User Manual
Typhoon

Revision 03.0

September 2026

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Approvals – US/Canada

Tempest Lighting, Inc. declares that the Projector Enclosure Series listed below are authorized to use the marking specified by UL LLC:

Blizzard, Part Number 52.xxx
Whisper, Part Number 53.xxx
Typhoon, Part Number 54.xxx
Cyclone, Part No. 55.xxx
Tacit, Part No. 56.xxx
Zen, Part No. 57.xxx

Tempest projector Enclosures are UL Listed, File Number E498709.

September, 2023
Tempest Lighting, Inc.

Approvals – Europe

CERTIFICATE AND DECLARATION OF CONFORMITY

FOR CE MARKING

Tempest Lighting, Inc.,

18723 Via Princessa, Unit 319, Santa Clarita, CA 9138, USA

t: +1 818 963 7069 e: info@tempest.biz

www.tempest.biz

Tempest Lighting, Inc. declares that their

Typhoon Projector Enclosure Series 54.xxx.x.x

complies with the Essential Requirements of the following EU Directives:

Low Voltage Directive 2014/35/EU	Test Report 54-60065-6500-06-24
Electromagnetic Compatibility Directive 2014/30/EU	Test Report 54-61000-6500-06-24

and further conforms with the following EU Harmonized Standards:

EN IEC 62368-1:2020+A11:2020	Test Report 54-62368-06-24
EN 60529:1991/A2:2013/AC:2019-02	Test Report 54-60529-06-24
EN IEC 61000-6-3:2021	Test Report 54-61000-6-3-06-24
EN IEC 61000-6-1:2019	Test Report 54-61000-6-1-06-24
EN IEC 55015:2019/A11:2020	Test Report 54-55015-06-24

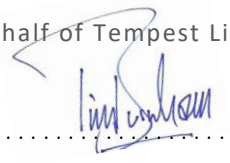
Dated: 12th April 2025

Position of signatory: President

Name of Signatory: Tim Burnham

Signed below:

on behalf of Tempest Lighting, Inc.



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Approvals – China

强制性认证目录外产品确认书
Confirmation Letter for Products
Outside the Scope of China Compulsory Certificate

Ref. No: CL-TEMPEST-160818-1

申请人: Applicant: Tempest Lighting Inc.		地址: Address: 11845 Wicks St., Los Angeles,CA 91352 United States
生产厂名称: Factory: Tempest Lighting, Inc.		地址: Address: 11845 Wicks St., Los Angeles, CA 91352, USA
产品名称: Product Name: 投影仪外壳, 灯具外壳 Projector Enclosures Moving Light Enclosures Lighting Enclosures	型号: Model: 18xx.IN, 19xx.IN, 2xxx.IN,66xx.IN, 52.xxx.IN, 53.xxx.IN, 54.xxx.IN, 55.xxx.IN, 56.xxx.IN	商标: Trademark: Tornado, Twister, Thunder, Blizzard, Whispr, Typhoon, Cyclone, Tacit
产品标准: Standard: /		HS code: 9405.99.0000

产品描述(包括使用场所) Product Description (utilization of product) :
Enclosures for high-powered luminaires and video projectors for outdoor use and indoor noise attenuation. For professional use only.

产品为用于户外和室内噪声衰减大功率灯具和视频投影仪的外壳。仅供专业使用。

确认意见 Conclusion:

According to the product description, the models above are out of CCC scope.

基于产品描述，如上型号的产品在中国强制性产品目录之外。

本确认书的有效期至: August 18th , 2017
Validity Period

日期: August 18th , 2016
Issue date:

Introduction

Thank you for purchasing a Tempest enclosure! We have worked hard to provide you with the very best product available for its purpose, and we shall continue to do everything possible to ensure that it works well for you for many years to come.

Please read this manual before starting work!

In the event of difficulty, please contact your Tempest reseller or Tempest direct:

info@tempest.biz

+1 818 787 8984

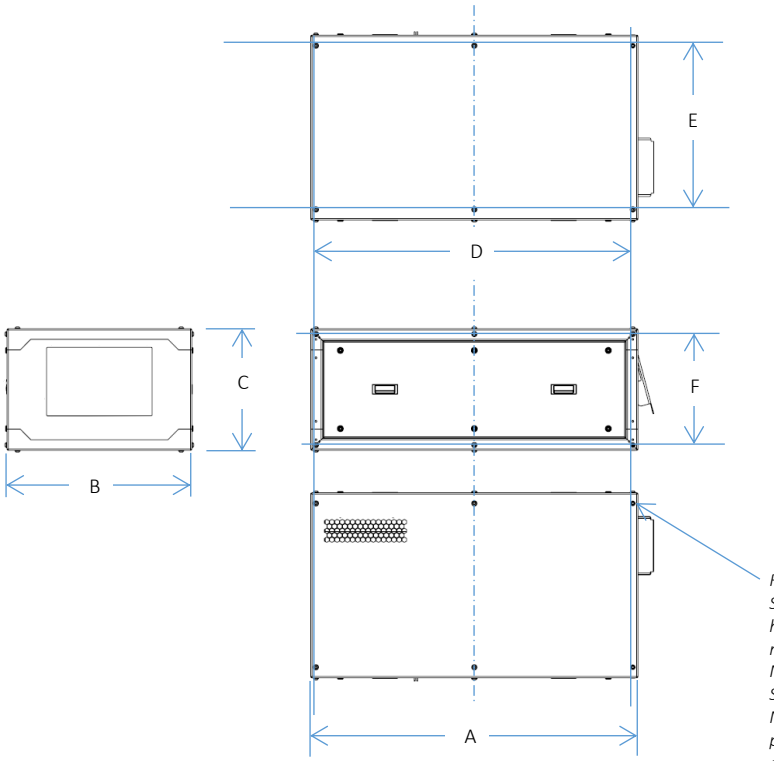
We will do everything we can to help you get the very best results from your Tempest enclosure.

IMPORTANT: Safety Advisories

- All installation and rigging work done must where applicable be designed and built in accordance with norms and standards of the local authority having jurisdiction of the installation site. It is the responsibility of the installer to obtain such approvals as may be required to achieve full compliance.
- All electrical work must be carried out by a suitably licensed electrical contractor in full compliance with local electrical standards.
- Lifting: some enclosures and the equipment inside them may be heavy. Use properly rated lifting equipment where appropriate and never attempt to carry out work with fewer than the number of workers needed to lift safely.
- It is the responsibility of the installer to ensure that all local building, safety and electrical codes are strictly adhered to in the installation of this enclosure. Tempest Lighting, Inc., its employees and agents are in no way responsible for damage arising from failure to follow either the instructions in this manual or building, safety and electrical codes prevailing at the installation location.
- Do not attempt to install or operate the enclosure before fully reading and understanding this manual
- Never allow anyone who has not read this manual to open the enclosure or perform maintenance on the projector within.
- Never leave the enclosure unattended when open.
- Always make sure all bolts and latches are tight and safety locks are in place after performing any form of maintenance on the unit.
- Do not open any electrical boxes until power has been shut off to all supply lines to the enclosure (including the one powering the projector).
- Do not open the enclosure in wet weather.

Installation

Dimensions and Rigging Points



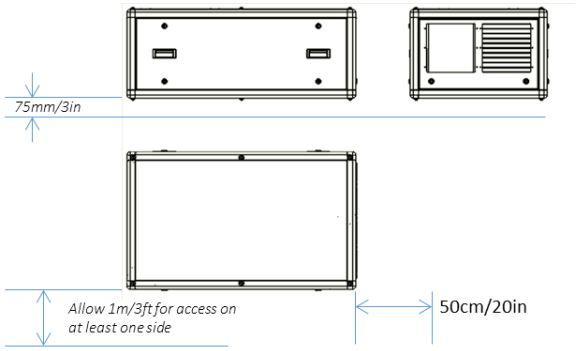
Rigging Points:
Six M12-1.75 x 40mm threaded holes top and bottom, left and right sides.
Note: M12x40 stainless steel bolts Supplied.
Note: Typhoon 100 – four rigging points top, left and right sides, six on base.

Typhoon	A in	A mm	B in	B mm	C in	Cmm	D in	D mm	E in	E mm	F in	F mm	W lb *	W kg *
54.100	34	864	30	762	15	381	32	813	26	660	13	330	85	39
54.150	42	1067	32	813	18	445	40	1016	28	711	16	394	106	48
54.210	51	1295	32	813	22	559	49	1245	28	711	20	508	177	80
54.250	51	1295	37	940	24	610	49	1245	33	838	22	559	223	101
54.305	51	1295	34	864	24	610	49	1245	30	762	22	559	205	93
54.310	59	1499	34	864	25	635	57	1448	30	762	23	584	247	112
54.320	67	1702	37	940	25	635	65	1651	33	838	23	584	305	139

*Enclosure weight, no options or accessories

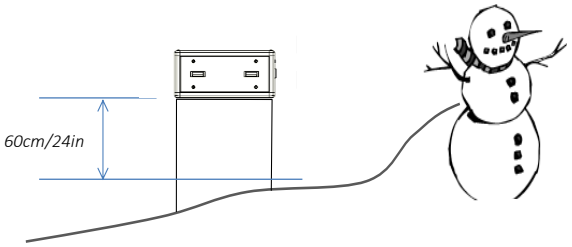
Air Clearance

Observe the minimum clearances shown around your enclosure



Snow Clearance

In areas where snow is likely, make sure the base of the enclosure is at least 24" [60cm] above highest potential snow drift level.



Mounting Bolts and Accessories

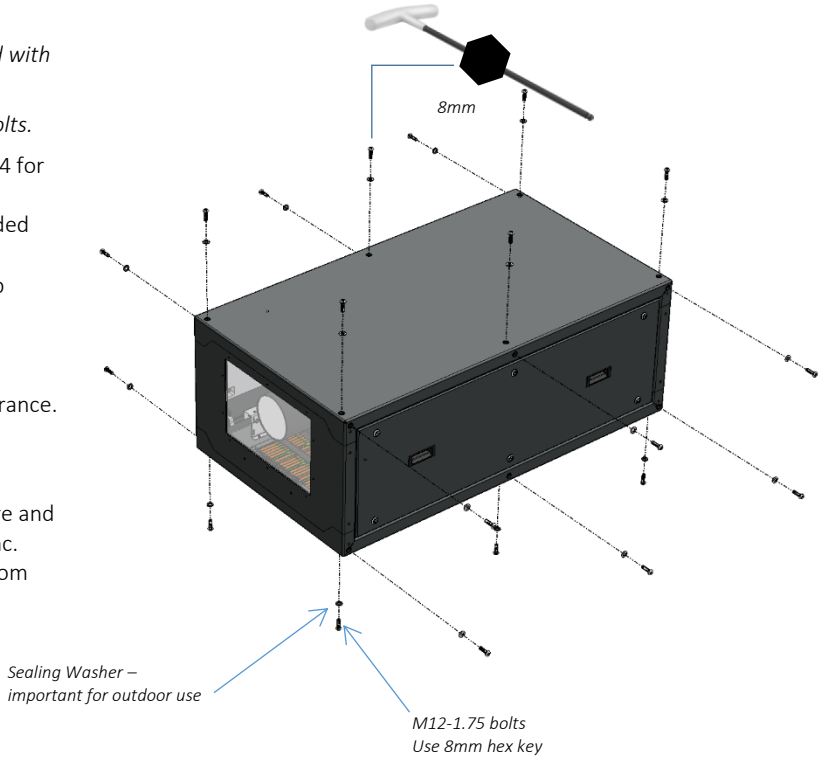
Note: In most cases Typhoon enclosures will be installed with the rigging options shown below.

All the rigging kits are installed using these mounting bolts.

- Each Enclosure must be mounted with SIX points (4 for Typhoon 100).
- All mountings must be made using the M12 threaded holes on the enclosure.
- Use an 8mm hex key to secure the M12 socket cap screws provided.
- Tempest recommends the use of stainless steel mounting hardware.
- Make sure the air inlet has at least 75mm/3in clearance.

IMPORTANT SAFETY NOTICE

Installer must ensure that all mounting points are secure and conform to local safety regulations. Tempest Lighting Inc. accepts no responsibility for damage or injury arising from inappropriate or unsafe installation.



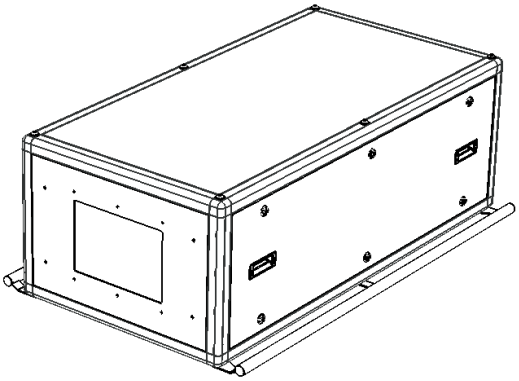
Rigging Options – Grab Handles

Grab handles make it much easier to carry and install the enclosure at the job site.

Handles install to the base of the enclosure for landscape operation, using the M12 bolts provided. For portrait, attach the handles to the side rigging points.

Grab handles may be used in conjunction with any of the available Typhoon rigging accessories.

54.GH.100	Typhoon 100	Pair of Grab Handles
54.GH.150	Typhoon 150	Pair of Grab Handles
54.GH.210	Typhoon 210	Pair of Grab Handles
54.GH.250	Typhoon 250	Pair of Grab Handles
54.GH.310	Typhoon 310	Pair of Grab Handles
54.GH.320	Typhoon 320	Pair of Grab Handles

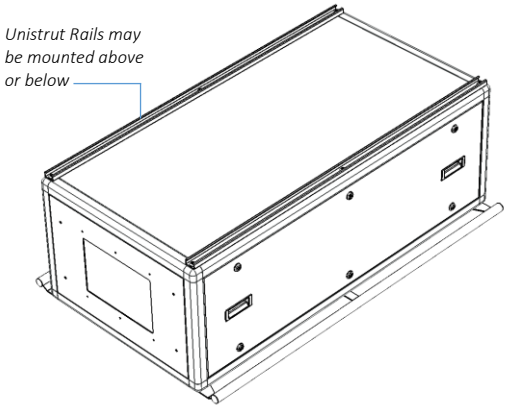


Rigging Options – Unistrut Kit

If mounting positions for the corner bolts are not convenient, use the Unistrut Kit to add two Unistrut rails and Unistrut spring nuts.

Using the spring nuts provided, the enclosure may now be attached at any point along the Unistrut rails.

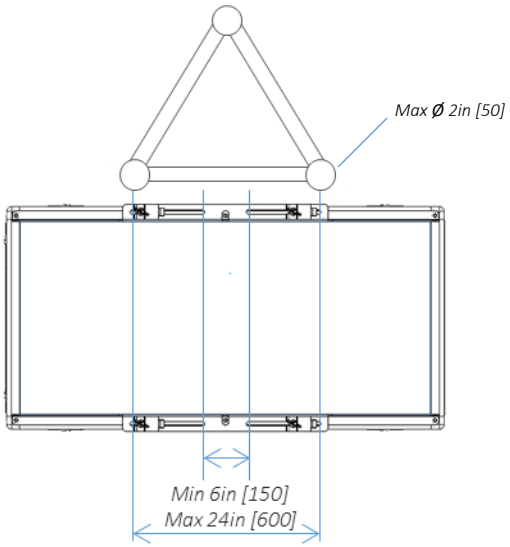
54.UR.100	Typhoon 100	Pair of Unistrut Rails
54.UR.150	Typhoon 150	Pair of Unistrut Rails
54.UR.210	Typhoon 210	Pair of Unistrut Rails
54.UR.250	Typhoon 250	Pair of Unistrut Rails
54.UR.310	Typhoon 310	Pair of Unistrut Rails
54.UR.320	Typhoon 320	Pair of Unistrut Rails



Rigging Options – Truss Kit

Use the Truss Hanger kit to hang any Typhoon enclosure from a truss up to 24in/600mm.

54.TR.100	Truss Kit, Typhoon 100
54.TR.150	Truss Kit, Typhoon 150
54.TR.210	Truss Kit, Typhoon 210
54.TR.250	Truss Kit, Typhoon 250
54.TR.310	Truss Kit, Typhoon 310
54.TR.320	Truss Kit, Typhoon 320

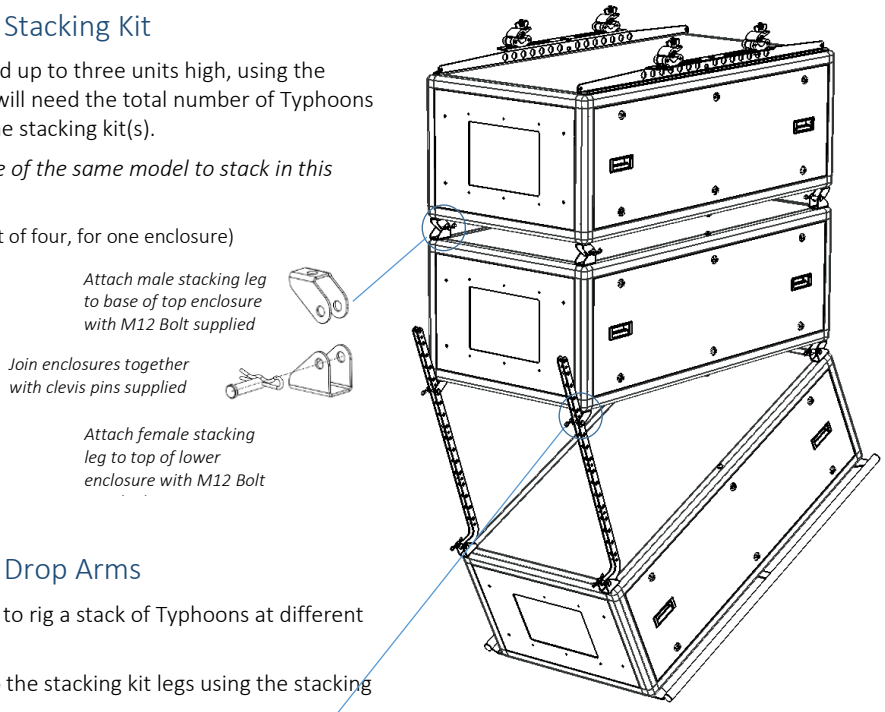


Rigging Options – Stacking Kit

Typhoon may be stacked up to three units high, using the 51.SK stacking Kit. You will need the total number of Typhoons to be stacked, minus one stacking kit(s).

Note: Typhoons must be of the same model to stack in this way.

51.SK Stacking Kit (set of four, for one enclosure)

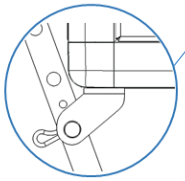


Rigging Options – Drop Arms

Use a pair of drop arms to rig a stack of Typhoons at different tilt angles, up to 45°.

The drop arms install to the stacking kit legs using the stacking kit clevis pins.

Important: Stacking kit legs must be installed facing forwards for use with drop arms.



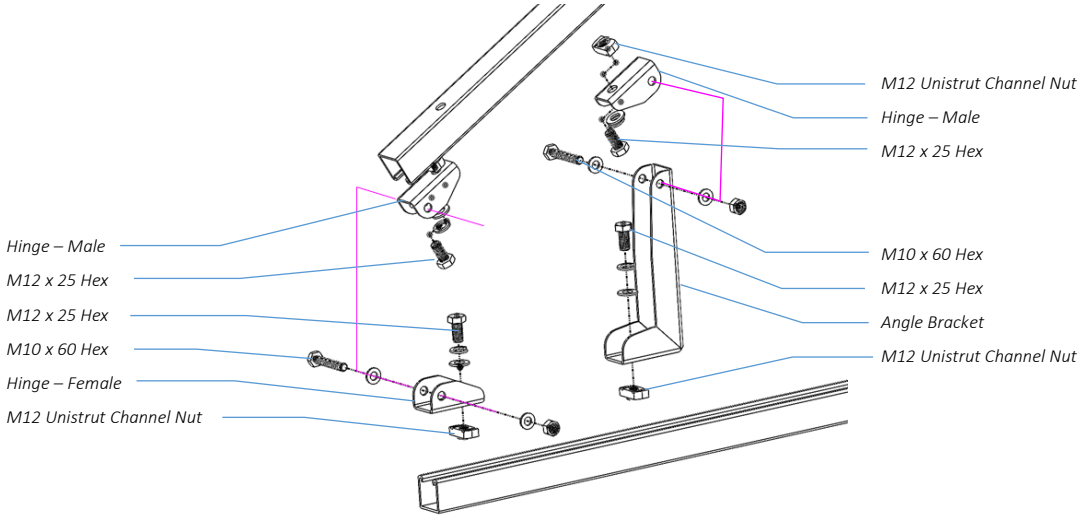
Note: Drop Arms require the use of a 51.SK Stacking Kit.

54.DA Pair of Typhoon Drop Arms

Rigging Options – Angle Mount Kit

The Angle Mount Kit is two separate tilt assemblies based on stainless steel Unistrut.

Each angle mount is shipped partially assembled. Complete the assembly, following the illustration shown here.



Use the Angle Mount Kit with any Typhoon enclosure, for a permanent tilt angle between 15 - 55°. The illustration here shows the enclosure mounted in a low position, projecting up, but the kit may also be used in a high position, with the enclosure reversed to project downwards, for example off the top of a building.

54.AM.xxx Angle Mount kit for Typhoon (xxx = model No.)

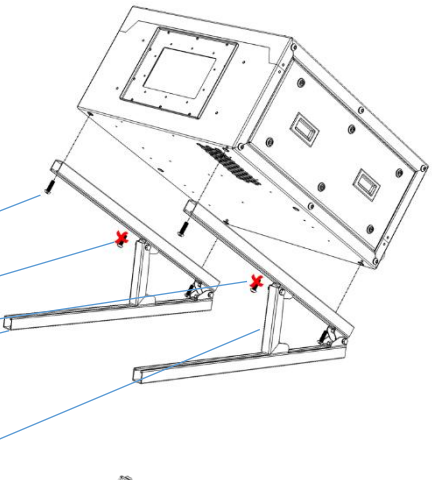
The kit comprises two sets of hinged stainless steel Unistrut supports. The top struts attach to the enclosure using the supplied M12 screws (use an 8mm hex key).

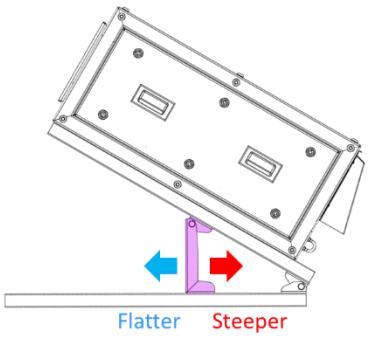
Typhoon 100: Discard the two middle bolts

Attach the bottom members to the structure/substrate using appropriate hardware (not included).

Simply slide the front supports along the Unistrut rails to adjust the tilt angle. Lock using a 19mm box wrench.

Angle range varies with enclosure length, but generally 15-50°.





Illustrations show landscape operation. Typhoon Angle Kit may also be attached to the side rigging points for portrait use.

Illustrations show projection tilted up. Simply reverse the enclosure for downward tilt angle.

Mounting the Projector

Most Typhoon enclosures come with a projector mounting plate, customized for each projector type to be used.

The projector mounts to the plate using either the ceiling mount threaded holes in the projector plate, or by removing the projector feet and replacing with appropriate screws (usually M10 or M12). This varies depending on the projector type.

1. Remove the projector tray from the Typhoon enclosure
2. Remove projector feet
3. Mount projector to plate, using the mounting holes and screws provided (this will differ by projector type)

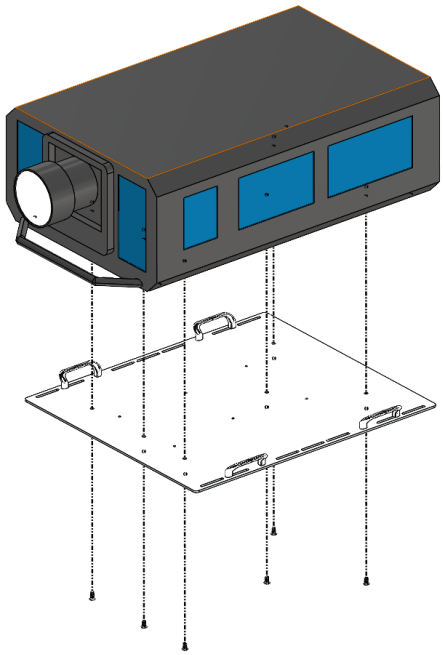
IMPORTANT:

Use either all four projector feet sockets or all available ceiling mount threaded holes, especially for portrait operation.

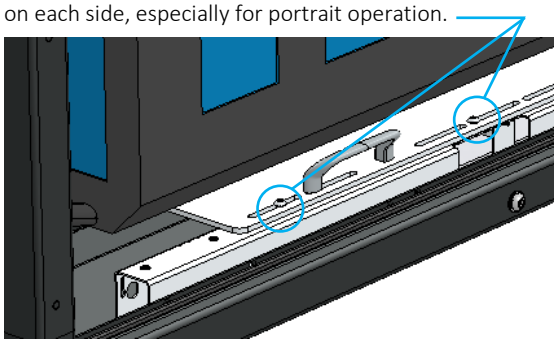
NOTE:

You may transport the projector inside the Typhoon enclosure, provided the enclosure is suitably protected in a road case or other vibration-absorbing method.

NOTE: You may specify multiple projector types when ordering, and Tempest will provide mounting holes for each type specified, based on projector manufacturer drawings.



4. Mount the projector/tray assembly in the enclosure
5. Adjust position front-back – it is usually best to have the lens front close to the port glass, both for projection and for air circulation.
6. Fix tray to projector beams, using the M8 screws provided. For larger projectors, use at least three screws on each side, especially for portrait operation.



Projector Mounting – Epson PU and PQ 13-20K Projectors

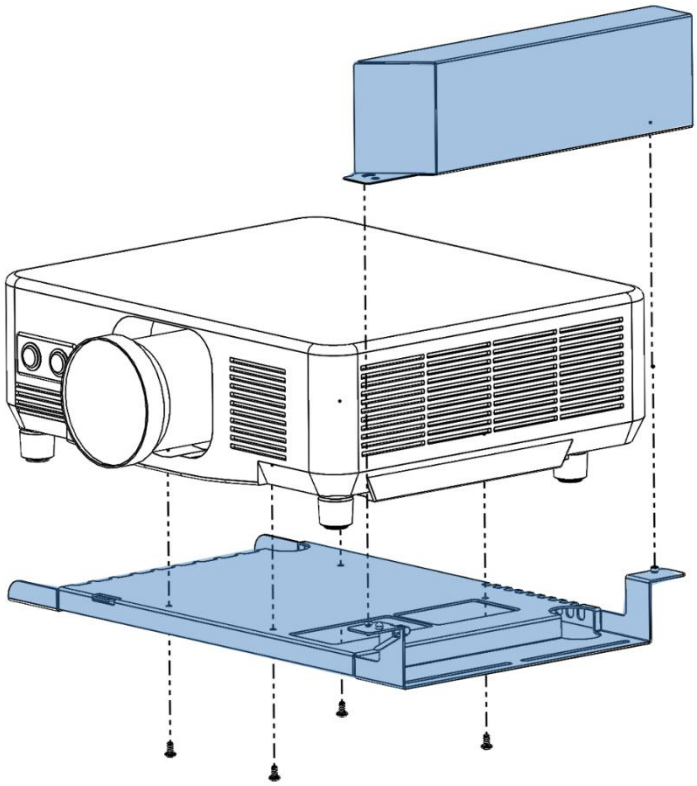
These projectors feature side exhausts, and a baffle is required to direct the exhaust air to the fan at the back of the enclosure.

The following instructions apply to Typhoon enclosures built after January 2026.

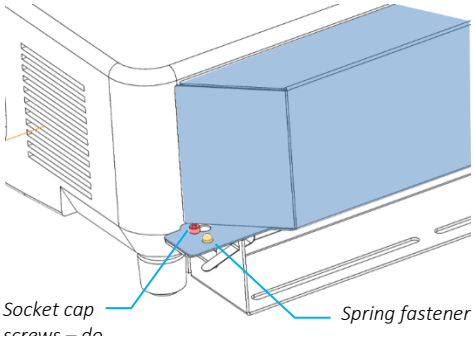
Note: It is not necessary to remove the projector feet (just screw them all the way in).

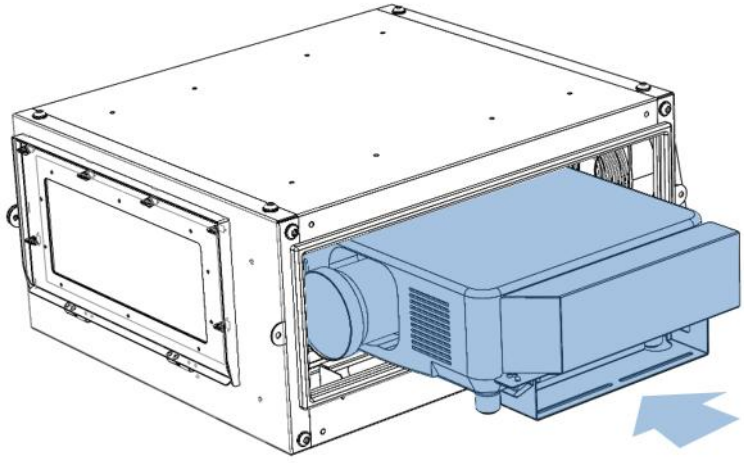
Use four M6 screws to attach the projector tray to the projector base.

Locate the side baffle on the two socket cap screws on the side of the projector tray. Slide into place until the spring catch snaps into place.

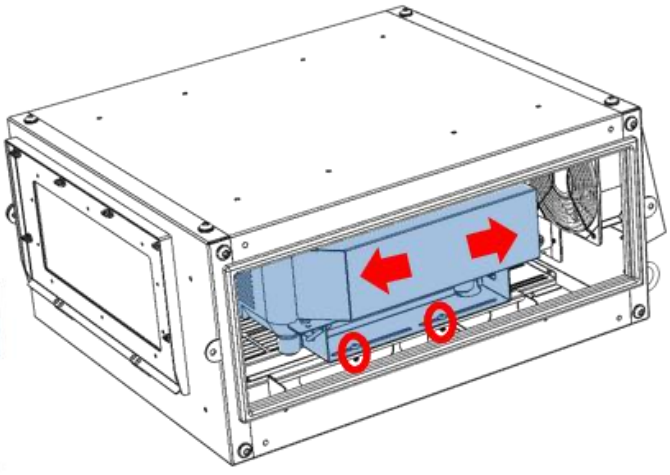


Side Baffle Mounting Detail





Slide the assembly into the enclosure



Adjust position front-to-back and secure with two M8 screws each side

Using Typhoon enclosures in Portrait mode

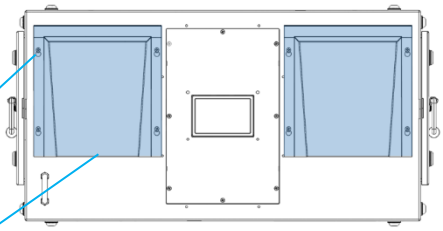
Typhoon enclosures may be used in either landscape or portrait mode.

Outdoor Use in Portrait Mode

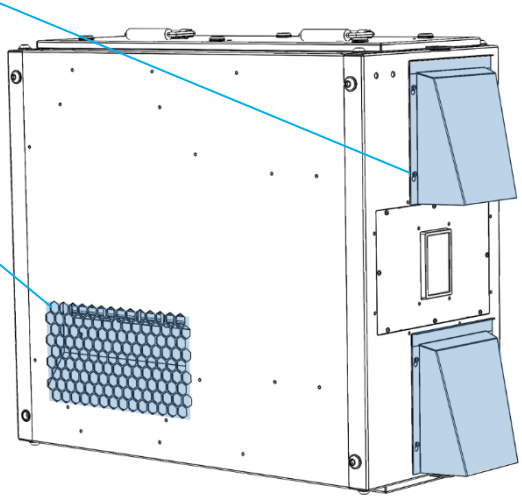
When using Typhoon projectors outdoors in portrait mode, the following steps must be taken:

Rotate Fan and Connector Panel

1. Loosen the 8 cowl screws one or two turns.
2. Remove both cowls, using the keyhole mounting holes.
3. Rotate the cowls 90 degrees and replace.
4. Tighten all 8 cowl screws



Rear view in landscape mode (layouts may differ)



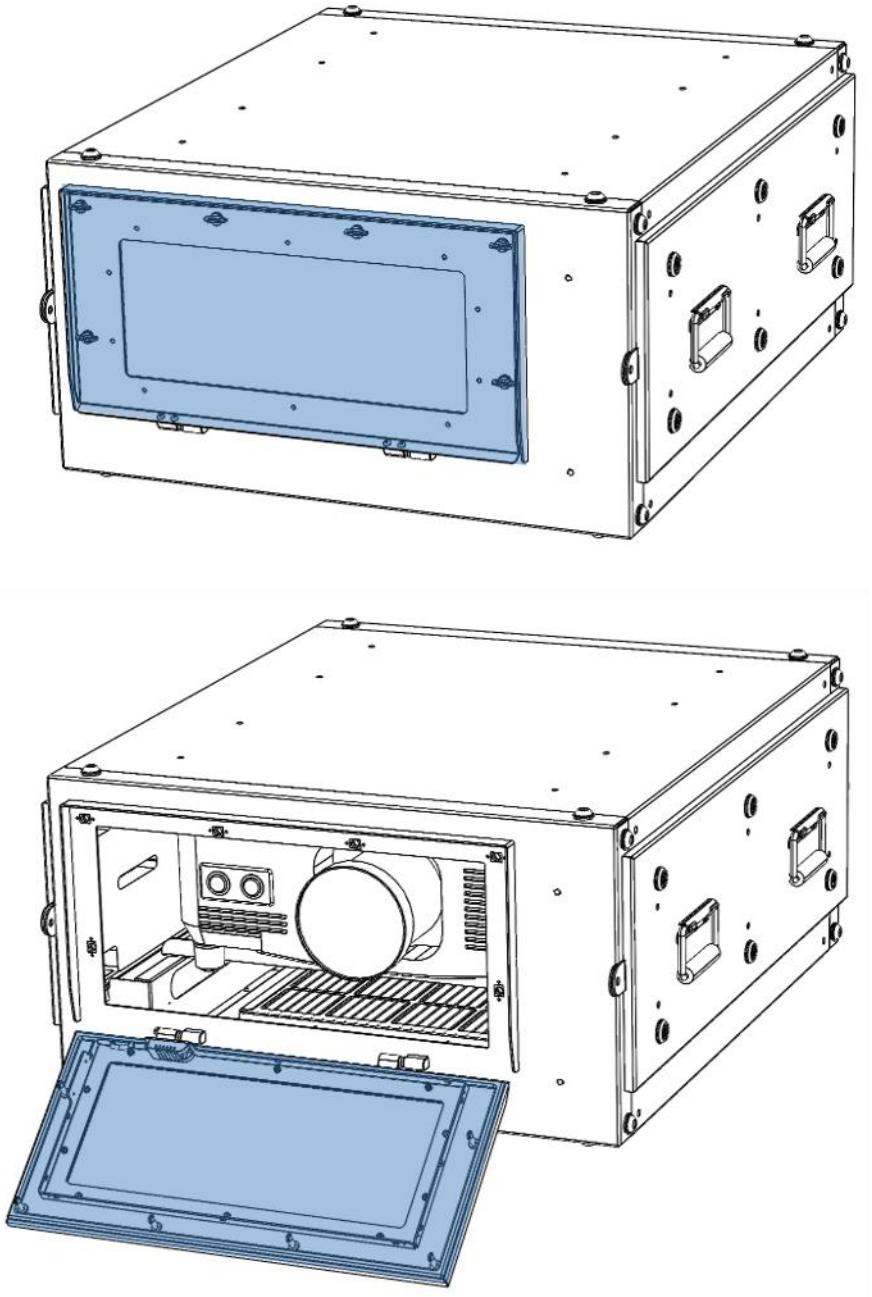
IMPORTANT: For outdoor use in portrait mode, the enclosure MUST be used with the inlet grille DOWN, as shown here.

Using the Typhoon Lens Door

A unique feature of current Typhoon enclosures is the easy-access lens door.

There is no need to move the projector if you need to change lenses in the middle of a production. Simply release the six quarter-turn fasteners, open the door, and switch lenses.

Easy!



Connecting the Enclosure

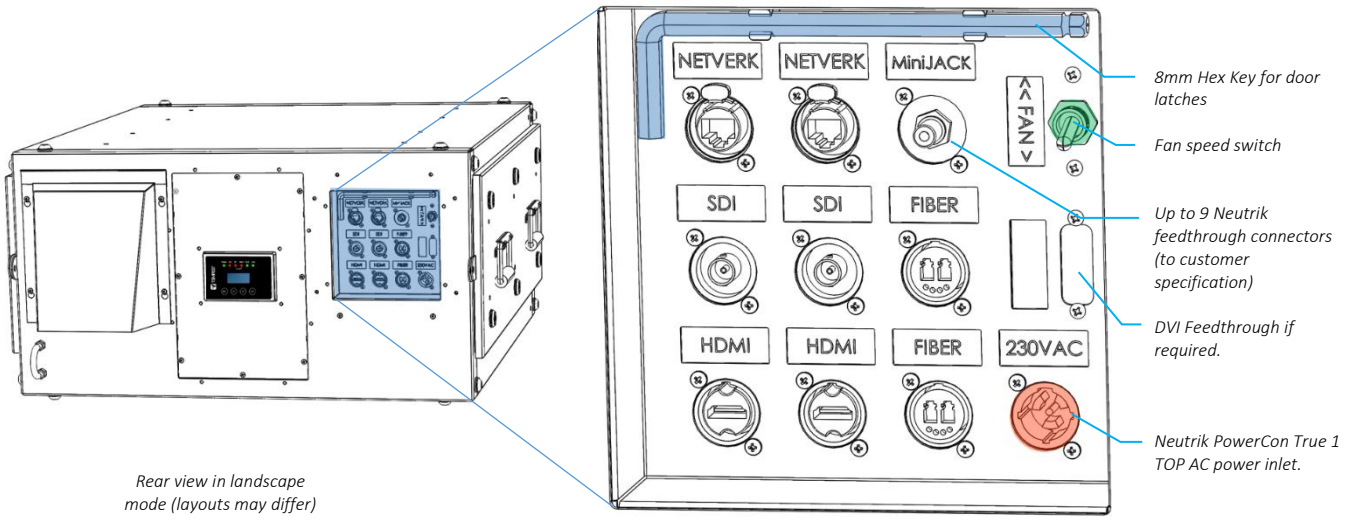
Typhoon enclosures for rental and staging are equipped with the power and signal connectors specified by each user, to suit the user's existing flexible power and signal cabling systems.

All signal connectors and most power connectors are located in the connector panel at the rear of the enclosure.

Note: For use on US-style electrical systems, Typhoon enclosures may be provided either with a 4-pole power inlet connector, or a standard 3-pole connector for 208V enclosure and projector power, and a separate 120V inlet for auxiliary power.

In most cases, A Neutrik Powe4rCVon True 1 TOP inlet connector is used (rated at 16A in Europe and 20A in the US).

Remove the connector panel cowl by loosening the cowl screws 1-2 turns and lifting off the cowl.



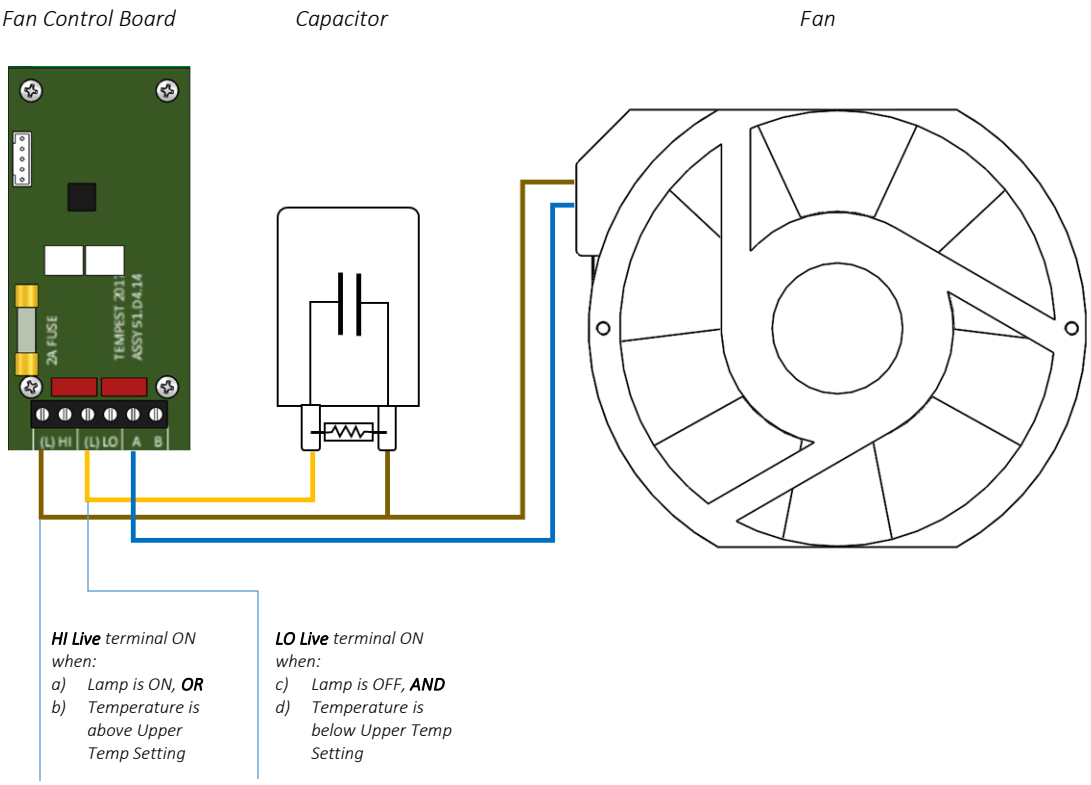
Rear view in landscape mode (layouts may differ)

Positive Pressure Fan Control Option

When the Positive Pressure (51.PP) option is ordered, the enclosure fan function is changed.

- Normally the enclosure fan(s) will run only when either the projector/luminaire lamp is on, or if the daytime temperature in the enclosure exceeds the DEC Upper Temperature setting. At all other times the fan is OFF.

- With the Positive Pressure option, when the fan would normally be off, it is instead powered via a capacitor that lowers the operating voltage so that the fan continues to run at a low level, maintaining positive pressure in the enclosure and preventing harmful contaminants from entering through the exhaust path.



Remote Monitoring Connections

Tempest enclosures optionally support two types of remote monitoring:

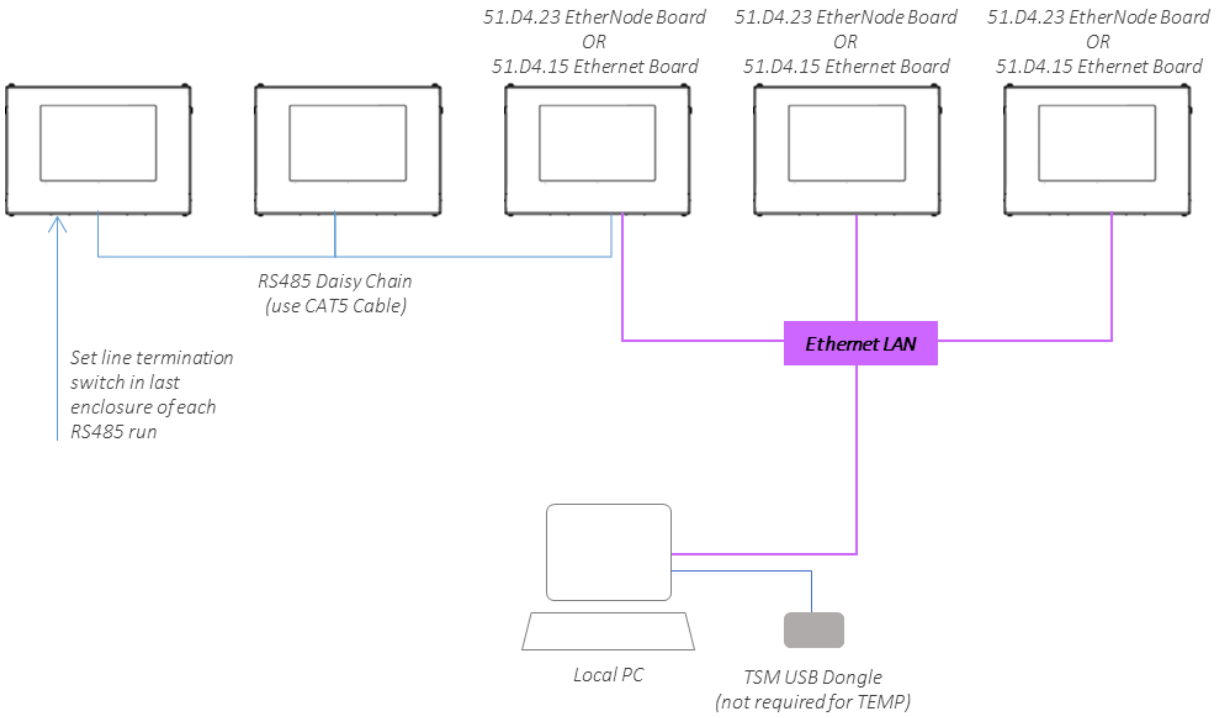
1. **Tempest System Manager (TSM)** – a dedicated network manager, with monitoring, system configuration and firmware upgrade capability over Ethernet.

   Requires 51.D4.23 EtherNode board in at least one enclosure

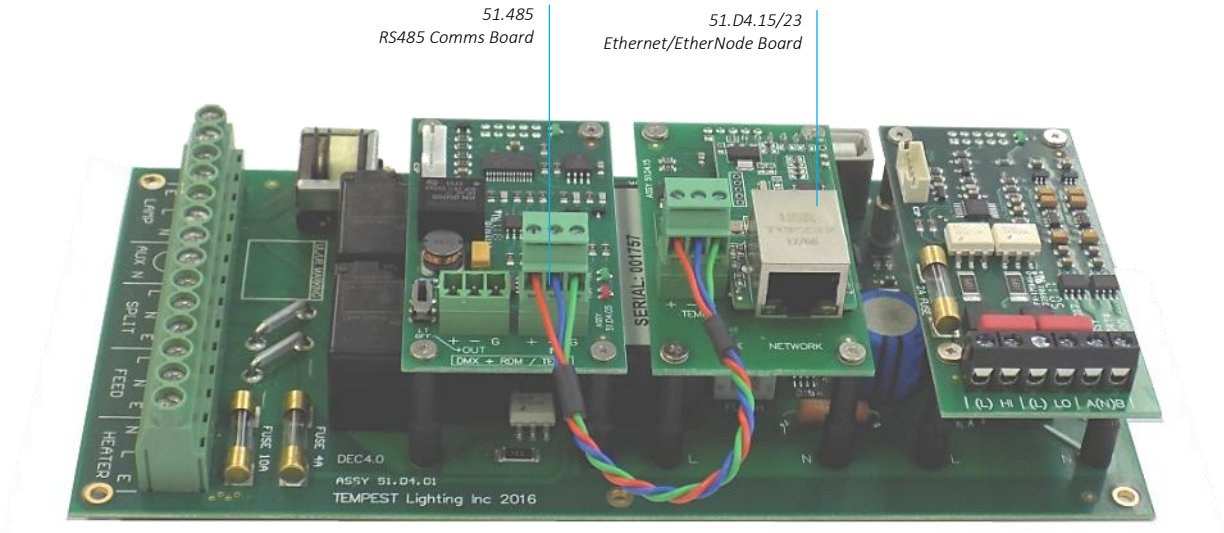
2. **Tempest Enclosure Management Protocol (TEMP)** – a simple protocol for use by system integrators wishing to monitor Tempest enclosures from their own show control network.

   Requires 51.D4.15 Ethernet board in at least one enclosure

The system topology is the same for both methods:



DEC4 Ethernet Adapters – 51.D4.15, 51.D4.23



As a default, DEC4 communicates using DMX512 and RDM, over RS485.

With the addition of either Ethernet board, any DEC4 – or any group of DEC4 boards connected using RS485 – may be connected to an Ethernet network – see above.

51.D4.15 Default Configuration

The bridge module is supplied in DHCP TCP port server configuration, with all traffic on port 3308. These settings may be changed with a web browser on port 80 at the DHCP assigned address. Login to the home page using 'admin' for user name as password.

The bridges may be discovered with a UDP broadcast on port 1500 and a payload of

(Hex) 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39

30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39

The bridge will respond from its DHCP address

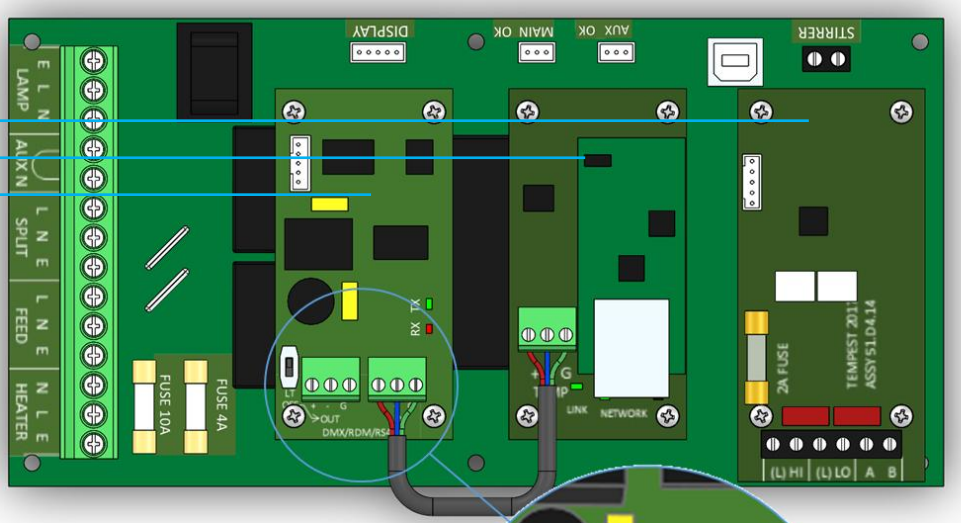
51.D4.15 Additional Support

The network IP is developed by Jinan USR, more details and software configuration utilities may be found by visiting their web site at https://www.pusr.com

RS485 (DMX/RDM) Cable Terminations

DEC4 System Control Board, with three typical Daughter Boards:

1. *AC Fan Controller*
2. *Ethernet Bridge*
3. *RS485 Comms*

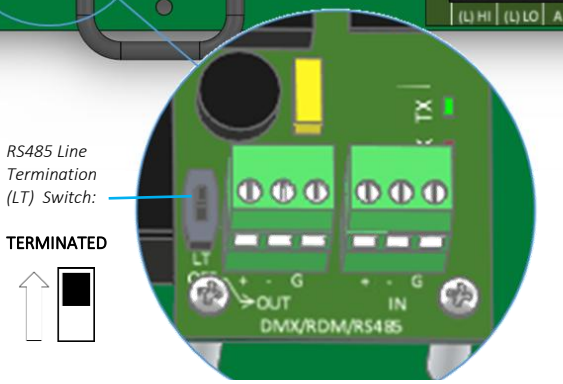


Loop a shielded twisted pair cable (eg Belden 9841, though many people now use a CAT5e cable) from the control/monitoring point, around all enclosures.

Maximum total cable length is 1,200M (4,000ft). For longer runs and wildly distributed systems, use a DMX/RDM splitter (make sure that it supports RDM) and multiple cable runs.

Use the termination switch to terminate each RS485 cable run at the last enclosure on each run.

RS485 Line Termination (LT) Switch:



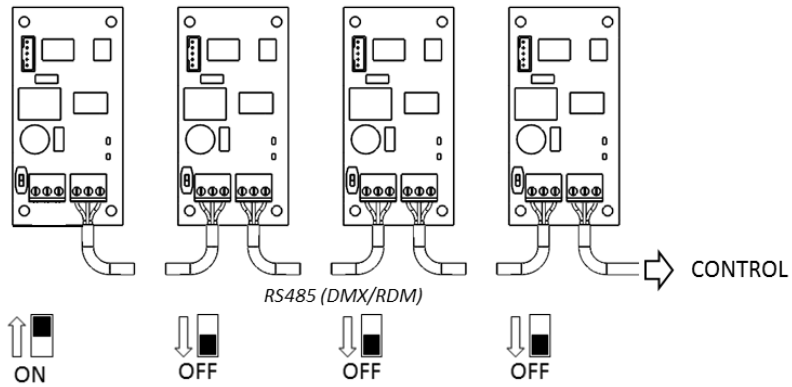
Data + Data - Common Data + Data - Common

DATA OUT DATA IN

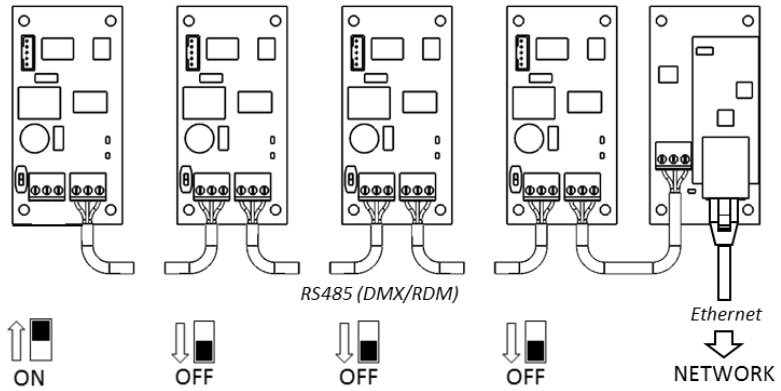
Terminal Screw Torque Setting 0.5Nm/4.5in-lb

Line Termination Switch Settings

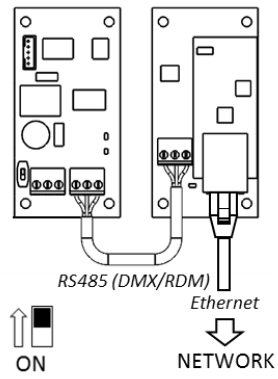
1. DMX/RDM control over RS485:



2. TSM/TEMP Control of an enclosure group via Ethernet



3. TSM/TEMP Control of a single enclosure via Ethernet



System Manager Installation

Connect the enclosure(s) to a Windows PC running Windows 10 or later, using the diagram above.

For more information on connecting enclosures using RS485, see the next section.

Note that Tempest System Manager is an operating mode of GetSet MV, a software application written and marketed by Tempest's electronics partner JESE. You will need to download GetSet MV from JESE's web portal:

https://www.jese.co.uk/support/

Use the Serial Number and Check ID from the RDM-TXI to log in:

IMPORTANT!

Do not connect any JESE USB device in to your windows PC before installing the software. Doing so may cause windows to install the incorrect USB driver for your device and prevent normal operation of the software.

JESE GetSet is licensed software and registered to a qualifying hardware component. Qualifying components include a USB controller such as an RDM-TRI or RDM-TXI.

The software license is perpetual and includes one year of updates and feature additions. Further updates and supports are available from JESE with an annual subscription fee.

Having installed GetSet, connect the RDM-TXI to the PC using the provided USB cable, and then launch the application.

Network Configuration

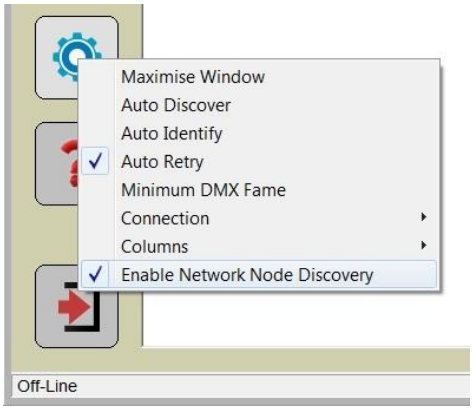
By default, EtherNode modules are configured for network DHCP addressing. In the absence of a DHCP service, modules will default to an address in 10.0.0.0/8 network range until a DHCP address is assigned. The default address may be determined by translating a modules' Serial Number to an address greater than $10 00 00 00. For instance, a Serial

Number of 1234 in hex is $ 04 D2 which yields a default network address of 10.0.4.170 and network mask of 255.0.0.0

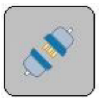
If there is no DHCP server available, the PC NIC (Network Interface Controller) may be configured to the 10.0.0.0 /8 CIDR. This may require administrator privileges to change settings. Please refer to the documentation or support resources for your operation system for configuring a static IP address.

3.4 Setting Up GetSet MV

For GetSet to discover EtherNodes on the same network, check the 'Enable Network Node Discovery' option in the Settings menu.

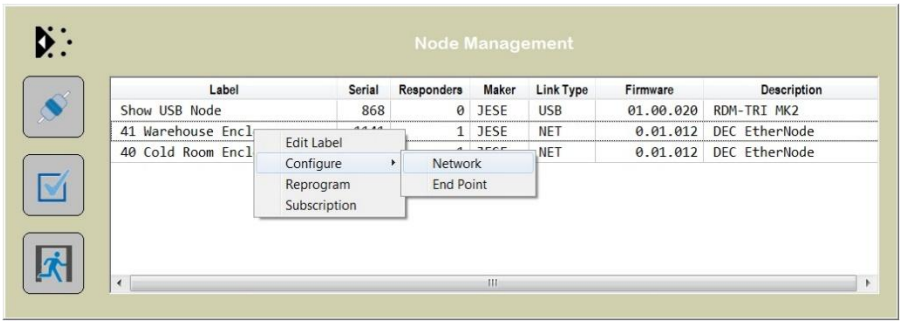


Next, click on the Node Button to open the Node Manager.

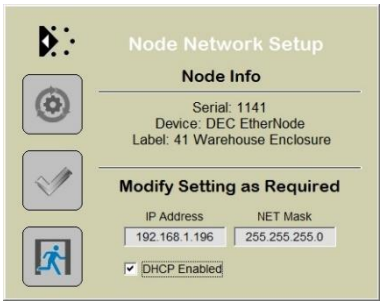


Click on the Connect Button to initiate a node discovery and populate the Node Manager with all USB and network enabled Nodes.

To assign a meaningful label to each of the nodes in the manager, right click on an entry and select the 'Edit Label' option.



EtherNode Configuration



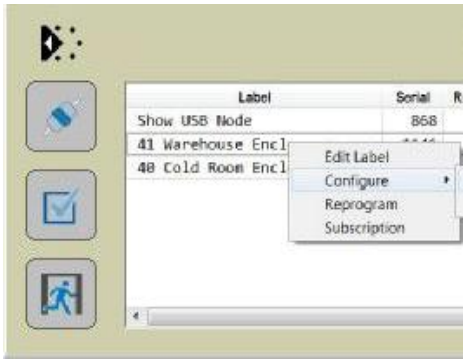
A node network configuration tool mat be accessed from the Node Manager by right clicking on an entry and selecting the Configure->Network Option.

Be aware, that setting an address and mask outside of the network used, will cause the connection to be lost.

To restore an EtherNode to default addressing and DCHC, Press and hold the DHCP reset on the EtherNode module, whilst powering up the DEC.

EtherNode Firmware Updates

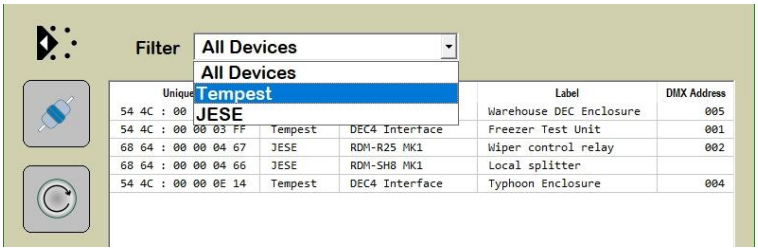
On occasion, there will be new firmware releases for EtherNodes and USB Controllers. The Firmware may be applied using the 'Reprogram' option, then selecting the File to load.



Enclosure Management

Running Discovery

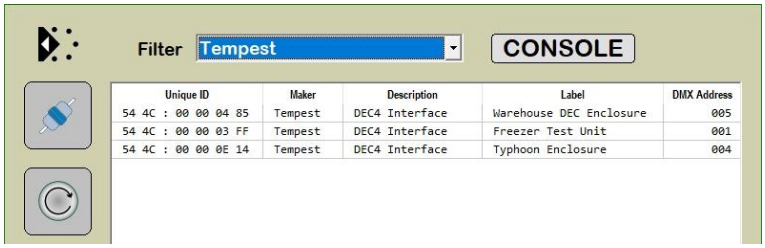
Having set up all EtherNodes and any other USB Devices, clicking on the discovery button will initiate a global discovery of all Tempest Enclosures and any other RDM compliant responders detected in the system.



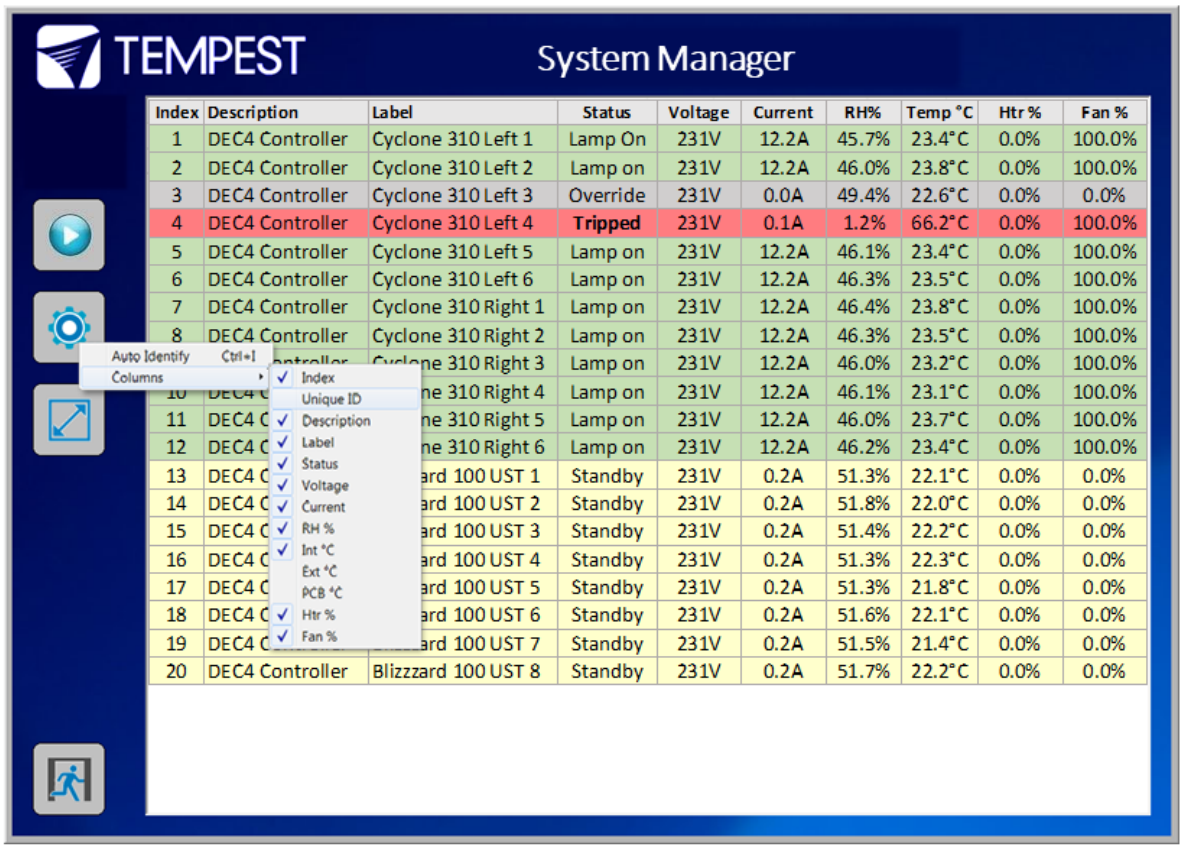
For Tempest Management options, select Tempest responders from the drop down filter list.

Enclosure Monitoring

On selection, the 'CONSOLE' button for Tempest enclosures provides access to the Tempest System Manager. The displayed responders will be limited to the Filtered items.



The Enclosure management window, shown here, loads from 'CONSOLE' button.



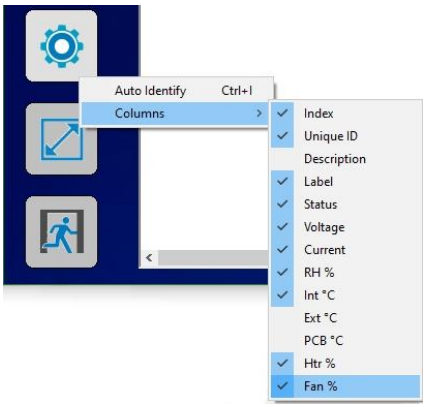
Index	Description	Label	Status	Voltage	Current	RH%	Temp °C	Htr %	Fan %
1	DEC4 Controller	Cyclone 310 Left 1	Lamp On	231V	12.2A	45.7%	23.4°C	0.0%	100.0%
2	DEC4 Controller	Cyclone 310 Left 2	Lamp on	231V	12.2A	46.0%	23.8°C	0.0%	100.0%
3	DEC4 Controller	Cyclone 310 Left 3	Override	231V	0.0A	49.4%	22.6°C	0.0%	0.0%
4	DEC4 Controller	Cyclone 310 Left 4	**Tripped**	231V	0.1A	1.2%	66.2°C	0.0%	100.0%
5	DEC4 Controller	Cyclone 310 Left 5	Lamp on	231V	12.2A	46.1%	23.4°C	0.0%	100.0%
6	DEC4 Controller	Cyclone 310 Left 6	Lamp on	231V	12.2A	46.3%	23.5°C	0.0%	100.0%
7	DEC4 Controller	Cyclone 310 Right 1	Lamp on	231V	12.2A	46.4%	23.8°C	0.0%	100.0%
8	DEC4 Controller	Cyclone 310 Right 2	Lamp on	231V	12.2A	46.3%	23.5°C	0.0%	100.0%
9	DEC4 C	ne 310 Right 3	Lamp on	231V	12.2A	46.0%	23.2°C	0.0%	100.0%
10	DEC4 C	ne 310 Right 4	Lamp on	231V	12.2A	46.1%	23.1°C	0.0%	100.0%
11	DEC4 C	ne 310 Right 5	Lamp on	231V	12.2A	46.0%	23.7°C	0.0%	100.0%
12	DEC4 C	ne 310 Right 6	Lamp on	231V	12.2A	46.2%	23.4°C	0.0%	100.0%
13	DEC4 C	ard 100 UST 1	Standby	231V	0.2A	51.3%	22.1°C	0.0%	0.0%
14	DEC4 C	ard 100 UST 2	Standby	231V	0.2A	51.8%	22.0°C	0.0%	0.0%
15	DEC4 C	ard 100 UST 3	Standby	231V	0.2A	51.4%	22.2°C	0.0%	0.0%
16	DEC4 C	ard 100 UST 4	Standby	231V	0.2A	51.3%	22.3°C	0.0%	0.0%
17	DEC4 C	ard 100 UST 5	Standby	231V	0.2A	51.3%	21.8°C	0.0%	0.0%
18	DEC4 C	ard 100 UST 6	Standby	231V	0.2A	51.6%	22.1°C	0.0%	0.0%
19	DEC4 C	ard 100 UST 7	Standby	231V	0.2A	51.5%	21.4°C	0.0%	0.0%
20	DEC4 Controller	Blizzzard 100 UST 8	Standby	231V	0.2A	51.7%	22.2°C	0.0%	0.0%

To start monitoring the discovered enclosures, select the Run button. On-line enclosures will be polled in turn and status data updated.

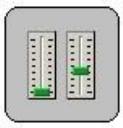
The monitor may be toggled between sizeable and full screen view with the scale view button.

The fields displayed in the window may be customized to suit the Enclosure configuration options and user preference. From the setting button, a drop down menu details all available fields, some of which may not apply to the enclosures in a particular installation.

Each Column may be ordered or grouped by right clicking the heading and selecting an option form the drop down menu.



DMX Control



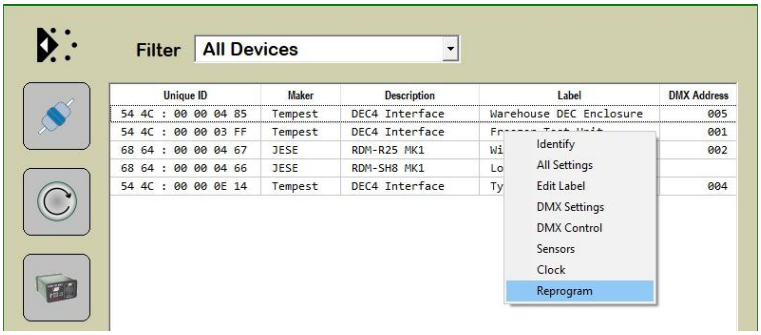
A fully configurable DMX Control Desk is accessible from the Desk button in the Main GetSet Form.

When there is a requirement to control DMX operable devices on the network, each device should be configured to the required DMX address and DMX personality. The desk may then be set to the required DMX footprint and all of the used slots labelled for convenience. See the Latest GetSet MV User guide for full and latest details.

Firmware Uploads

From time to time, new firmware with enhancements or feature additions for the enclosures will be released.

To load firmware to the enclosures, right click the entry in the main window and select 'Reprogram' from the drop down window. For additional details, refer to the latest GetSet MV User Guide.



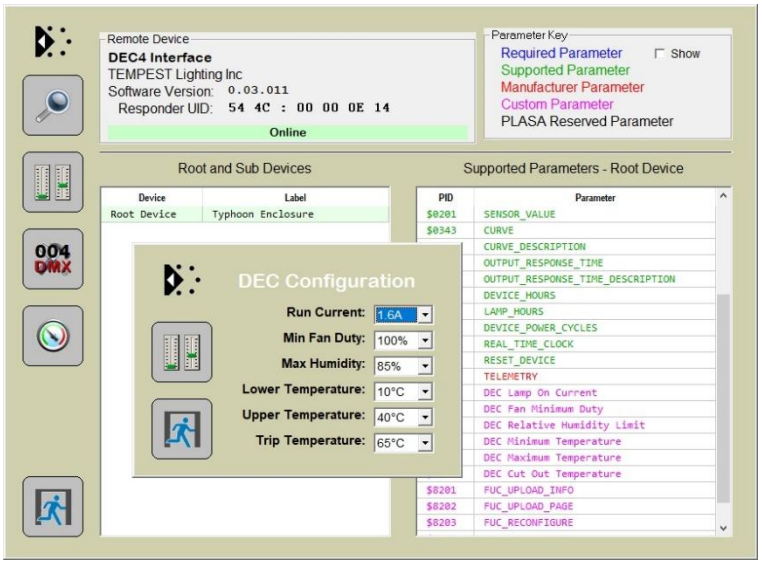
Remote Configuration

User configurable settings that may be accessed from the enclosures' user interface, may also be accessed from GetSet.

To access the settings window, double click the entry shown on the above window to bring up the device manger. Select one of the related 'Custom Parameters' to open the configuration window.

Settings may be selected from the presented values in each of the drop down windows.

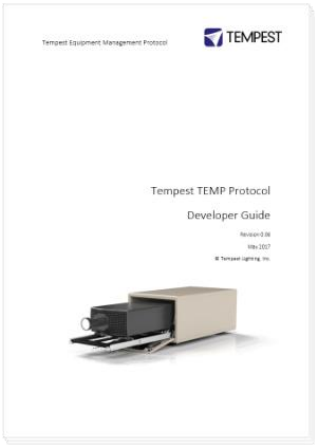
Note that various other generic services and tools are available from the Device Manager window. Details on each of these features are available in the latest GetSet MV User guide.



Tempest Equipment Management Protocol

TEMP allows you to access status information and set configuration values on DEC3.3 and DEC 4 enclosure controllers, using the 51.D4.15 Ethernet Adapter, over an Ethernet network.

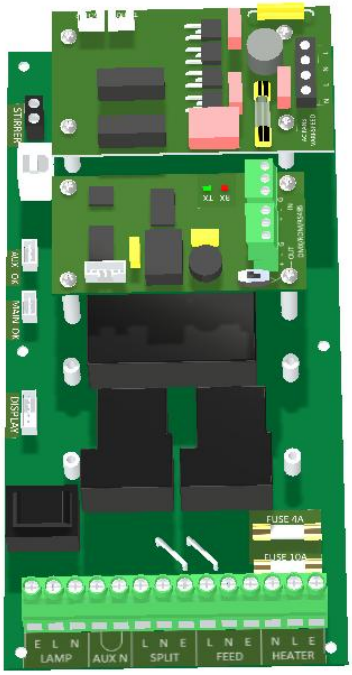
Download the Developer Guide at
www.tempest.biz/tech_support



IMPORTANT:
Tempest warrants that, if correctly implemented, TEMP will provide a reliable and accurate method of monitoring Tempest DEC3 and 4 controllers over an Ethernet network. However, the integrator is entirely responsible for the connection between the Ethernet Bridge and the network.

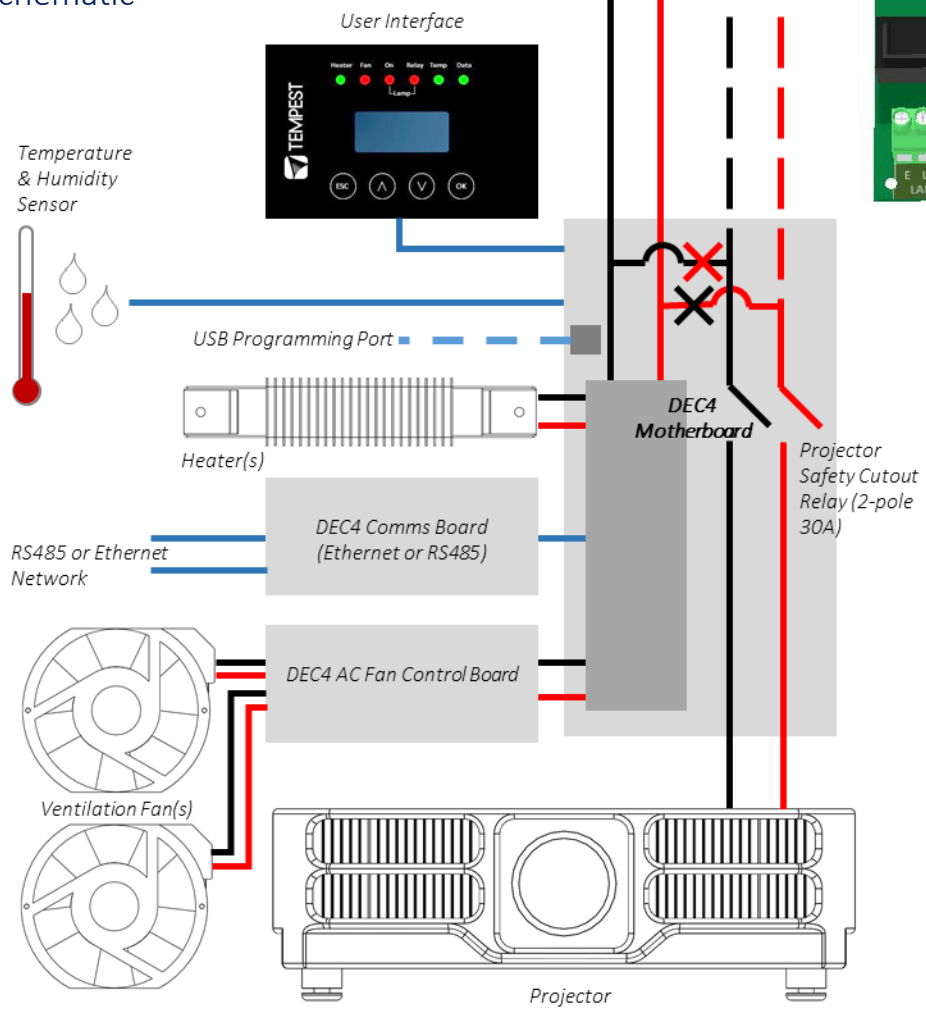
Digital Enclosure Control

DEC4™ – that's Digital Enclosure Control, fourth Generation – is the brain of your Tempest enclosure. It will maintain the internal environment in a comfortable temperature and humidity range, and prevent condensation – the real killer of outdoor equipment. DEC4 monitors internal and external temperature, humidity and lamp current at all times, and uses this information to control the enclosure's lamp relay, fan(s) and heater(s). It can report back over an RS485 network, using the RDM protocol (Remote Device Management), or connect to your TCP/IP network for remote monitoring amd management using Tempest's TEMP protocol.



Typical DEC4 configuration, with Motherboard, fan control board and RS485 comms board

Schematic



DEC4 Main Functions

Firmware Revision

This manual covers DEC4 Firmware revision 2.03.000 and higher.

To check the Firmware revision, on the User Interface menu, go to Status Display/Firmware.

1. Sense current to projector (lamp on/off)
2. Record lamp hours
3. Monitor temperature and relative humidity inside Enclosure
4. Monitor temperature outside enclosure
5. Maintain internal temperature at safe operating level
6. Maintain relative humidity within safe limits to prevent condensation
7. Isolate projector in case of unsafe temperature
8. Report status over RS485, RDM, TCP/IP
9. Maintain positive pressure (optional) 24/7 to prevent ingress of salt air and other contaminants through the exhaust path
10. Circulates air internally to prevent hot and cold spots when projector is idle

DEC4 constantly monitors the following parameters:

- Projector/Luminaire current
- Line Voltage
- External Temperature
- Internal Temperature
- Internal Relative Humidity

DEC 3.3's patented Goldilocks™ algorithm uses a combination of sensors, heaters and fans to maintain a safe operating temperature and a safe relative humidity level that will not allow condensation to take place.

As air is heated it is able to support more moisture without condensing, so Goldilocks uses heat to raise the air temperature inside the enclosure in the event that relative humidity approaches dewpoint.

Factory Settings – Data Modes

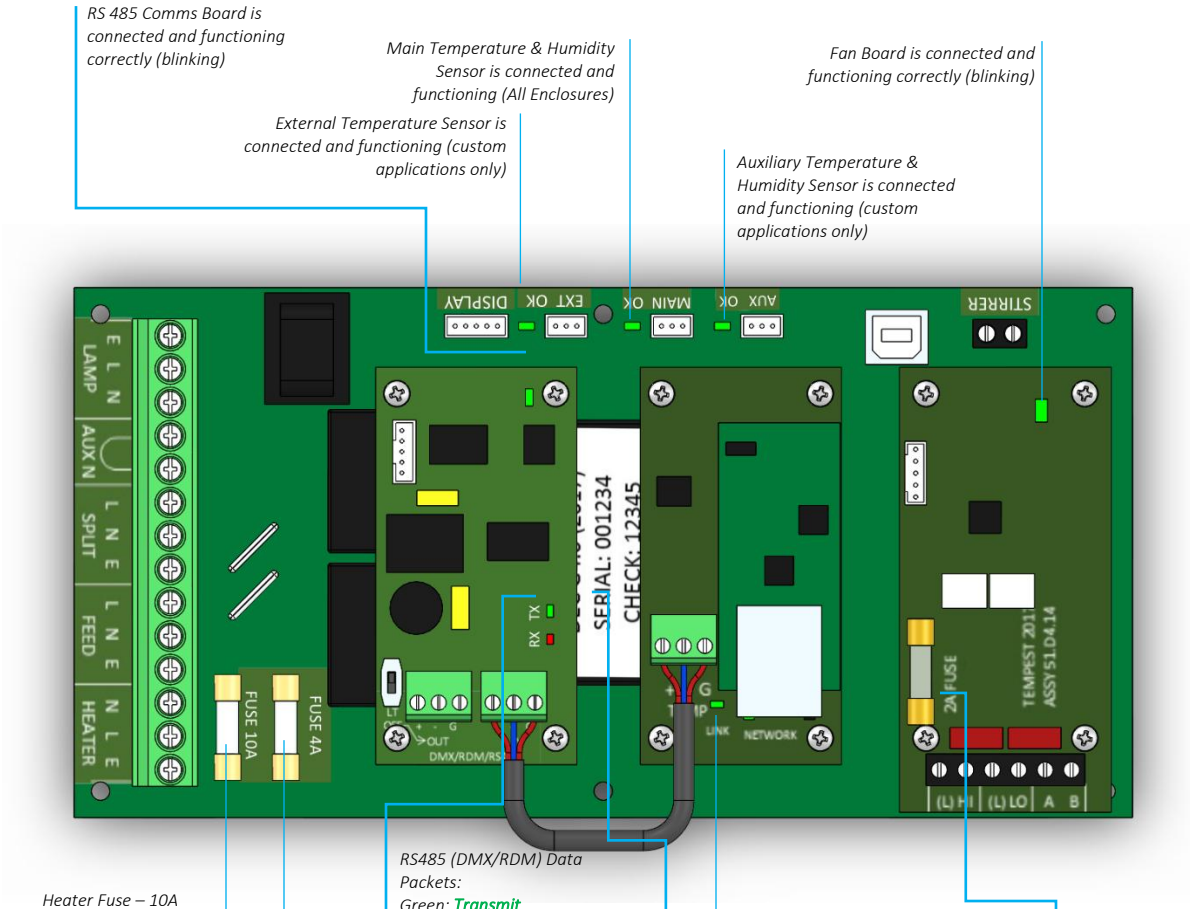
In most applications, DEC4 will operate correctly with its factory default settings, in Basic operating mode.

You do not need to do anything. Please skip to the next section.

- Standard default temperature and humidity settings
- DMX, RDM and Remote Monitoring disabled
- Best for standalone operation

If your needs are more complex, read on.

Hardware Indicators & Fuses



Operating Modes

RDM Only Monitor (Factory Default)

- Supports RDM monitoring over RS485 if present
- Supports TEMP monitoring if present
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- No DMX control

RDM+DMX Control

- Enclosure functions as a 1-channel DMX device, with remote control of the lamp relay
  - DMX level > 75% enables normal relay operation (normally ON)
  - DMX level < 25% disables normal relay operation (relay turns OFF)
  - This allows you to force a hard reset of the lamp relay in the event of a projector malfunction
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- Control mode is recommended for show control applications, but can be risky in live show operation, since the DMX slot used for the enclosure MUST be kept high to prevent the lamp relay from opening.

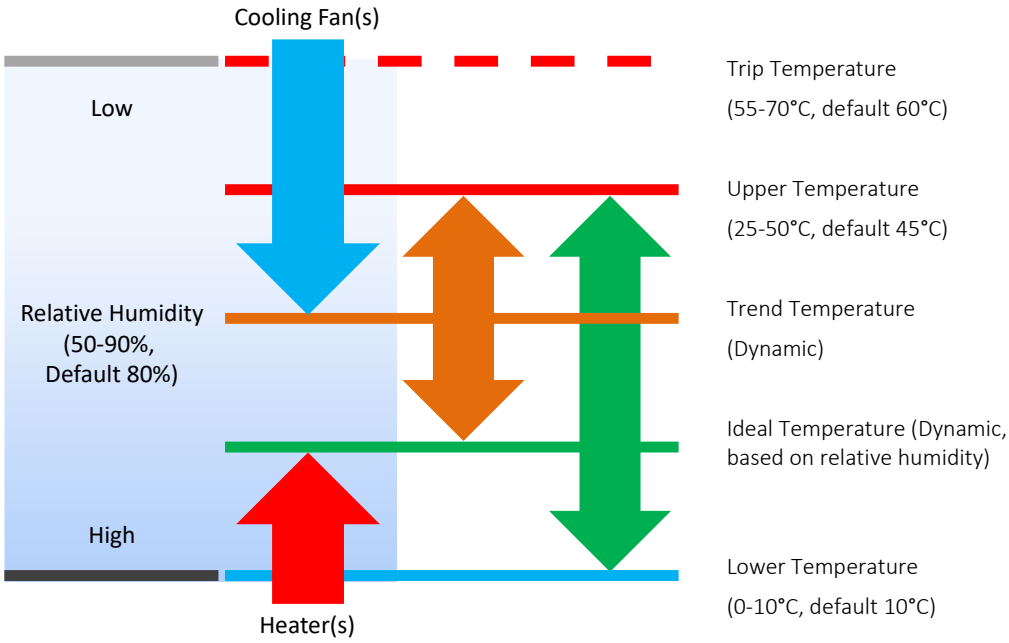
RDM+DMX Service

For trained service personnel only

- Normal operation is suspended and the enclosure functions as a 3-channel DMX device:
  - Lamp Relay (Slot 1)
  - Fans (Slot 2)
  - Heater (Slot 3)
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- ***Service mode is ONLY for troubleshooting – DO NOT use Service mode for normal operation.***

DEC4 Control Parameters

Temperature and Humidity Ranges



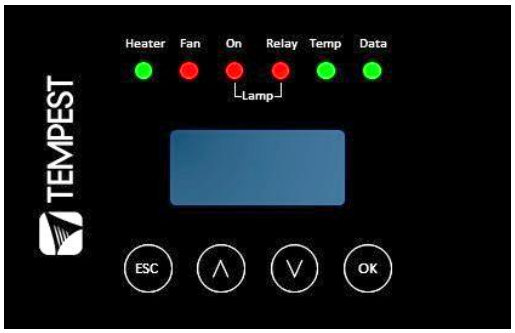
Notes:

1 In moving light enclosures the temperature sensor is located in the exhaust airflow. Temperatures shown may be higher than those around the projector.

2 We recommend using the factory default settings for several weeks or months before making any changes. In most cases they will not be necessary.

Control Interface

LED Indicators

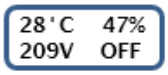


Heater	ON (Green)	Heater is ON, to maintain lower temperature level or to prevent condensation
	ON (Amber)	Enclosure is temporarily outside the Goldilocks zone, and DEC is working to restore it
Fan	ON (Green)	Lamp is ON, or Temperature is HIGH and fan is cooling enclosure. Short burst when lamp off indicates fan moving air to stabilize temp/humidity.
		NOTE: Fan LED will not light if no fan is detected
Lamp On	ON (Green)	Current sensing shows lamp is ON
		Lamp hour counter is running
	OFF	Current sensing shows lamp is OFF
		Lamp hour counter is not running
Lamp Relay	ON (Green)	Lamp relay is closed (normal)
		Projector power receptacle is energized
	ON (Red)	Lamp relay is open due to over-temperature event. Projector power receptacle is isolated.
Temp	FLASHING (Green)	Temperature is below lower temp setting
	ON (Green)	Temperature is in normal range
	ON (Amber)	Humidity is above target limit
	ON (Red)	Temperature is above top setting
	FLASHING (Red)	Temperature is above Trip level
		Projector power is isolated
Data	OFF	Data not used in present Mode. **OR** DEC4 is in RDM + DMX Control Mode and no valid data packet has been detected.
	ON (GREEN)	Good data packet received.
	ON (RED)	RDM + DMX Control Mode: Data Fail. A previously good data signal has failed.

User Interface LCD Display

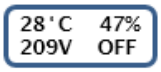
The display on the Control display provides additional status information, depending on the operating mode:

RDM Only Monitor Mode



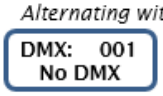
internal temperature, relative humidity
line voltage, lamp status

RDM+DMX Control Mode
RDM+DMX Service Mode



internal temperature, relative humidity
line voltage, lamp status

Alternating with:

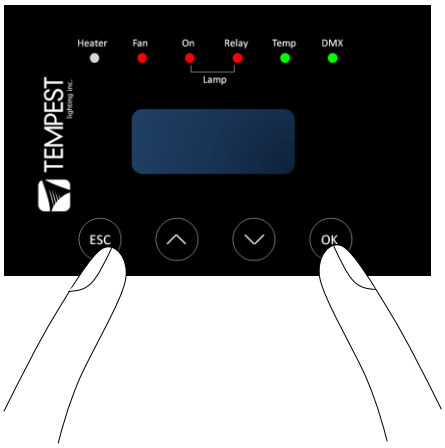


DMX Start Address
DMX Status

(Alternating DMX Display requires a DMX signal to be present)

Control Interface Operation

The Control Interface is normally LOCKED.



- To UNLOCK, hold **ESC** and **OK** together for **5 seconds**.
- You are now in the CONTROL MENU
- Use ↑↓ to scroll up and down the menu.
- Press **OK** to enter a menu item
- Use ↑↓ to set the item parameter, or to scroll to the next menu level.
- Use **ESC** to go BACK, or **OK** to confirm settings (↵).
- To exit and LOCK, hold **ESC** for 5 seconds.

Menu will time out and the display will lock after ten minutes.

Control Menu

Set DMX Options

SET Data Mode

From the Front Panel, this menu item allows the user to check (and if necessary change) the Data mode.

RDM Only Monitor	DEFAULT	Supports RDM or TEMP if connected. No DMX Control.
RDM+DMX Service		Service mode – 3 DMX slots, starting with the DMX address set
		Important: Please ensure that DEC4 is NOT left in Service Mode.
RDM+DMX Control		DMX (set 1 address for lamp relay) plus RDM

SET DATA ADDRESS (in RDM Only Monitor, RDM+DMX Service or RDM+DMX Control Service modes)

Select a DMX starting address in the range 001 to 510

1 – Lamp Relay

In Service Mode an addition two slots are available

2 – Fan Duty Control

3 – Heater Duty Control

Note that the DMX control is designed using a SAFETY pile-on Logic. So the DMX input can only override automatic settings within safe limits.

SET DATA CURVE

DMX Curves affect the way the fixture relay is controlled in RDM+DMX Control Mode.

DMX levels are shown as %.

Response Curve 1 (default)

DMX level 0-25 Relay disabled (open)

DMX level 26-75 No change to relay status

DMX level 76-100 Relay enabled (normally closed)

Response Curve 2

DMX level 0-19 No change to relay status

DMX level 20-40 Relay disabled (open)

DMX level 41-59 No change to relay status

DMX level 60-80 Relay enabled (normally closed)

DMX level 81-100 No change to relay status

SET DATA RESPONSE

DMX Response sets a delay time before DMX Control Mode settings are acted on. Setting a response delay of a few seconds would prevent unintended fixture relay state changes in the event of a short accidental change in DMX level.

NOTE: from firmware revision 0.00.100, DEC holds last valid DMX level if DMX is interrupted.

Response Delay Values are:

No Delay (default), 1, 2, 5, 10, 15, 20, 30, 60 seconds.

Set Temp Units

Choose to display temperature values in Celsius or Fahrenheit (default Celsius)

Note that temperature settings must be entered in Celsius.

Set Temp Ranges

Set three temperature trigger points for Bottom, Top and Trip temperatures, in °C.

SET TEMP LOWER (minimum temperature to be maintained)

(default 10°C, permissible range 0-10°C).

SET TEMP UPPER (maximum desired daytime temperature)

(default 45°C, permissible range 25-50°C).

SET TEMP TRIP (temperature at which load will be isolated – see note)

(default 60°C, permissible range 55-70°C).

Note: A thermal emergency is when enclosure ventilation fails with the lamp on, in which case the temperature will rise very quickly. To avoid nuisance tripping we recommend setting a higher Trip temperature, 60°C or above.

Set Max Humidity

Sets highest desired Relative Humidity: Default 85%, permissible range 80-90%.

Note that, when the projector/luminaire lamp is OFF, the enclosure heaters will switch on to raise the temperature and lower the risk of condensation. We recommend setting the highest Max Humidity that works in your location, to avoid unnecessary heater use.

Set Lamp Options

SET LAMP ON POINT

The lamp current at which DEC detects the projector/luminaire lamp is running. Default is 1 Amp, which allows for most equipment fans and power supplies to run without changing the air in the enclosure. Lamp on point may be set in 0.1 Amp increments between 0.2 Amps and 2.0 Amps.

If the enclosure fans never turn off, the Lamp On point is probably set below the standby current draw of the projector/luminaire. Check the standby current draw on the display and set the Lamp on Current higher.

RESET LAMP HOURS

Reset each time you change the lamp in the projector.

Make this a part of your maintenance instructions.

Set Fan Function

SET FAN TEST

To test the enclosure fan(s), press [OK]

The enclosure fan will run

The Display Fan LED lights green

DEC Beeps

To stop the fan test, press [ESC]

SET FAN TYPE ID *(Tacit and Zen Enclosures Only)*

For Tacit 050-150, choose Fan Type **220**

For Tacit 210 and higher, choose Fan Type **270** *(see also SET FAN MAX DUTY)*

For Zen 1xx, choose Fan Type **175**

For Zen 2xx, choose Fan Type **220**

For Zen 3xx – 5xx, choose Fan Type **270** *(see also SET FAN MAX DUTY)*

SET FAN RECOVERY *(Tacit and Zen Enclosures Only)*

Select a setting between 0 and 10, where 0 is fastest fan speed response and 10 is slowest.

SET FAN MAX DUTY *(Tacit and Zen Enclosures Only)*

This limits maximum speed of PWM-controlled fans. **If fan type 270 is used, MAX DUTY Should be set to 80**%.

Range: 50-100%

Default: 100%

SET FAN MIN DUTY *(Tacit and Zen Enclosures Only)*

In effect this is the fan speed setting. the actual range varies for each fan type:

Start with a moderate MDC value – say 60.

Test the projector, with the enclosure closed, and monitor the projector inlet temperature over the projector control system.

If the projector is running HOT, INCREASE the MDC level

If the projector is running COOL, DECREASE the MDC level

The aim is to find the sweet spot where the projector is running at an acceptable temperature over long periods, and the blower speed is no higher than necessary, to minimize power consumption and noise level.

SET FAN RUN ON

Time the fan will run after system detects LAMP OFF (cooldown).

Range: 5 – 15 minutes

Default: 5 minutes

COLD-WEATHER OPERATION (Firmware revision 2:06:001 and above)

You can verify your firmware revision in the Status Display section below.

Cold-weather operation for Blizzard, Cyclone and most Typhoon enclosures with FW 2:06:001 is now automatic – no special settings are required. Please note the following rules apply:

1. Temperature < Lower Temp (LT) Setting, LAMP OFF
   - The heater will run as required to maintain the LT setting
2. Temperature < Lower Temp (LT) Setting, LAMP ON
   - The heater will run as required to maintain the LT setting
   - The fan will not run
3. Temperature reaches/passes Lower Temp (LT) Setting, LAMP ON
   - As the temperature inside the enclosure rises:
   - The fan will start pulsing, to move some air through the enclosure
   - The heater will pulse, backing off its contribution to the internal temperature
   - NOTE: These functions are trend-driven, and may vary, dependent on the rate of temperature change
   - If the temperature drops again (too much fan, too little heater), the system will revert to step 2.

Status Display

View current status information, using the arrow keys to scroll through:

a) Humidity – relative humidity in %

b) Internal temperature, in degrees C or F

c) External Temperature (custom enclosures with external temperature sensors only)

d) PCB temperature (this will usually be significantly higher than air temperature)

e) Voltage – line Voltage reaching the DEC

f) Current being drawn by projector/light, in Amps

g) Lamp Hours elapsed since last reset

h) Firmware version

i) UID – unique system ID number

Safe Mode

In certain circumstances, the DEC User Interface may display the message SAFE MODE. This can happen if the Humidity sensor stops reporting, or reports an extreme value, indicating the probability of a sensor error. This situation may arise either because of a faulty sensor or in conditions of extremely high absolute humidity.

In SAFE MODE, the normal operation is temporarily suspended, and the enclosure works to return the internal environment to a condition from which normal operation may be resumed.

SAFE MODE is SAFE! It indicates that attention may be needed, but not that your equipment is at risk

DEC4 Firmware Updates

From time to time Tempest may introduce new DEC4 firmware for feature enhancements and bug fixes. Please note that the main System Control Board (SCB) and the various optional daughter boards each have their own firmware, and it will be good practice to update all firmware in an enclosure for optimal performance and interoperability.

- System Control Board firmware may be updated DIRECTLY using JESE JUST software and a USB cable, or INDIRECTLY, over an RDM network, using JESE GetSet software and a JESE RDM-TRI interface.
- Fan board firmware is extremely simple and is unlikely to require updating.
- RS485 Board (51.485) firmware may be updated over an RDM network, using JESE GetSet software and a JESE RDM-TRI interface.

All required files are available for download at http://www.tempest.biz/tech-support.php?lang=en

Indirect Firmware Updates

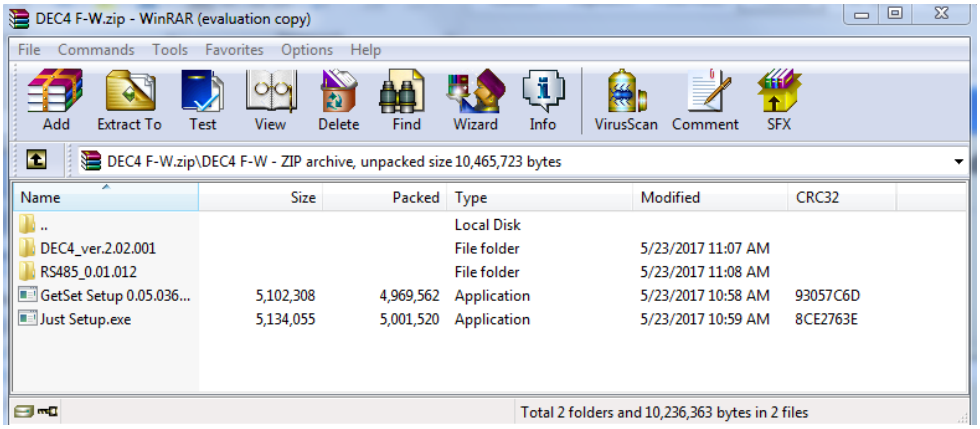
Requirements

Windows Laptop / PC, Windows XP through Windows 10

A JESE RDM-TRI or RDM-TXI interface and USB connection (available from Tempest).

An installed version of the JESE GetSet RDM configuration utility.

A copy of the firmware file(s) to upload, available for download from www.tempest.biz/tech_support.

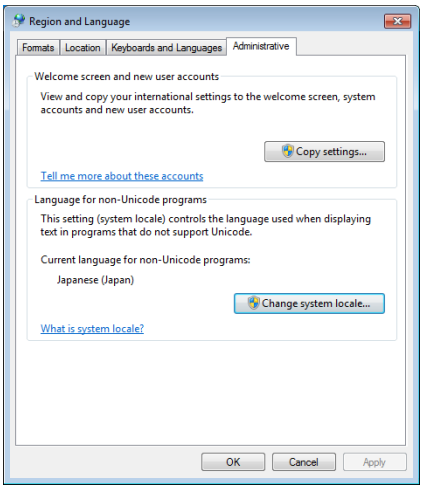


Powered Target DEC4 with 51.485 RS485 communication interface card.

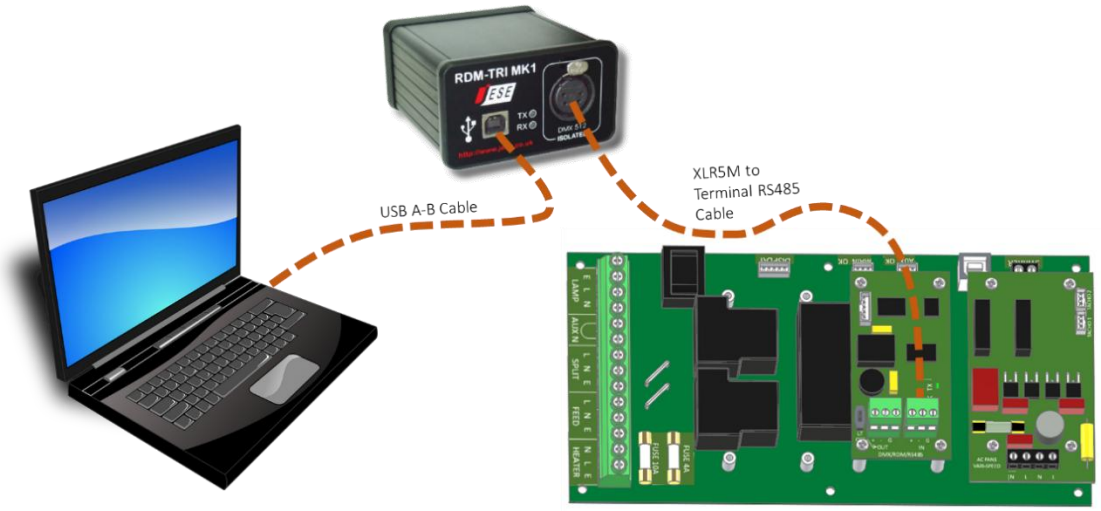
Installation Procedure

1. If not already installed, install a copy of GetSet. *To ensure that the correct USB drivers are loaded, the software should be installed and the PC/Laptop re-started before connection to an RDM-TRI.*

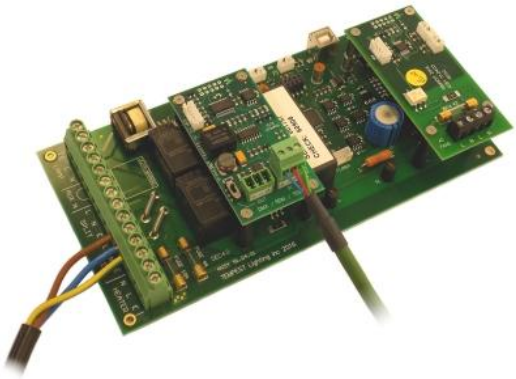
2. If using an Asian character set, go to control panel and select Region and Language. Ensure input locale for non Unicode programs is set to a non Asian language



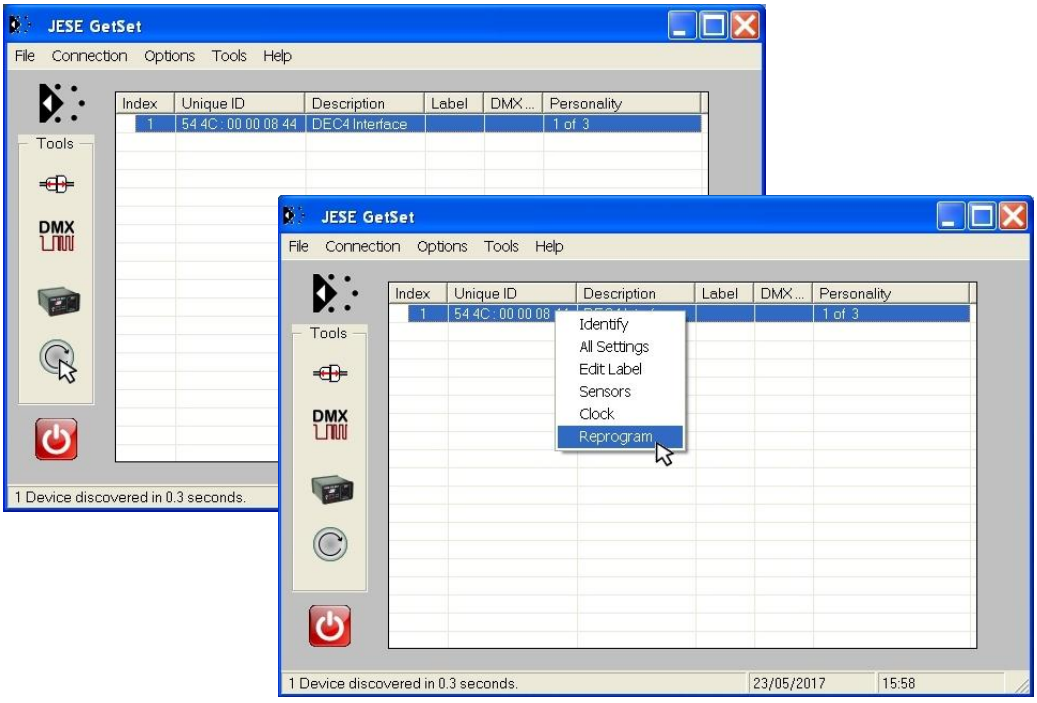
3. Plug you RDM-TRI in to your PC and connect to the RS485 connection on the DEC4 communications board with the fly lead, as shown below.



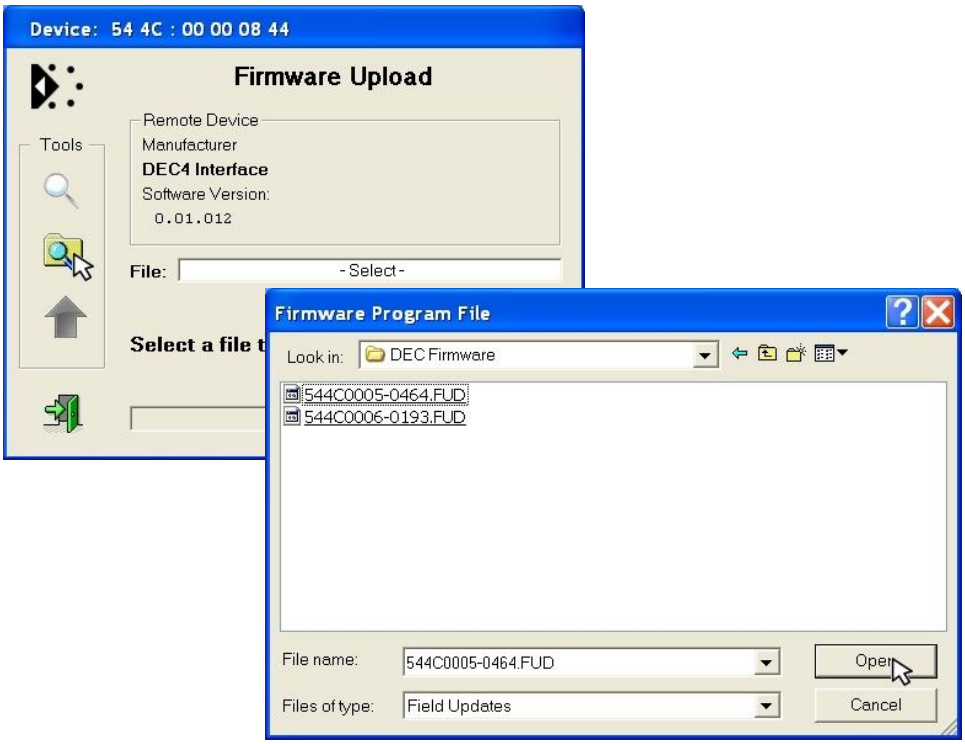
4. Power up the target SCB, ideally with mains power, or alternatively, with a USB power adaptor connected to the USB Port on the SCB.



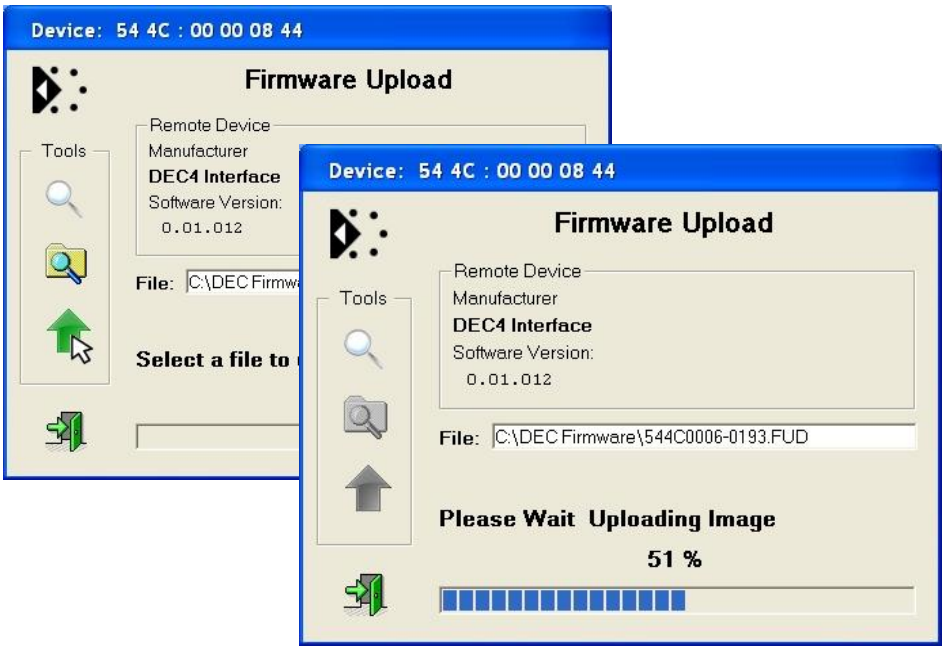
5. On older revisions of DEC Firmware, if the elected DEC ‘DATA MODE’ is set to ‘RS485 TEMP’, select ‘RDM MONITOR’ mode using the DEC user display. On more recent revisions of Firmware, the appropriate mode will be automatically selected.
6. Open the GetSet application, connect to the RDM-TRI and discover the DEC. To run discovery, click the Icon indicated below
7. Right click on the highlighted item in the list view and select ‘Reprogram’ from the popup menu. This will open the firmware upload tool.



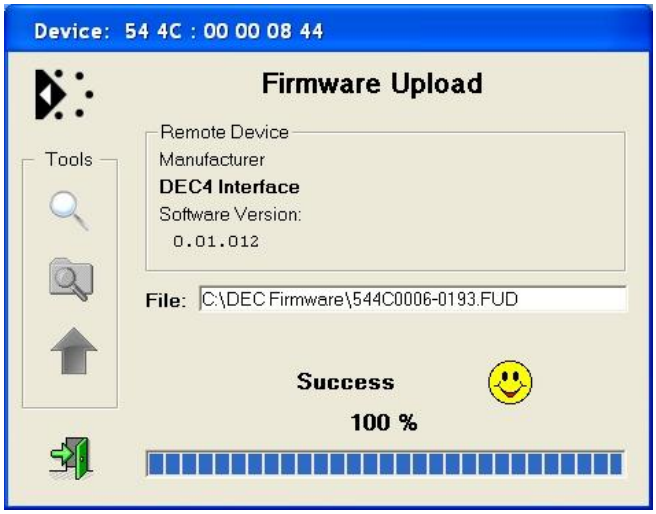
8. In the Firmware upload handler, search for a file to upload by clicking the file icon. Find and select the file to load and click the Open button.



9. On returning to the File upload tool window, select the green upload arrow to initiate the upload process. The upload will the start.



10. On successful completion of upload and restart, the firmware upload is complete.



Repeat from stage 8 to 11 for each additional file to upload.

On completion of the upload, dismiss the upload window and return to the main window.

Close the application and disconnect the USB Cable from the SCB

Important:

If the Tempest enclosures are connected to an RDM interface or controller, set the DATA MODE for each enclosure as follows:

RDM MONITOR ONLY	To view status information over RDM
RDM + CONTROL	To monitor and over RDM and control the Lamp/Projector relays via DMX

If the enclosures are connected to an Ethernet network for monitoring using TEMP (Tempest Equipment Management Protocol) then the appropriate mode

Routine Maintenance

Check the following every six months:

Clean Port Glass

Clean port glass using a window cleaning fluid or mild detergent. Use a soft, lint free cloth.

Check Filter

In most cases the filter will be good for 1-2 years. If the filter becomes clogged the temperature inside the enclosure will start to rise. This is an indication that the filter must be changed.

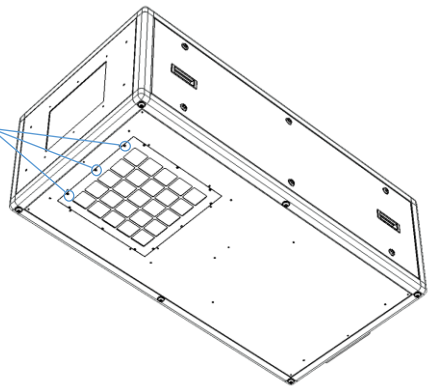
Part Numbers:

51.HF.15 Typhoon 200-300 Replacement Filter

51.HF.22 Typhoon 350 Replacement Filter

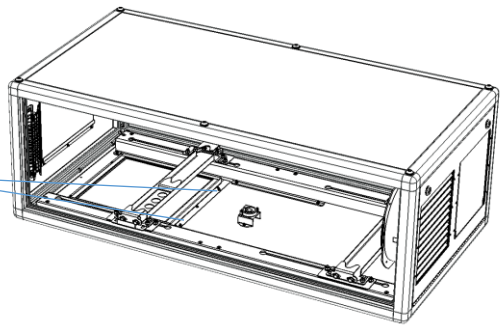
To replace filter from below

1. Remove the 12 filter clamp screws.
2. The filter will drop out.
3. Replace filter and filter clamp.

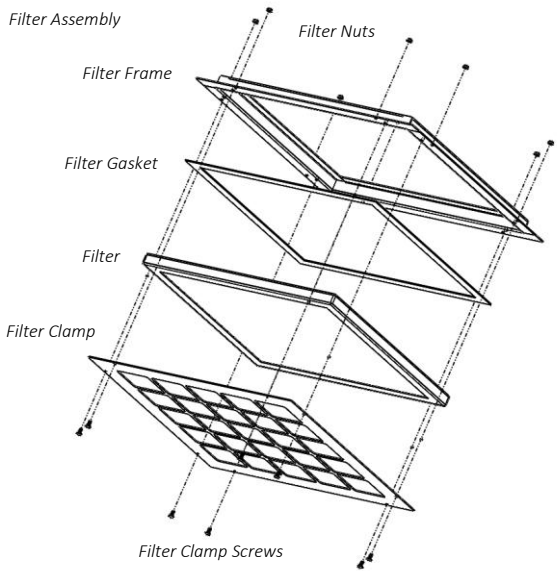


To replace the filter from inside the enclosure

1. Remove both side panels
2. You MAY need to remove the projector
3. Remove the eight M4 nuts holding the filter assembly
4. Lift the filter assembly out of the enclosure base



5. Remove the filter clamp screws
6. Replace the filter and filter clamp
7. Replace the filter assembly



Check Temperature/Humidity Sensor

If the sensor above the port glass is defective, the controller may not operate correctly. A defective sensor will result in one of three messages appearing on the DEC user interface.

8. If you see any of these messages, contact Tempest for a replacement sensor.

RH: 5%

RH: 100%

RH: ####

For After Sales Support

Contact your Tempest dealer or email info@tempest.biz

Troubleshooting

Projector does not have power:	1. Check Projector power switch 2. Check projector is plugged into DEC4 projector outlet 3. Check that enclosure feed circuit is on 4. Check DEC4 User Interface leds are on. If feed circuit is on and UI leds are off, check feed wiring to DEC terminals and meter DEC4 projector outlet for power 5. If UI lamp led is on and DEC4 projector outlet is live, there is a projector fault.
Enclosure overheats:	1. **Is the projector connected to the DEC4 projector receptacle?** If the projector is powered independently the controller has no way to know when to turn on the exhaust fans! 2. Is the filter clogged or obstructed? 3. Check that the Fan led on the UI is on when the projector is running. If not, then the projector is probably not connected to the DEC (see 1). 4. If the fan led is on, check that the fan is running. If not, check fan wiring. If wiring is ok, fan may be faulty. 5. Check the UI display for RH (relative humidity) message. If display reads RH 5%, RH 100%, or RH###, there is a sensor fault. Contact Tempest for a replacement sensor.
Dirt/Debris inside enclosure	1. Filter is either missing or damaged? 2. Filter is not properly seated 3. Side panels or back door is not firmly latched
Water in enclosure	1. Check the drain holes in the bottom of the enclosure. If they become blocked, and water that gets in cannot escape. 2. Check seals around side panels and back door
Fan LED is on but fans do not operate	The exhaust fan is protected by a 20mm 4A slow-blow fuse on the DEC4 motherboard, and a secondary fuse on the fan board. In very exceptional cases it is possible that either fuse could fail. Check visually. The fuse is protected with a clear resin sealant and soldered to the circuit board. With care, you can de-solder the fuse and replace it, but we recommend replacing the DEC4 motherboard to maintain the integrity of the board's conformal coating.
Heater LED is on but heater does not operate	The heater is protected by a 20mm 10A slow-blow fuse on the DEC4 motherboard. In very exceptional cases it is possible that it could fail. Check visually. The fuse is protected with a clear resin sealant and soldered to the circuit board. With care, you can de-solder the fuse and replace it, but we recommend replacing the DEC4 motherboard to maintain the integrity of the board's conformal coating.

None of the above?	Contact info@tempest.biz

Warranty

INSPECTION/WARRANTY/RETURNS.

A. Customer, at its sole expense, shall inspect all Goods promptly upon receipt and accept all Goods that conform to the specifications or catalog. All claims for any alleged defect in or failure of the Goods or Seller's performance to conform to the Contract, capable of discovery upon reasonable inspection, must be set forth in a written rejection notice detailing the alleged non-conformity, and be received by Seller within thirty (30) calendar days of Customer's receipt of the Goods. Failure by Customer to notify Seller of the alleged non-conformity within thirty (30) days will be conclusive proof that the Goods have been received by Customer without defects or damage, and in the quantities specified on the bill of lading and shall constitute an irrevocable acceptance of the Goods and a waiver of any such claim in connection with the Goods.

B. Seller warrants to Customer only that the Goods will be free from defects in material and workmanship at the time of delivery and, subject to the exceptions and conditions set forth below, for the following period (the "Warranty Period"): twenty four (24) months from the date of shipment by Seller. Seller may provide additional years of warranty coverage beyond 24 months, at the rate of 2.5% of the net sale price per year, up to a total of three additional years' coverage beyond the standard 24 month warranty period. Seller will remedy a defect as set forth in paragraph 7 D, below, (the "Warranty"). The Warranty is subject to each of the following exceptions and conditions:

1. Customer must promptly (and in all events within the Warranty Period) notify Seller of any alleged defect in a written notice (the "Notice") which shall set forth the quantity, catalog number, finish, original purchase order number, Seller's invoice number on which Goods were originally billed and a statement of the alleged defect, along with digital photographs showing such defects where feasible.

2. The Warranty shall not apply: (i) to any claimed defect that was capable of discovery upon reasonable inspection and deemed to be waived under paragraph 7 A, above; (ii) to any Goods that have been subject to misuse, abnormal service or handling, or altered or modified in design or construction; (iii) to any Goods repaired or serviced by any person other than Seller's authorized service personnel or to Goods installed other than according to installation instructions, or (iv) with respect to normal wear and tear. Seller warrants materials and finishes to customary commercial standard and makes no warranty whatsoever to cover minor imperfections of finish not affecting the performance of the Goods.

3. Seller makes no Warranty with respect to parts or components that are not the product of Seller, and specifically makes no warranty whatsoever for equipment housed inside enclosure products manufactured by Seller.

4. The Warranty is Seller's exclusive warranty with respect to the Goods. Seller makes no warranties, guarantees or representations, express or implied, to Customer except as set forth in this paragraph 7. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR USE OR FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED AND DISCLAIMED.

C. Seller will accept the return of Goods properly rejected under paragraph 7 A, above, or as to which Notice of an alleged breach of Warranty has been timely given and such Goods may be returned to Seller, freight prepaid, but only upon Customer's receipt of Seller's written return material authorization ("RMA") and shipping instructions. The RMA shall be void if the Goods are not received within 45 days after issuance of the RMA. No deduction or credit in respect of any rejected or returned Goods shall be taken until Customer has received Seller's further written deduction or credit/authorization following Seller's inspection to confirm nonconformity or defect. Seller will charge to Customer any and all costs incurred by Seller in connection with the handling, shipping, inspection and disposition of any returned Goods that are determined by Seller not to have been nonconforming upon Delivery or as to which the warranty hereunder is not applicable.

D. UPON ANY PROPER RETURN PURSUANT TO PARAGRAPH 7C, ABOVE, WHETHER IN CONNECTION WITH A REJECTION OF GOODS OR AN ALLEGED BREACH OF WARRANTY AND BASED UPON THE CONDITIONS SET FORTH IN THIS PARAGRAPH 7, SELLER AGREES THAT IT WILL, AS THE SOLE AND EXCLUSIVE REMEDY UNDER THE CONTRACT OR OTHERWISE, FOR ANY NONCONFORMITY OR BREACH OF WARRANTY, AND AT SELLER'S SOLE ELECTION: (i) REPAIR SUCH GOODS; OR (ii) REPLACE SUCH GOODS.

NOTE: All sales are subject to Tempest Lighting, Inc. Standard Terms and Conditions (Standard Terms). In the case of any discrepancy between the foregoing and Standard Terms, Standard Terms shall prevail. Download Standard Terms here.

Appendix – TEMP Protocol

AVAILABLE TO SPECIAL ORDER

Tempest can optionally provide a firmware load that facilitates TEMP over RS485, suitable for interfacing to an Ethernet adapter. TEMP is a lightweight proprietary ASCII based protocol, intended for rapid integration into management systems. With TEMP and a suitable RS485 to Ethernet adaptor connected to the DEC DMX connectors, your DEC may be configured and monitored over an IP network.

Please contact factory for ordering information.

Physical Layer

1. EITHER: Use a 51.EN Ethernet daughter board plugged directly to the DEC4 motherboard, connected to your TCP/IP network.
2. OR: Use a 51.485 RS485 daughter board on each of a number of DEC4 motherboards, and use one of the convertors listed below to bridge to your TCP/IP network.

   Suitable Converters include:

   http://gridconnect.com/rs485-ethernet.html

   http://www.audon.co.uk/lan232/ENET485-POE.html

   http://uk.rs-online.com/web/generalDisplay.html?id=brainboxes

Developer's Guide

Download the Developer Guide from www.tempest.biz/tech-support.