iDrive™ 1000 The intelligent 210W LED Driver

USER MANUAL

Product Overview

The unique **iDrive™-1000** LED driver is the latest intelligent innovative driver and control system from IST Ltd, designed to optimise the performance of second generation high power LED lighting systems.

The patented **iDrive™-1000** includes a wealth of innovative technology to allow the user total choice and flexibility in LED type, fixture and installation.
Each channel can be individually tuned to optimise specific LED forward current settings with a variable constant current output between 350mA and 1000mA, precisely in 50mA increments.

The output connection utilises a simple 8-way terminal block for ease of installation, the number of LED's fitted to each channel can be varied. The patented power supply automatically adjusts the forward voltage between 14 - 55 VDC to allow for the number and type of LED's being used, since most LED's have different forward voltages. The **iDrive™-1000** will cater for them all, it also compensates for voltage drop over long cable runs.

The **iDrive™-1000**, DMX-512A system, has been designed to the latest accreditation and is fully isolated and protected, with the ability to use a 'master' - 'slave' setup the iDrive™-1000 is a truly flexible system designed for the user and lighting designer who requires much more from their lighting systems.

The **iDrive™-1000** ensures ultimate reliability with multiple protection systems to enable increased longevity for all lighting installations. An internal sensor measures the PSU temperature itself to ensure that the system is optimised whatever the environmental conditions whilst a patented closed-loop feedback monitoring facility for the LED fixtures can be activated during set-up enabling four different temperature profile setting - an industry first. Both thermal feedback systems will protect LED's and drivers from failure whatever climate they are operating in.

Features

• Variable forward current settings on each output channel between 350mA and 1000mA in 50mA increments.

• Simple LED display interface to control DMX addresses and internal preset functions.

• Master / Slave Option

• Universal voltage input with standard IEC converter 100-240V AC / 50 - 60hz

• Compact size and rugged aluminium construction.

• Standard 5-Pin XLR DMX in/out connections.

• Output 8-pin terminal block.

• Patented Colour Cool™ thermal management system to optimise and prolong the life of fixtures & LED's.

• 4 Thermal control settings to allow for a range of environmental installations.

• The iDrive™ technology is licensed and patented in the UK and USA with Worldwide applications pending.

• Patented colour mixing 3 channel system.

• Smooth dimming control 0-100%.

• High Efficiency up to 85% max .

• Long life and high reliabilty (50,000 hours).

• Short and open circuit protection.

• Output voltage 14V - 55V DC (variable).

• Self test functions.

• No forward voltage binning resulting in cost savings.

• Internal thermal protection.

• Safety approvals include CE.

V.1.4

Patented: USA 6,963,175.B2
GB 2369730

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SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input

Input Voltage Range	:100 - 240V AC
Input Frequency	:50 - 60 Hz
Consumption	:14 - 210 Watts
Power Factor	:0.98 MAX
Efficiency	:85% MAX
Connection	:Standard IEC
Standby Power	:14 Watts (Total)
Insulation Class	:1

Output

Power Output Range	:5 - 55 Watts per channel
Output Current	:350mA - 1000mA per channel
Output Current control	:50mA increments.
Voltage	:14 - 55V DC per channel 55V DC
Voltage Increment	:256 steps
Connection	:8 - Pin terminal

Control Input

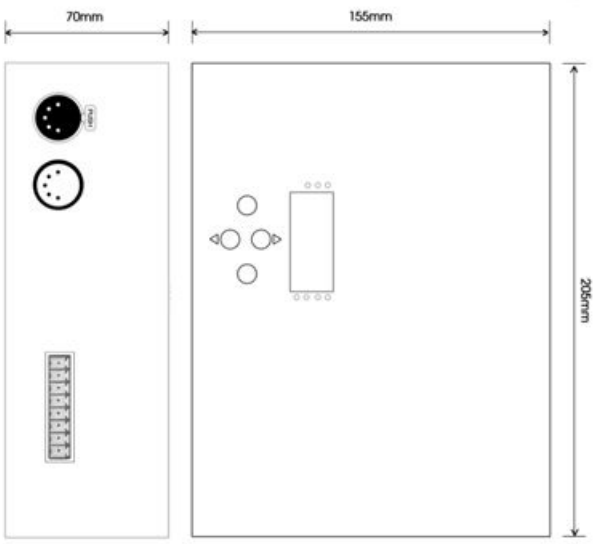
Dimming control	:DMX-512A
Connection	:Standard 5 - Pin XLR
Dimming Range	:0 - 100%
DMX Start Address Range	:1 - 510 via Display Panel
DMX String Length	:1 - 3 via Display Panel
Programmes	:See user manual for all pre-sets
Master / Slave Arrangement	:See user manual for set up

Mechanical

Mounting	:Four 3mm holes for fixing
Construction	:Aluminium casing for improved thermal dissipation

Environmental

Operating Ambient Temperature	:-20ºC to + 40ºC
Storage Ambient Temperature	:-20ºC to + 70ºC
Case Temperature	:+ 65ºC
Relative Humidity	:80%
Lifetime (failure after 50,000 hours)	:5%
Lifetime (failures after 50,000 hours):	5%



Dimensions:

205 x 155 x 70 mm

Weight: 1250 grams

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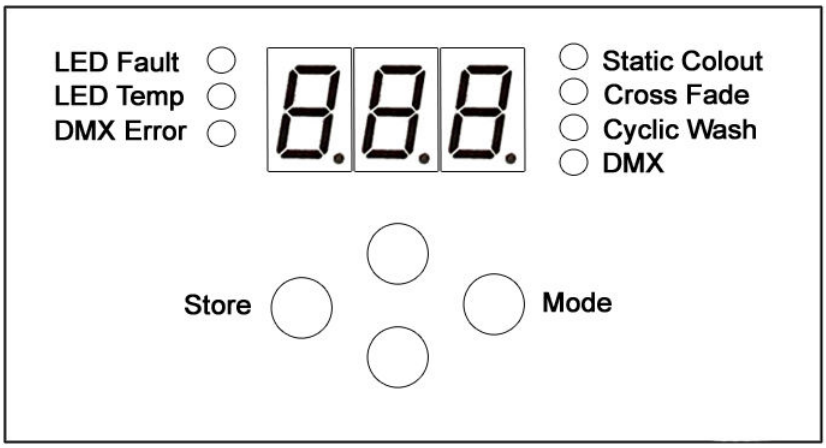
DMX AND PRE-SET PROGRAMME SETTINGS



- **Static Colour** - 37 preset colours
- **Cross Fade** - 56 preset colours with 8 speed setting
- **Cyclic Wash** - 4 preset with 8 speed setting
- **DMX** - address 001 - 510 with 3 string length setting

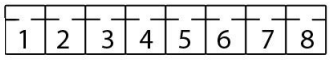
- **LED Fault -** this indicates faulty wiring or connection to the LED fixture
- **LED Temp -** this will flash when the thermal protection is activated.
- **DMX Error -** this will flash when the system is set to DMX but no signal is being received

WIRING SPECIFICATION INFORMATION

CONNECTION OUTPUT

8 - Pin Terminal Block

1 = Channel 1+	5 = Channel 3+
2 = Channel 1-	6 = Channel 3-
3 = Channel 2+	7 = Thermistor Ground
4 = Channel 2-	8 = Thermistor Temp



* IST Ltd recommend that a 10K ohm SMT thermistor type: EPCOS B57621C103J62 is located in the centre of the LED board for effective thermal management control.

iDRIVE™ CONFORMS TO THE FOLLOWING PSU SPECIFICATIONS.

EMC:
EN 55022/55015
EN 61000-6-3
EN 61000-6-4
EN 61547

Harmonic & Flicker
EN 61000-3-2
EN 61000-4-2 to EN61000-4-11

Safety:
EN 60595-1 & EN 61558-1

CE

Factory Default Setting

Channel No	1	2	3
Forward Current mA	500	500	500

Function	Static Colour	Cross Fade	Cycle Wash
Setting No	037	028	001
Speed	003	003	003

LED fixture thermal feedback setting @ T1 (off)
DMX setting address 001 string length 3

colourcool

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The iDrive-1000 has been designed to work with all high powered LED's

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IST Ltd is a certified Future Electronics LUXEON® Solution Partner

USER MANUAL

Set-up

1.To re-set factory setting, switch off at the main's power, hold down buttons 'store' and 'mode' then switch on power, when the 'store' and 'mode' buttons are released the **iDrive™1000** will power up with the pre-set function. (Fig 1)

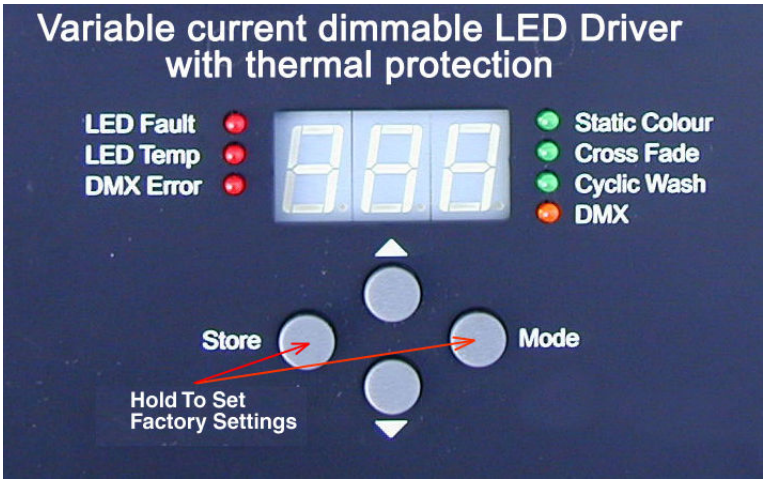


Fig 1

2. To change the forward current on each channel the following procedure is used.
Note: please ensure that any changes in the factory set forward current is suitable for the LED type being driven. The **iDrive™1000** has a changeable forward current range between 350mA and 1000mA in 50mA increments.

Switch off power supply, hold down 'store' and '▼', switch power back on, as the 'store' and ▼ ' buttons are released the **iDrive™1000** will default to the forward current setting for channel 1 and the LED indicator at 'static colour' will be on. (Fig 2)
The current can be changed up ▲ or down ▼ in increments of 50mA and shown on the LED display.
Once the required forward current has been selected press 'mode' button to select channel 2, the LED indicator at 'cross fade' will be illuminated.

Again the current setting for channel 2 can be changed up ▲ or down ▼ to the require setting which are shown on the LED display.
Once the required current settings are obtained, press the 'mode' button to go to channel 3, the LED indicator at 'cyclic wash' will be illuminated.

Repeat the procedure by selecting the required current settings using up ▲ or down ▼ buttons.

Once all three channels have been set the user can either press 'store' to exit the function and save all settings OR press 'mode' button' to gain access to the thermal feedback settings.

The thermal feedback settings have 4 pre-set selections accessed by using up ▲ or down ▼ buttons.

OFF- no thermal feedback.
T1 - the thermal control will activate between 60°C and 100°C
T2 - the thermal control will activate between 70°C and 110°C
T3 - the thermal control will activate between 80°C and 120°C
T4 - the thermal control will activate between 90°C and 130°C

SEE FIG 3

Please note:
Additional thermal modes have been reserved for future releases

Once the required feedback settings have been selected press 'Store' to save and exit the program.

Please note: Any program changes made will be remembered by the **iDrive™1000** even if the unit is powered off.

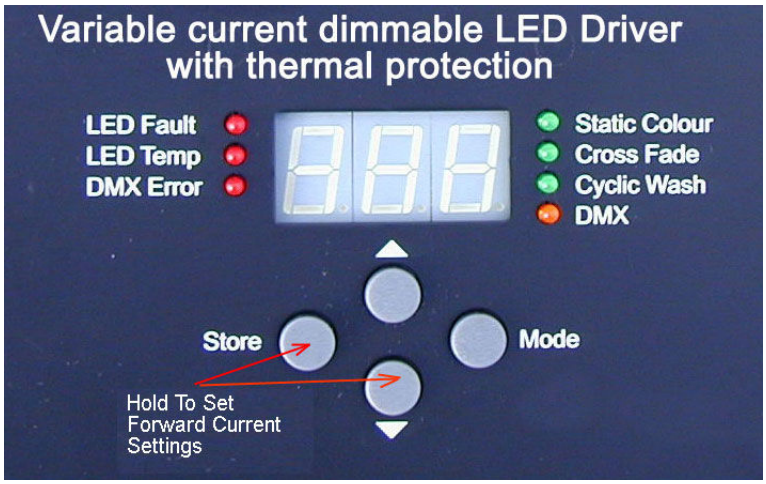


Fig 2

Functions

3. Internal functions.
The iDrive has three internal 'mode' selections for stand alone installations or slave - master setup.

Static colour
By pressing the up ▲ or down ▼ buttons many different colour pre-sets can be selected. Once the required colour has been selected press 'store' to save and exit. (See Static Colour Settings Matrix Page 8)

Cross fade
This effect allows the user to select a cross fade between one colour setting and another, example is a fade from Yellow to Purple, Many different colour's have been programmed in to the **iDrive™1000** to allow a full selection of fades from one colour to another. (See Cross Fade setting matrix Page 9)
The colours are selected by using up ▲ or down ▼ buttons, once the required colour's have been selected, press the 'store' button to save. This action will take the user into a 'speed' selection and the speed between the fade colour's selected can be changed from a fast colour change 'sp1' to a slow fade 'sp8'.
Once the required speed has been selected press 'store' to exit and save.

Cyclic wash
This is a function that will cycle the colours clockwise, Red to Green to Blue or anti-clockwise Blue to Green to Red. Again, as with the cross fade, once the cycle has been selected press 'store' button to save and access the speed control.
(See Cyclic Wash Setting Matrix Page10)

Please note when selecting mode settings, if the 'store' button is NOT pressed within 20 seconds the **iDrive1000** will revert back to its previous stored setting.

4. **DMX**

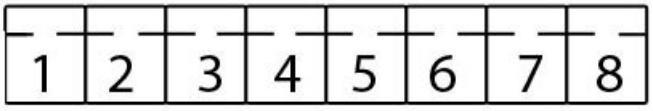
By selecting the 'DMX' button the **iDrive™1000** can be controlled by a DMX system, full DMX address selection is made using the up ▲ or down ▼ buttons.
Once the required address has been chosen, press the 'store' button.
This will save the DMX address setting AND allow the user to set the string length between 1 and 3.

The string length setting facility is useful in many situations,
Example: If the **iDrive1000** is being used to drive all white LED's (12 per channel) then by setting the string length to 1, only one fader is required to dim all channels.
If the string length is set to 3, there is individual control over Red, Green & Blue.

LED fixture connection

8xpin terminal block connection configuration reading left to right as you 'look' at the header on the PCB is:

Pin 1 = channel 1, Red +
Pin 2 = channel 1, Red -
Pin 3 = channel 2, Green +
Pin 4 = channel 2, Green -
Pin 5 = channel 3, Blue +
Pin 6 = channel, 3 Blue -
Pin 7 = thermister ground
Pin 8 = thermister LED temperature



Internal Thermal Protection

The **iDrive™1000** contains a built in thermal safety facility, should the temperature inside the casing exceed 65ºC the internal thermistor will reduce all output channels by 90%.

LED fixture thermal feedback derating curves

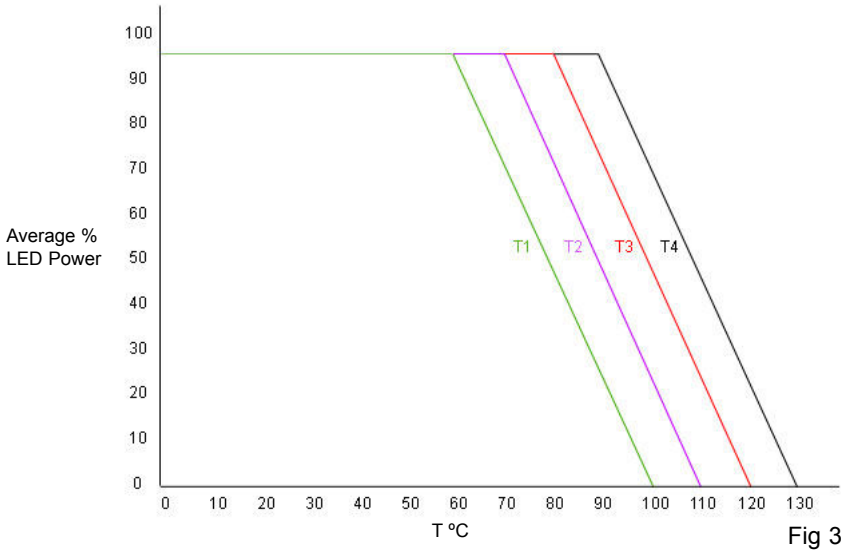


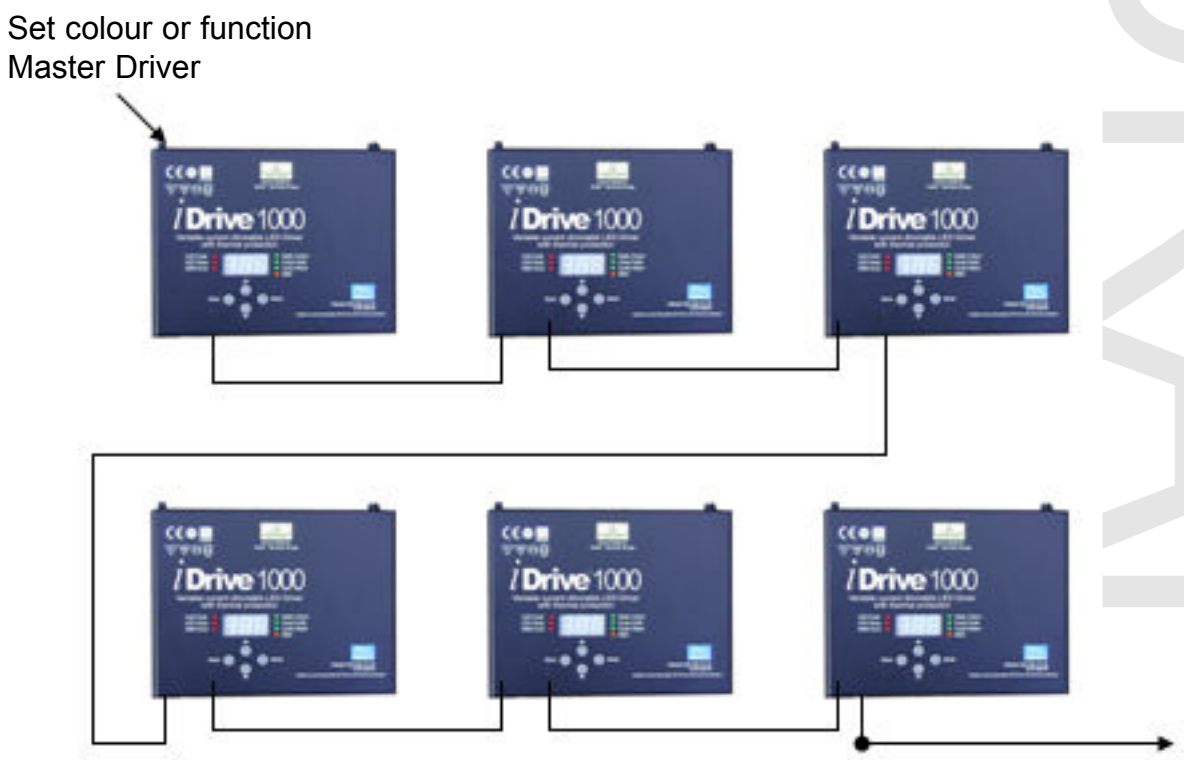
Fig 3

LED Fixture Thermal Feedback Derating Curves

Master slave Configuration

The **iDrive™-1000** can be used in a 'master' 'slave' arrangement as shown in Fig 4.

The first unit in the chain is set to a pre-set function, such as colour, cycle wash or cross fade, each subsequent driver is then set to a DMX address 001. Connection is via XLR in and out sockets using appropriate DMX leads.
This will allow all the units in the chain to replicate the settings and function of the first driver. Up to 32 drivers may be connected in the chain. The last driver in the chain should be terminated with a 120-ohm metal film resistor as per DMX practice.



‘Slave’ drivers, DMX address set to 001.

Fig 4

iDrive™-1000

Static Colour Settings Matrix

Number	Red %	Green %	Blue %
001	100	0	0
002	100	33	0
003	100	66	0
004	100	100	0
005	66	100	0
006	33	100	0
007	0	100	0
008	0	100	33
009	0	100	66
010	0	100	100
011	0	66	100
012	0	33	100
013	0	0	100
014	33	0	100
015	66	0	100
016	100	0	100
017	100	0	66
018	100	0	33
019	100	50	50
020	100	66	50
021	100	83	50
022	100	100	50
023	83	100	50
024	66	100	50
025	50	100	50
026	50	100	66
027	50	100	83
028	50	100	100
029	50	83	100
030	50	66	100
031	50	50	100
032	66	50	100
033	83	50	100
034	100	50	100
035	100	50	83
036	100	50	66
037	100	100	100

Cross Fade Settings 001 - 028 are saturated colour, 029 - 056 are pastel colours.

Cross fade will fade from the start colour in column 1 to the finish colour in column 2.
Note:

Magenta = Red & Blue
Cyan = Blue & Green
Yellow = Red & Green
White = Red & Green & White
Black = Off

Number	Start Colour	Finish Colour
001	Black	Red
002	Black	Green
003	Black	Yellow
004	Black	Blue
005	Black	Magenta
006	Black	Cyan
007	Black	White
008	Red	Green
009	Red	Yellow
010	Red	Blue
011	Red	Magenta
012	Red	Cyan
013	Red	White
014	Green	Yellow
015	Green	Blue
016	Green	Magenta
017	Green	Cyan
018	Green	White
019	Yellow	Blue
020	Yellow	Magenta
021	Yellow	Cyan
022	Yellow	White
023	Blue	Magenta
024	Blue	Cyan
025	Blue	White
026	Magenta	Cyan
027	Magenta	White
028	Cyan	White

The Cross Fade colours for settings 029 - 056 replicate the above but in 'pastel' colours this means that all colours are on at 50% intensity, with the moving colours cross fading between 50% and 100% intensity

Once the selected cross fade setting has been selected, then the speed of the function can be set between 001 -008 by using the up/down buttons.

Cross Fade Speeds

Speed No	Time sec's
SP1	1.65
SP2	5.00
SP3	8.02
SP4	14.75
SP5	27.85
SP6	54.00
SP7	106.50
SP8	209.75

Cyclic Wash 001 - 004

Number	Sequence	
001	Red / Blue – Red / Green – Green / Blue	clockwise
002	Blue / Red – Blue / Green – Green / Red	anti-clockwise

Setting 003 is as setting 001 but in pastel colour, all colours are on at 50% intensity with the moving colours intensity changing between 50% & 100%
Setting 004 is the same as 002 but in pastel setting.

Once the selected cyclic wash has been selected, then the speed of the function can be set between 001 -008 by using the up/down buttons.

Speed No	Time sec's
SP1	4.90
SP2	14.75
SP3	24.50
SP4	44.25
SP5	83.50
SP6	162.20
SP7	320.00
SP8	630.00

iDrive™ 1000 wiring configurations.

Since the **iDrive™1000** power supply is specifically designed for LED applications, each channel has its own power supply and can be considered separate for the purpose of connecting LED's.
Consideration as to the mix of LED numbers per channel must be made when using the **iDrive™1000** internal stand alone functions.

Fig 1 shows the **iDrive™**1000 powering 4 x LED's on the first channel, 8 x LED's on the second channel and 12 x LED's on the third channel.

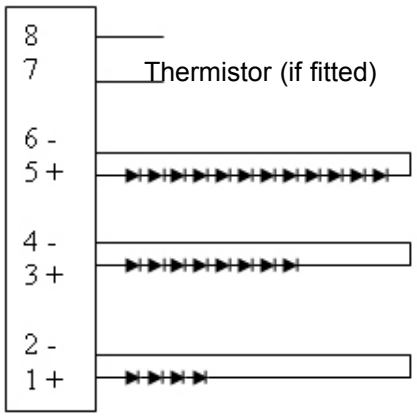
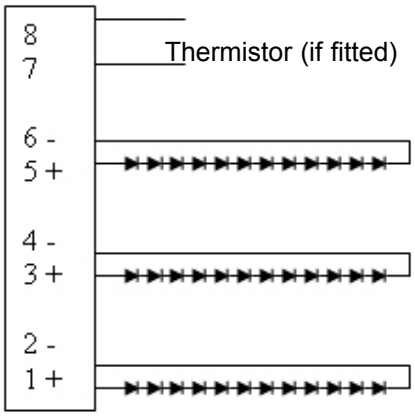


Fig 2 shows a conventional 36 x RGB fixture connected to the 8 - pin terminal block



8 - pin terminal block typical connection using all 8 x wiring options with the thermistor pair included. (Fig 4)

Fig 4

iDrive™ 1000 wiring configurations.

As the forward current can be set independently on each output channel, the following shows typical, but not all possible setup configurations.