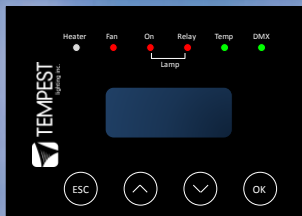




TEMPEST

Application Guide

Tempest Equipment Management Protocol



Tempest Lighting, Inc.
11845 Wicks Street
Sun Valley, CA 91352, USA

Tel +1 818 787 8984
Fax +1 818 252 7101
info@tempestlighting.com

www.tempest.biz

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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.

Suitable Converters include:

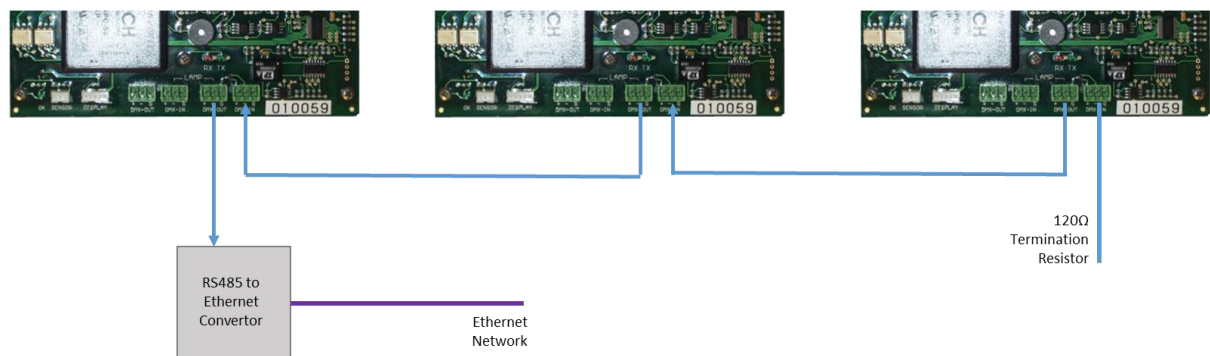
<http://gridconnect.com/rs485-ethernet.html>

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

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

Physical Layer

- You may connect one converter to either a single DEC controller or to a series of DEC's wired together in an RS485 daisy chain.
- The DEC board has four RS485 (DMX) connectors. For a single DEC/Converter pair use one of the DMX Out terminals (they are marked +, -, C). For a series of DEC's on one converter (the number of DEC's and the cable length and topology must follow the RS485 standard), connect as shown here.



Protocol Implementation

The protocol is a half-duplex ASCII syntax, based on a client-server model.

1. Terms and Conventions

All commands are initiated by a TEMP Controller and are responded to by a TEMP Responder.

Commands and Responses are collectively referred to as packets.

A single Command and associated Response is referred to as an exchange.

2.1 TEMP Controller

A TEMP controller is not to be confused with a DEC or 'DEC Controller'. The TEMP Controller, referred to here on in as a Controller will be the system of software that is a client of the Tempest DEC's.

All serial packets sent by the Controller will be referred to as a command.

2.2 TEMP Responder

A TEMP Responder, for the purpose of this document, refers to a Tempest DEC and from here on, is referred to as a Responder.

All serial packets sent by a Responder will be referred to as a response.

3. Connectivity

3.1 Physical Connection

The connection to the Tempest Equipment is via an RS485 Buss with Controller Idle Sate bias, compliant with ANSI E1.20 section 2.4.1. at 250K Baud, 8 data bits, two stop bits.

3.2 DEC Configuration

For a DEC to be operable with TEMP, the DEC must be configured to be in 'BASIC' mode. For further details on configuring a DEC, refer to the accompanying user manual.

4. Responder Addressing

The responder address will be the electronic UID of the responder. A responder UID is comprised of a PLASA manufacturer ID and a unique manufacturer serial number. For Tempest equipment, the vendor ID or VID is \$544C. The remaining 8 characters are a hexadecimal extrapolation of the responder serial number, so for example, a serial number of 64035 would be represented by a hexadecimal value of \$0000FA23. These two strings combined together form the responder address \$544C0000FA23.

The responder serial number can be found on the Tempest electronics or by accessing the user display and scrolling the status information.

A Get command to address \$FFFFFFFF will solicit a response from all responders, which having more than one responder on a single buss will cause a data conflict.

A Set command to address \$FFFFFFFF will be acted on by a responder but not responded to.

1 Command Structure

Each packet is transmitted as an ASCII string, enclosed in the reserved characters '<' and '>'. Any traffic between the < and > characters shall be disregarded.

On receipt of a < character before the final > character, all preceding data shall be disregarded.

Each packet is addressed to an associated Responder.

Each packet contains a reserved Command or Response Identifier character, being '?' or '!' respectively.

The responder address shall be sent immediately after the command or response Identifier.

There are two classes of exchange, Set to configure and Get to retrieve status data.

5.1 Get Command Example.

```
<?:$544C000FA23;GET:STS=ALL>
```

5.2 Get Response Example

```
<!:$544C000FA23;STS:ACV=#223,ACC=#5.3,ATM=#32,RHM=#62,RLY=AUT>
```

5.3 Set Command Example

```
<?:$544C000FA23;SET:RLY=OFF>
```

5.4 Set Response Example

```
<!:$544C000FA23;RLY=OFF>
```

6 Packet Parsing

6.1 Order of Precedence

Packets are syntactically arranged for parsing in order of precedence, the precedence being a semicolon, colon and comma.

6.2 Type Identifiers

- Decimal values are preceded by a hash character
- Hexadecimal values are preceded by a dollar character
- Text strings are preceded by a literal character ' (Not enclosed)
- All other data implicitly represents an enumerated constant

6.3 Reserved Characters

The following characters are reserved for syntactic control:

```
< > ! ? # $ ' = ; : , \
```

Reserved characters used in strings will be preceded by the reserved escape character \ .

Character Use Description

```
\\ Backslash  
< \< Start of packet  
> \> Packet terminator  
? \? Command Packet Identifier  
! \! Response Packet Identifier  
# \# Decimal Value Descriptor  
$ \$ Hexadecimal Value Descriptor  
' \' String Literal  
; \; Packet section separator  
: \: Packet Section Label Identifier  
, \, Parameter separator  
= \= Parameter value Identifier
```

Packet Parameters

Each packet will contain one or more parameters, each parameter being in the format NNN=D, NNN being the three letter Mnemonic or PID to identify the parameter and D being the value or data of the parameter. In a frame payload, all parameters are cardinal with no pre-determination of the order.

Set command packets may only contain one parameter.

6.4 Set PIDs

6.4.1 RLY

This is used to change the operational mode of the relay in a DEC. Arguments for this PID are:

- AUT Automatic, in control of the DEC and closed (on) by default.
- OFF Takes control from the DEC and holds the relay open (off)

Response to this parameter will be one of the following enumerated constants:

- OFF When set to off by a controller
- AUT When in control of DEC and closed (on)
- TRP When in control of the DEC and tripped (off)

6.4.2 LBL

This writes a label to the responder, for use by the controller. The label may be up to 32 ASCII characters, with any reserved characters escaped as detailed on section 6.3

Response to this will echo the label back.

6.5.1 STS

This is used to return the current status of the DEC, arguments for this PID are:

- ALL Requests all information in one packet.
- SEN Requests only dynamic sensor information.
- CFG Requests configuration settings.

Responses parameter to this parameter include:

- ACV AC RMS Line Voltage
- ACC AC RMS Lamp current
- ATM Air temperature (Main) °C
- RHM Relative Humidity (Main) %
- PCT PCB temperature °C
- HRL Lamp hours
- RLY Relay Status (OFF | AUT | TRP)

6.5.2 LBL

This is used to retrieve the responder's label

FOR FURTHER TECHNICAL ASSISTANCE, PLEASE CONTACT hamish.dumbreck@jese.co.uk