# MVP Data Communications

Data is formatted and sent as packets although the receiver may not get the whole packet within a single TCP packet.

Note this is for MVP only.

## Communications Diagram

The goal for the Thermostat, or any other low power device, is to limit the amount of time, and the frequency of data transmission. The Thermostat will accumulate a number of data packets and send them in as few TCP packets as possible (hopefully one). The server then has the opportunity to send any commands, or data requests at this time. The sequence is;

1. Send a data packet.
2. Receive an acknowledgement along with any RPC commands and data requests.
3. Send any RPC responses if any have been sent above. This will not occur if there are no RPC commands or data requests in the above packet.

Open Port

Ack

Data Packet

Data RPC Response

RPC Response Packet

RPC Response Acknowledge

Close Port

Ack

Thermostat

Cloud

## Data Packet

|  |  |
| --- | --- |
| HTTP Header | Data Payload |

### HTTP Header

POST zgTherm1.php HTTP/1.1 <http://50.57.99.73/zgTherm1.php>

User-Agent: ZeusGrid

Host: 50.57.99.73

Content-Type: application/octet-stream

Content-Length: xxxx

<blank line>

### Data Payload

|  |  |  |
| --- | --- | --- |
| Information Header | Format Header | Number of Data Packets |

#### Identification Header

The Identification Header contains the following pieces of data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Timestamp  4 bytes | Version  4 bytes | Serial Number  4 bytes | Log Record Interval  2 bytes | Number of records  1 byte | Flags  1 byte |

Flags:

Alert Present = 00000001 binary

Others are reserved

#### Format Header

The Data Format Header contains a description and format of the timed data

Status%1d,ITemp%2d.100,IHumid%2d.100,OTemp%2d.100,OHumid%2d.100

Format:

|  |  |
| --- | --- |
| **Item** | **Description** |
| Name |  |
| %<number of bytes>d | d for decimal |
| .nnn | Optional multiplier |
| \0 | A byte of zero terminates the string |

In the example above, the Temperature & Humidity data is a 2 digit precision float, multiplied by 100 and represented as an integer.

#### Data Packets

There will be a number of data records packed in after the Format Header. The records will be in the format as described in [Data Streaming Packet and Logging Format.doc](file:///C:\Users\Bob\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\J32C8V21\Data%20Streaming%20Packet%20and%20Logging%20Format.doc).

## Data RPC Response

|  |  |
| --- | --- |
| HTTP Response Header | Optional RPC Commands |

### HTTP Response Header

HTTP/1.1 200 OK  
Content-Type: text/plain  
Content-Length: xxxx  
<blank line>

### Optional RPC Commands

None or more RPC commands as described in [Data Commands and Format for MVP.docx](file:///C:\Users\Bob\AppData\Local\Microsoft\Windows\ZeusGrid\Comfort%20Control\Design%20Documents\Data%20Commands%20and%20Format%20for%20MVP.docx). Separate multiple commands by a carriage return / line feed. Terminate the last command with a carriage return / line feed. It is up to the server to assure that the response to all of the commands won’t exceed the maximum packet length of 1400 characters.

The second response packet, after the RPC response, is this same packet as the above with no RPC commands in it (Content-Length: 0). In the future we may allow repeated RPC packets to be sent.

## RPC Response Packet

This packet will only be sent if the previous packet included RPC commands.

|  |  |
| --- | --- |
| HTTP Header | RPC Responses |

### HTTP Header

POST zgResponse1.php HTTP/1.0

User-Agent: ZeusGrid

Host: 50.57.99.73

Content-Type: application/octet-stream

Content-Length: xxxx

<blank line>

### Optional RPC Commands

One or more RPC responses as described in [Data Commands and Format for MVP.docx](file:///C:\Users\Bob\AppData\Local\Microsoft\Windows\ZeusGrid\Comfort%20Control\Design%20Documents\Data%20Commands%20and%20Format%20for%20MVP.docx). Multiple responses are separated by a carriage return / line feed. The last command is terminated by a carriage return / line feed.

## RPC Response Acknowledge

The RPC Response Acknowledge packet, after the RPC response, is the same packet as the Data Response above with no RPC commands in it (Content-Length: 0). In the future we may allow repeated RPC packets to be sent.