT Address (PC address)

The DimStat PC address is the unique number which is used by DimStat over 5-pin DMX cable network to identify each dimmer unit for the purpose of reporting status information and for transferring data between the dimmer unit and PC.



Note: This setting is not required if Ethernet DimStat is being used.

Setting Serial DimStat address

1. Press INST.
2. Press ↑ or ↓ to choose DIMStat ADDRESS menu. Press ENT.
3. The screen shows:



ADDRESS : [001]
ENTER ↑ ↓

4. Press ↑ or ↓ to set the address number between 001 and 255.
5. Press ENT to leave the menu and record the changes or EXIT (to leave the previous settings unchanged).

Passwords

Passwords are used at 3 levels of the PowerModule dimmer set-up procedure: DMX, CONF and INST. One password or 3 separate passwords may be used to give a range of access options. Passwords are in the form of 4 digit codes and may be set and used from the front panel of the dimmer and DimStat, but passwords may only be read using DimStat. Passwords set to 0000 give unrestricted access.



Note: Setting the password to 0000 (factory default) turns off the password protection, and no prompts to enter a password are seen on the display.

Setting or changing passwords

The procedures for programming passwords for DMX programming, Channel configuration and Installation are identical. The procedure for programming the DMX password is described below.

1. Press INST.
2. Press ↑ or ↓ to choose PASSWORD DMX menu. Press ENT.
3. The screen shows:



NEW PASSWORD
* : * : * : *

4. Press ← or → to select a digit to enter (shown in square brackets).
5. Press ↑ or ↓ to adjust the digit.



Note: Make a copy of passwords in the back of this handbook, as the passwords can be interrogated only via a DimStat link to a remote PC. Resetting the password to 0000 disables the previous setting.

6. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Sleep mode

The SLEEP function switches off the LCD backlight during a performance when the control panels are in view of an audience or camera. When enabled, the sleep function switches off the backlight a short time after the last touch of a panel button, and switches back on when a front panel button is pressed.

To Activate 'Sleep' mode

7. Press INST.
8. Press ↑ or ↓ to choose GENERAL SETTINGS menu. Press ENT.
9. Press ↑ or ↓ to choose SLEEP MODE menu. Press ENT.
10. The screen shows:



```
GENERAL
SLEEP MODE [OFF]
```

11. Use ↑ or ↓ to select either ON or OFF.
12. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Module Current Limit

Each PowerModule has a facility to measure the current and to restrict the operation of all dimmers (or in the case of 3-phase Power Modules the dimmers on each phase) to ensure the maximum current is not exceeded. This operates as a 'maximum demand' protection system, and reduces the levels of all dimmers on the phase which is exceeding the preset current.

However, to eliminate the risk of an important light automatically dimming during a performance, it is possible to prioritise the channels which will reduce in intensity to ensure the maximum demand is not exceeded. This is achieved by setting the dimmer channel to "priority", and it will then ignore any instruction to reduce level if the maximum demand is exceeded. Similarly, non-dim channels are also unaffected by the current limiting function.

This function is activated in three steps: setting a current limit, choosing any priority channels, and activating current limiting as described below.

Setting the Maximum Current

1. Press INST.
2. Press ↑ or ↓ to choose LINE PARAMETERS menu. Press ENT.
3. The screen shows:



```
LINE    U: [230]
I: 44   FREQ: 50
```

4. Press → to select maximum current for the module (or per phase for the PM6), and adjust the level using ↑ and ↓.
5. Press ENT to leave the menu and record the changes or EXIT (to leave the previous settings unchanged).

Choosing Priority Channels

1. Press CONF.
2. The screen shows the individual channel number (or T if the PowerModule is set to Config Channel: JOINED mode) and gives access to all configuration options.
3. Press ↑ or ↓ to select the required channel number, followed by → repeatedly to select PRIORITY option shown as follows:



```
CONFIG:  CH: 1
        PRIORITY [NO]
```

4. Press ↑ or ↓ to select YES for priority operation or NO for normal operation of this channel.



Note: If set to No, the dimmer will take part in a general reduction of the intensity if the preset maximum current (maximum demand) for the phase in this dimmer rack is exceeded. If set to Yes, the dimmer will remain at its level, and others will reduce in level to maintain the maximum phase current.

5. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Activate Current Limitation

1. Press INST.
2. Press ↑ or ↓ to choose GENERAL SETTINGS menu. Press ENT.
3. Press ↑ or ↓ to choose CURRENT LIMIT menu. Press ENT.
4. The screen shows:



```
IP Address
[010] .101.101.001
```

5. Press ↑ or ↓ to turn the current limiting function either ON or OFF.
6. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Voltage regulation

Voltage regulation is a software feature which maintains the dimmed level of channels in the event of the mains supply fluctuating (e.g. when power is supplied from a generator source or a high-impedance main). The dimmer's incoming voltage is measured, and if it diverts from the anticipated incoming voltage, the dimmer will adjust the output accordingly to maintain a constant voltage at the output. The dimmer will maintain output to about 1V for every 10V input voltage swing. This feature does not maintain the voltage of full-on dimmer channels, as the regulation circuit can only work with sufficient voltage headroom. Programming involves two stages, firstly setting the nominal voltage, and secondly activating the voltage regulation software.

Setting Nominal Voltage and Frequency

1. Press INST.
2. Press ↑ or ↓ to choose LINE PARAMETERS menu. Press ENT.

3. The screen shows:

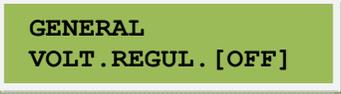


LINE U: [230]
I: 44 FREQ: 50

4. Press ↑ or ↓ to set the target voltage for regulation.
5. Press → twice to select Frequency
6. Press ↑ or ↓ to select 50 or 60Hz
7. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Activate Voltage Regulation

1. Press INST.
2. Press ↑ or ↓ to choose GENERAL SETTINGS menu. Press ENT.
3. Press ↑ or ↓ to choose VOLT. REGULATION menu. Press ENT.
4. The screen shows:



GENERAL
VOLT. REGUL. [OFF]

5. Press ↑ or ↓ to turn the voltage regulation ON or OFF.
6. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Lamp Saver

Lamp Saver is a global feature which only applies preheat if the channel has been used after power up.

Lamp Tuning

Lamp Tuning is a global feature which provides a load learning facility whereby the Matrix dimmer records the current after the lamp has been set to between 90-100% for 3 seconds. This data is then used to 'tune' the dimmer curve to ensure that all lamps respond the same, and there is not an inconsistency in dimming between a 25W lamp and a 5kW lamp on different dimmers.

Default Factory Settings

The PowerModule is supplied with a set of factory default settings and recommended software set-up parameters. It is advisable to reset the dimmer software to the original factory settings in the case of a significant software update.

To reset the PowerModule to factory default settings

1. Press INST.
2. Press ↑ or ↓ to choose FACTORY RESET menu. Press ENT.
3. Press ↑ or ↓ to select YES (shown in square brackets).
4. Press ENT to confirm and reset the PowerModule's memory or EXIT to leave the previous settings unchanged.

The factory defaults are:

Nominal Voltage	230V
Max Current	22A
Freq	50Hz

Serial DimSTAT Address	001
DMX Fail	RESET
DMX Address Mode	START
Config Channel	JOINED
Sleep Mode	OFF
Voltage Regulation	OFF
Current Limitation	OFF
DMX Minimum Reset	OFF
Lamp Saver	OFF
Lamp Tuning	OFF
DMX Backup Preset	All Off
Passwords	All 0000
sACN Universe A	00001
sACN Universe B	00002

Dimmer Curve	LINEAR
DMX Address	001
UA Address	001
Minimum	0.00%
Maximum	100%
T-In	0.02sec
T-Out	0.02sec
Start Mode	BASIC
I/O (Non-Dim)	NO
Priority	NO

Ethernet Connectivity

PowerModule fitted with an Ethernet connection supports the ESTA/ANSI BSR1.31 Streaming ACN standard for dimmer level control.

Streaming ACN Universes

Each Streaming ACN Universe has 512 DMX channels (1-512) , as for normal DMX.

Each Ethernet dimmer module supports an A and a B DMX universe. The A universe is used for the internal dimmers (and any dimmers connected to the DMX-A Through output) and the B universe is used for equipment connected to the DMX-B output (e.g. scrollers, motorised yokes, etc.). However, if required A and B could be set to the same universe.

DMX and sACN Level Arbitration

Control levels from DMX A and Ethernet Universe A are merged using "highest-takes-precedence" logic.

Ethernet settings

The following Ethernet settings are available:

- IP address
 - This must be unique to each device on the network, and should be selected in consultation with your network manager.
 - ETC recommends a value in the range 10.101.101.1 to 10.101.101.99
- Subnet mask
 - ETC recommends a default of 255.255.0.0 unless otherwise required by your network manager.
- Gateway
 - ETC recommends using 10.101.1.1 unless otherwise required by your network manager.
- Universe A:
 - The sACN Universe (1-65279) used for the UA control signal for the internal dimmers.
- Universe B

- The sACN Universe that is output on DMX Port B for use by external equipment, such as moving lights and scrollers.

Setting Ethernet Address

The network structure and addressing scheme should be designed in detail before setting the Ethernet options, to ensure a smoothly working system. This information should be carefully archived as it will be needed in future when any changes are made to the networked dimmer system.

1. Press INST.
2. Press ↑ or ↓ to choose the ETHERNET SETUP menu. Press ENT.
3. Press ↑ or ↓ to choose the IP ADDRESS menu. Press ENT.
4. The screen shows:

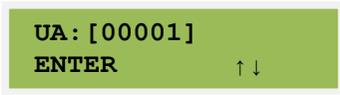


5. Use the → and ← to select each section of the IP Address, and ↑ and ↓ to adjust the value.
6. Press ENT to leave the menu and record the new IP address or EXIT to leave the previous settings unchanged.

The Subnet Mask and Gateway are set in the same way.

Selecting Streaming ACN Universes

1. Press INST.
2. Press ↑ or ↓ to choose the ETHERNET SETUP menu. Press ENT.
3. Press ↑ or ↓ to choose the UNIVERSE A menu. Press ENT.
4. The screen shows:



5. Press ↑ or ↓ to set the Streaming ACN Universe for Universe A.
6. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Universe B is set in the same way.

DMX Addressing

Each dimmer in the PowerModule is assigned a DMX channel number. A feature is provided to set either a Start address for the Module (sequential addressing of the dimmer channels) or to address the dimmers individually.

It is important to set the DMX Addressing mode before the DMX addresses, as a later change can affect previously chosen settings.

Setting DMX Addressing Mode

1. Press INST.
2. Press ↑ or ↓ to choose GENERAL SETTINGS menu.
3. Press ENT.

4. Press ↑ or ↓ to choose DMX ADDRESS menu.
5. Press ENT.
6. The screen shows:

```
GENERAL
DMX MODE [START]
```

7. Use ↑ or ↓ to select either SINGLE for different individual DMX addresses or START to number the dimmers are numbered sequentially from the first address.
8. Press ENT to record the changes or EXIT to leave the previous settings unchanged.



Caution: Changing this setting to START can alter the DMX addressing of the dimmers.

Setting Dimmer Addresses for DMX Port A

First select the DMX scheme as described above (either individual or start address).

1. Press DMX, and the screen displays:

```
DMX ADDRESS
ENTER ↓
```

2. Press ENT, and the screen displays:

```
DMX : [001] 002
CHAN . : 1 2
```

- a. If SINGLE has been selected, two channels are displayed at a time, with their relevant DMX address.
Use → and ← to select each dimmer channel as required
- b. If START has been chosen, only one DMX address is entered for the first dimmer.
The remaining dimmers are automatically addressed in sequential order.
3. Use ↑ and ↓ to adjust the DMX addresses as required.
4. Press ENT to store the settings and to return to the previous menu.



Note: DMX address 000 unpatches the channel from that DMX control source. Valid DMX addresses are between 001 and 512.

Setting Streaming ACN Address

1. Press DMX, and the screen displays:

```
DMX ADDRESS
ENTER ↓
```

2. Press ↓, and the screen displays:

```
UNIVERSE ADDRESS
ENTER ↑
```

3. Press ENT, and the screen displays:

```
UA : [001] 002
CHAN . : 1 2
```

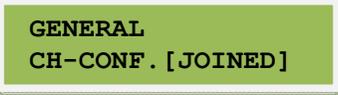
4. Adjust sACN addresses as required in the same way as for DMX addresses.
5. Press ENT to store the settings and to return to the previous menu.

Channel Configuration

The channels in PowerModule dimmers can be configured either individually for each dimmer or combined for all dimmers in the module.

Setting Channel Configuration Mode

1. Press INST.
2. Press ↑ or ↓ to choose GENERAL SETTINGS menu. Press ENT.
3. Press ↑ or ↓ to choose CONFIG CHANNEL menu. Press ENT.
4. The screen shows:



GENERAL
CH-CONF . [JOINED]

5. Use ↑ or ↓ to select either SINGLE for individual channel configuration or JOINED for all dimmers to be configured identically.
6. Press ENT to record the changes or EXIT to leave the previous settings unchanged.



Caution: Changing this setting to JOINED can alter the configuration of the dimmer channels.

Channel Min (Preheat) and Max Levels

These settings adjust the output range of a dimmer by setting a minimum level and a maximum level.

A minimum level is used to provide a pre-heat to preheat lamp filaments, whereas the maximum level is used to limit maximum power and extend lamp life.

- Minimum levels range from 0% to 29.9%
- Maximum levels range from 30% to 100%.
- Factory default values are 0% for minimum and 100% for maximum.



Note: The 110 V dimmer curve is provided for control of 110V lamps, as opposed to setting the Max to 50% as it produces a smoother control over the whole range of intensity.



Note: In the case of high inrush loads (e.g. PAR cans) where hard flashing on from a cold state is required, or for 5kW lamps where the high inrush current could cause the short circuit protection to report an error, it is recommended to set a 'minimum' preheat level to approximately 5%. See also **DMX Minimum Reset**.

Setting Min and Max Levels

1. Press CONF.
 - If Config Chan is SINGLE, the screen shows the individual channel number
 - Press ↑ or ↓ to select the required channel number
 - Press ← to reselect the channel number
 - If Config Chan is JOINED the screen shows a T

2. Press → to select the maximum or minimum option, highlighting the existing value in square brackets:

```
CONFIG:  CH: 1  
MIN [000.0] %
```

3. Press ↑ or ↓ to set the level
 - MIN: minimum level, 00% to 29.9%.
 - MAX: maximum level, 30% to 100%.
4. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Channel Fade Times

Each dimmer has two times associated with it which control the minimum time to fade in and out, and are called T-IN and T-OUT. These times are referred to as 'fade response times' and are used to protect the lamp filaments from thermal damage, and for reducing surges in the system that could trigger the short-circuit detection.

- The default times are currently 0.02 seconds.



Note: Recommended values are 0.02s for a 1 kW load, 0.1s for a 2 kW load, and 0.5s for a 5 kW load.

Setting Channel Fade Times

1. Press CONF.
 - If Config Chan is SINGLE, the screen shows the individual channel number
 - Press ↑ or ↓ to select the required dimmer number
 - Press ← to reselect the channel number
 - If Config Chan is JOINED the screen shows a T
2. Press → to select the T-IN or T-OUT option, highlighting the existing value in square brackets:

```
CONFIG:  CH: 1  
T-IN [00.02] s
```

3. Press ↑ or ↓ to set the fade time
4. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.



Note: Zero (0) seconds should not generally be used with TV-type 2kW or higher wattage lamps, where the minimum recommended is 0.05 s. Faster response times should be used with care as they may cause spurious Overload or Short Circuit error.

Dimmer curves

Dimmer curves (dimmer laws) are used to adjust the relationship between control level and light output. This enables the dimmer to be fine-tuned to accommodate the preferences of a live audience or a television camera. There are 10 factory standard dimmer laws, and a provision for further custom selectable curves in later software releases.

The factory default is LINEAR. The following dimmer curves are available:

LINEAR	Linear relationship (default)
BBC	BBC specification (modified square law for TV applications)
S-LAW	S-Law
INV. LIN	Inverse Linear (0% DMX gives 100% Output etc)
TVE	Television specified curve
FLU-30	Fluorescent (minimum 30%)
110V LIN	110V lamp load, linear law
FLASH	flash effect (light switches on and off as the control fades up and down)
NON DIM	Non-dim or switch operation (see note below)
2kW	Adjusted linear curve for 2kW loads
USR1-6	User-definable curves, configurable via DimStat



Note: There are two method for selecting Non-Dim (switch) operation - via the dimmer curve and the I/O option, both found in CONF. For Non-Dim operation, either or both options may be set, but for normal dimmer operation BOTH must be set to 'NO'.

To select a dimmer curve

1. Press CONF.
 - If Config Chan is SINGLE, the screen shows the individual channel number
 - Press ↑ or ↓ to select the required dimmer number
 - Press ← to reselect the channel number
 - If Config Chan is JOINED the screen shows a T
2. Press → to select the CURVE option, highlighting the existing value in square brackets:

```
CONFIG:  CH: 1
CURVE [LINEAR]
```

3. Press ↑ or ↓ to select the dimmer curve
4. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Non-Dim Operation

PowerModules may be set to switch on and off rather than dim, and in this way are used for many other functions such as switching power to working lights, non-dim and auxiliary circuits. There are two methods of selecting non-dim operation - as described here, and also as one of the 'Dimmer Curves' as described in the previous section.

In Non Dim mode the channel switches on at 6% and switches off at 5%.

To prevent accidental damage due to 'flashing' discharge loads, when in I/O mode the T-IN option defines a minimum "On" time, and T-OUT a minimum "cool-down" or Off time.

Eg: If T-IN is set to 10 seconds and T-OUT is set to 30 seconds, a rapid on-off flash of the channel will cause the output to stay on for 10 seconds, then wait 30 seconds before it will turn on again.

Setting Non-Dim Switch Mode

1. Press CONF.
 - If Config Chan is SINGLE, the screen shows the individual channel number
 - Press ↑ or ↓ to select the required dimmer number
 - Press ← to reselect the channel number
 - If Config Chan is JOINED the screen shows a T
2. Press → to select the I/O option, highlighting the existing value in square brackets:

```
CONFIG:  CH: 1
I/O [NO]
```

3. Press ↑ or ↓ to turn I/O (Non-Dim) mode on or off.
4. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Start Mode

Power Modules are equipped with a software feature to alter the criteria for dimming cold filaments. The response of a dimmer depends on the resistance of the filament, which varies according to temperature. A cold filament has a slower response than a warm filament. Although the Isine modules restrict maximum current to 10 times the nominal current, if the complete rig is subject to a sudden loss and resumption of power, it is possible for the combined cold switch-on load to exceed the diversified power supply can withstand, resulting in nuisance tripping of circuit breakers. For this reason, the dimmers are installed with a range of start modes to give the users flexibility in the set-up characteristics of the dimmer.

The options are:

BASIC	Normal mode
SOFT START	If the circuit has not been used for 5 minutes, the initial response time is automatically set to 500 ms
BURST	If the circuit has not been used for 5 minutes, the dimmer burst-fires 20 cycles at full power to heat the filament rapidly, giving a very fast lamp response.
PROP	Proportional burst start mode. The number of full power cycles is in relation to the speed of rise of DMX signal between 0% and 9%.
BLINK	Flashes the output to full. T-IN sets the fade in time, T-OUT sets the fade out time, and the DMX level sets the flash period.

To set start mode

1. Press CONF.
 - If Config Chan is SINGLE, the screen shows the individual channel number
 - Press ↑ or ↓ to select the required dimmer number
 - Press ← to reselect the channel number
 - If Config Chan is JOINED the screen shows a T
2. Press → to select the MODE option, highlighting the existing value in square brackets:

```
CONFIG:  CH: 1
MODE [BASIC]
```

3. Press ↑ or ↓ to select the start mode.

- Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.



Note: In BLINK mode the T-IN and T-OUT times define the fade-in and fade-out timings. The DMX level then controls these times proportionally. (E.g. at 100% DMX the full in and out times are used, and at 50% the times are halved.)

Information displays

Module Power Info

- Press PWR.
- The screen shows:

```
U: 236 234 235 V
I: 3 0 0 A
```

- U is the mains input voltage in Volts
 - I is the instantaneous load current in Amps.
- Press EXIT to leave the screen.

Dimmer Channel Info

- Press INST.
- Press ↑ or ↓ to choose CHANNEL INFO menu. Press ENT.
- The screen shows:

```
INFO      CH: [1]
CURRENT   02.8 A
```

- Press ← or → to select other information as follows:

CURRENT	Current in Amps measured at the output (May differ from an input current as Sinewave dimming acts like a transformer)
VOLTAGE	Voltage at the input of the dimmer
TEMP.	Dimmer module temperature
DMXA	Level received from DMX Port A
UA	Level received from Ethernet sACN control
ACTUAL	The actual level of the dimmer (May differ from DMX value due to MIN, MAX or MANual settings)
STATUS	Any error message(s) with details
COS Phi	Approximation of load Power Factor

- Press ↑ or ↓ to select another dimmer channel (shown in square brackets), or,
- Press EXIT to leave the screen.

Manual Control

This group of buttons provides direct access to detailed set-up and status information and manual override controls, and do not require passwords for access.

Manually control a dimmer level

It is possible to control any dimmer directly from the front panel using the cursor controls to set the desired level. This can be used for testing circuits, overriding control signals or setting an independent fixed level. The level is mixed with any other incoming signal on a highest level takes precedence basis.

1. Press MAN.
2. Press ENT on MANUAL LEVEL
3. The screen shows:



```
L:          236V
CH: T123456  0A
```

4. Use ← or → to select a channel number (active channel number is underlined), or 'T' which controls all channels together.
5. Press ↑ or ↓ to adjust the level. The dimmer output is controlled live while in this menu.
6. Press ENT to store the current levels or EXIT to leave the previous settings unchanged.



Note: Stored manual levels will persist throughout power cycle, and be merged Highest-Takes-Precedence with DMX and sACN control input.

To operate the built-in chaser

The PowerModule has a sequence chaser to provide basic effects without a control desk. This is primarily used for exhibition and display lighting purposes.

Not currently implemented

Fault Reporting

Local Fault reporting

If a discrepancy in the normal operating parameters is detected, the PowerModule will report the potential fault and will take action to minimise the effect of the fault. The CHK LED illuminates if a fault is recorded, and any circuit errors are reported on the screen above the channel number affected as shown below for channel 3 which is displaying a short-circuit condition:



```
L.:  s    UAxUBx
Ch: 123456 DAxDSx
```

Status Code	Meaning
l	no load (control present but no output)
s	short circuit
t	over-temperature
o	overload (e.g. 4kW plugged into a 2kW dimmer)
c	internal dimmer control faulty (e.g. output with no control signal)
v	voltage out of range (either over or under voltage)
d	fault has persisted beyond a default auto-reset time, and the dimmer has been disabled

and is now awaiting manual intervention and reset

The channel display indicators give the last recorded fault condition. If the fault is a self-resetting fault, or if the dimmer is automatically disabled, the reason for the problem may not be obvious from the channel display.

To assist with faultfinding a log of the errors may be seen in DimSTAT, and a summary of the history is shown using the dimmer's LCD screen as follows. Faults are discussed in greater detail in Section 8 'Fault finding'.

To check fault reports and to reset the log

1. Press CHK.
2. The screen shows:

A photograph of a dimmer's LCD screen. The screen is green and displays the text "STATUS : OK" in black, bold, uppercase letters. The screen is framed by a white border.

- This screen has no errors

3. Press ↑ or ↓ to view any other reports in the error log.
4. Press ENT to leave the menu and CLEAR the log or EXIT to leave the log unchanged.

DimStat

DimStat provides a system-wide network, and operates on a host polling protocol where the PC searches for connected dimmers at initiation, and then regularly polls dimmers for data to display. If a fault occurs, the PC's display quickly shows the detail, and if the fault is cleared the system resets accordingly. Information displayed includes: DMX start address per unit, DMX OK, line voltage, current per channel, dimmer curve, response time, maximum and minimum current, type of fault reported (temperature, overload etc.), date and time of fault. It is possible to set the dimmer curve, start address and pre-heat from DimStat software on the PC. The operation and performance of the PowerModule dimmer is monitored constantly and comprehensively by the on-board data processors, and this information is available on the LCD screen of the dimmer, and through DimStat.

For further information, please refer to the DimStat software manual.

Service

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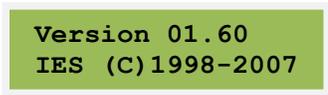
Germany

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techserv-hoki@etcconnect.com

Fault finding

Module Firmware Version

1. Press INFO, and either wait or press it again.
2. After displaying the nominal voltage, current and frequency settings, the screen shows:



Version 01.60
IES (C) 1998-2007

3. After 3 seconds, the screen automatically resets to show the normal output details.

Reported faults

No load (control present but no output)

This can be reported if either a load fails or if no load is connected.

Short circuit

This can happen if a lamp filament blows, or if a faulty cable or luminaire is connected to the circuit. A temporary short circuit such as a lamp failure will produce a SHORT report in the log, but the dimmer will usually reset to normal operation when the fault has cleared. If the fault continues, the channel will eventually change to DISABLE.

Disconnect the load from the dimmer and check the circuit wiring and connected loads for the short.

Over-temperature

If one of the Isine modules exceeds an operating temperature of 78°C, the dimmer will switch off and report an over-temperature condition. This can be caused if the ventilation is obstructed (e.g. the dimmer is resting on the floor and is being used continuously at full load).



Note: If the dimmer module is not suspended in free air then it will be cooled less effectively and its power handling capacity will be limited.

Overload

The dimmer will respond quickly to any error which demands a higher current than expected, for example 4 kW plugged into a 2.5 kW dimmer. The dimmer will automatically switch off and after 3 seconds will attempt to fade up the circuit again. If this process fails 3 times, the dimmer will report an overload and will disable until the fault is cleared and the dimmer reset.

Control Fault

The Control fault indicates an internal problem due to power or parts failure. Ensure that there is no external fault, such as over-voltage, before replacing the module.

Voltage out of range

If the supply voltage varies too far above or below the nominal voltage the dimmer will close down and report a voltage error. In the case of temporary supply fluctuations, the fault will auto-reset, but if the dimmer shuts down, the first point to check is the nominal voltage setting of the dimmer to make sure it is set to the local supply voltage.

Disabled

If a fault persists beyond the auto-reset time of 10 seconds, the dimmer will close down awaiting manual intervention and reset. Check the fault log to see the type of fault which caused the dimmer to disable.

First line maintenance

This check list provides initial assistance in the case of a problem which has not been identified and reported by the dimmer's own software.

LCD display blank

- Check all power supply connections.
- Check any module RCBO or MCB is on.

LCD display corrupted

- Switch off and on again.
- If the fault persists, open the module and check all connections, and that plug-in ICs are secure in their sockets.

No output from one channel

- Check the control signal is active.
- Check the DMX address is correct.
- Check there is no 'I' showing on the output screen.

- Remove the dimmer channel and check the internal fuse.

RCBO trips continuously

- Unplug all load plugs - If the fault persists, refer to service technician.
- If the RCBO holds in, replace one plug at a time until the RCBO trips again.
- Check the circuit (cables, plugs and sockets, distribution, lights) for a loose terminals, a phase to neutral short, a phase to earth short or a neutral to earth short and correct where necessary.

Dimmer output is full on all the time

- Disconnect the DMX cable to isolate control.
 - If the dimmer is still on after a few seconds, check:
 - a) That the MANual level is set to 0%
 - b) The dimmer curve has not been set to 'Inverted'
 - c) The MIN level is at zero
 - d) If I/O is on, check the T-IN time
 - If the dimmer is still on, and there is no 'Control' fault identified, refer to a service technician.
- If the dimmer switches off when the DMX cable is removed, check that both NON-DIM mode selections (dimmer curve and Channel Configuration I/O) are set to OFF. If one or both these functions are set to ON, the dimmer will be operating in Non-Dim mode.

Lamp filaments are noisy

Replace the lamp with a new lamp, and in the case of 110 V PAR lamps, try the circuit with a different manufacturer's lamp, as some lamps are noisy even on smooth mains supplies.

Dimmers work, but DimStat doesn't recognise all or some dimmers

If using Serial DimStat, check the DMX network to ensure 2-pair cable is used and correctly connected throughout. If a DMX booster/isolator unit is used in the network, check that it supports bi-directional data on pins 4 and 5.

If using Ethernet DimStat, check that the Power Modules are properly connected to the Ethernet network and can be PINGed.

Voltage regulation is not operating properly

The PowerModule uses a measurement of mains voltage in the general operation of the dimmer circuit, in the status reporting system, fault detection and reporting, and output voltage compensation. For accurate measurement and operation, the incoming mains supply voltage at the dimmer is calibrated at the factory. If this calibration is wrong, the voltage-related parameters will be affected. The solution is to recalibrate the PowerModule.



WARNING: RISK OF ELECTRIC SHOCK This set-up procedure may only be carried out by a qualified electrical engineer as it involves an accurate measurement of the mains supply.

To adjust calibration of line voltage

This requires a true RMS digital voltmeter, and a safe means of connecting the voltmeter to the dimmer's supply. If the mains supply is known to have a high impedance, it is advisable to take the measurement under normal operating loads so that voltage drop in the supply can be accommodated in the measurement.

1. Measure the voltage of the PowerModule power supply.
2. Press INST.
3. Press ↑ or ↓ to choose CAL.VOLTAGE menu. Press ENT.
4. Enter the service password. Press ? to set the digit and press ? to enter the other digits. The screen now shows:
5. Press ↑ and ↓ to adjust the voltage to match the voltage measured at the supply.
6. In 3-phase Power Modules press ← and → to select the other phases.
7. Press ENT to leave the menu and record the changes or EXIT to leave the previous settings unchanged.

Appendix A: Menu Structure

Flowchart of the PowerModule menu system

