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Protocol Transports

RS232 Specifications
- Baud Rate: 9600
- Data Bits: 8
- Stop Bits: 1
- Parity: None

RS232 Cabling

TCP/IP
- TCP Port: 60000

Protocol Document Notes
The general format of this protocol is hexadecimal, although the Data Envelope portion of the protocol will contain some ASCII characters for the purposes of reporting the varied data values.

Throughout this document, all hexadecimal values will be displays using 0x in front of the actual value. All ASCII string literal examples will be show with double quotes at the beginning and end of the series of characters. Neither of these identifiers are actually part of the protocol and are used just for clarification.

The symbols < and > will be used to indicate separation of protocol sections and are also not part of the protocol and will be used throughout this document for clarity purposes.

The term “You” that is used throughout this document refers to the client side programmer.

Communication
When you send any command using this protocol, you will receive a “NACK” when the RackLink™ device was unable to carry out your request. The “NACK” will contain an error code indicating what failed. If your message is correct you will receive a
“RESPONSE” to the command indicating the current status. If you have registered status changes updates, you will receive those unsolicited when items change. You are NOT responsible for sending NACKS on message that you receive. You are responsible for responding to PING Messages, if you fail to respond to three ping messages in a row, you will be considered disconnected and will stop receiving any unsolicited messages. Once you are considered disconnected, you will also receive a NACK for any message you send, accept for the Login command. A log entry will be entered into the RackLink device indicating you have lost communication. You must reestablish communication at this point.

When you first connect you must send a “SET” login message to the RackLink device. You will get a login “RESPONSE” indicating if your credentials have been accepted. You will than get a “SET” ping message from the RackLink device. You respond with a "Response" message. Once you do that you can use any of the other valid commands in this document. If you lose communication to the RackLink device, you must follow these same steps to “reestablish” communication.

Protocol Message Structure

General Message Format

<Header><Length><data envelope><Checksum><Tail>

- Header
  - Value: 0xfe
  - Data Length: 1 Byte

- Length
  - Total Length of the data envelope.
    - Value Example 1: 0x3c (60 bytes)
    - Value Example 2: 0x06 (6 bytes)
  - Data Length: 1 Byte

- Data Envelope
  - Contents: Varied (See Remainder of Document)
  - Data Length: 3 – 250 Bytes

- Checksum
  - Summation of all the bytes starting and including the header byte all the way to the end of the data envelope. The checksum will only include the least significant 7 bits. The eighth bit gets set to zero.
  - Data Length: 1 Byte

- Tail
  - Value: 0xff
  - Data Length: 1 Byte
Checksum
Here is an example message with the correct checksum.

0xfe 0x14 0x00 0x02 0x01 "UserName|Password" 0x04 0xff

In order to calculate the checksum correctly, you must add up all of the bytes starting and including the header byte all the way to the end of the data envelope. The checksum will only include the least significant 7 bits. The eighth bit gets set to zero.

Elongated Example
sum = 0 ; (clear your variable)

    sum = sum + 0xfe; (Header)
    sum = sum + 0x14; (Length)
    sum = sum + 0x00;
    sum = sum + 0x02;
    sum = sum + 0x01;
    sum = sum + 0x55; // "U" == 0x55
    sum = sum + 0x73; // "s" == 0x73
    sum = sum + 0x65; // "e" == 0x65
    sum = sum + 0x72; // "r" == 0x72
    sum = sum + 0x4e; // "N" == 0x4e
    sum = sum + 0x61; // "a" == 0x61
    sum = sum + 0x6d; // "m" == 0x6d
    sum = sum + 0x65; // "e" == 0x65
    sum = sum + 0x7c ; // "|"== 0x7c
    sum = sum + 0x50; // "P" == 0x50
    sum = sum + 0x61; // "a"== 0x61
    sum = sum + 0x73; // "s" == 0x73
    sum = sum + 0x73; // "s" == 0x73
    sum = sum + 0x77; // "w" == 0x77
    sum = sum + 0x6f ; // "o" == 0x6f
    sum = sum + 0x72; // "r" == 0x72
    sum = sum + 0x64; // "d" == 0x64

    sum = sum & 0x7f (Bitwise “and” to keep least significant 7 bits)

Answer: sum = 0x04

We elongated the checksum example for clarification, normally a while loop is used to iterate through the bytes to perform the math. See the example below.

C Style example

    int calculateChecksum(char *msg, int length) {


```c
int sum = 0;
for (int i = 0; i < length; i++)
{
    sum += msg[i];
}
sum &= 0x7f;
return sum;
```

**Escaped Data**

*(The protocol has been developed to limit the chances of actually needing escaping. This section may not be needed, but added for the off chance that it will be needed.)*

To protect key portions of this protocol we have three protected byte values that cannot be used anywhere in the protocol except for their designated purpose. If the value must be used, than the value must get escaped.

It is important to understand that escaping the data values adds bytes to the message. These escaped bytes (0xfd) will not be included in the length or the checksum calculations. So when calculating both length and checksum, you must remove and revert the escape sequences prior to your calculations. Examples will be provided.

**Protected Values**

- Header: 0xfe
- Tail: 0xff
- Escape Byte: 0xfd

**Escaping a Data Value**

When escaping a data value the value must equal one of the three protected values, see above. You insert the “Escape Byte” into the message prior to the value that needs escaping. Then you invert the bits on the value that needs escaping. This should be the last thing you do while assembling your command message before you transmit the message.

**Escaping Example**
The example contains a fictitious message, and is only used for the purpose of this discussion. On a side note the checksum and length are calculated correctly for the message.

If you notice below in the “Data Envelope” section that a value of 0xff is needed. Since this value is protected this message needs to get escaped.

<Header><Length><data envelope><Checksum><Tail>

<0xfe><0x04><0x00 0x06 0x00 0xff><0x07><0xff> (Not Escaped)

So we add the escape byte (0xfd) before the value that needs escaping, and invert the bits of the value to complete the escaped process. You will notice that the length and the checksum did not change.

<0xfe><0x04><0x00 0x06 0x00 0xfd 0x00><0x07><0xff> (Escaped)

Data Envelope Message Structure

Format
<address><cmd><sub cmd><data_n0 ... data_n(x)>

- Address
  - Future
  - Values: 0-127 (0 will be used for the initial release)
  - Data Length: 1 Byte
- Cmd
  - Values: 0x0-0xfc (See Command Tables)
  - Data Length: 1 Byte
- Sub Cmd
  - Values: 0x00-0xfc (See Sub-Command Tables)
  - Data Length: 1 Byte
- Data Bytes
  - Valid Values: 0-255 (See Data Tables, and Escaped Section)
  - Data Length: 0 – 247 Bytes

Command Table

<table>
<thead>
<tr>
<th>Command</th>
<th>Byte Value</th>
<th>Valid Sub Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nack</td>
<td>0x10</td>
<td>Response</td>
</tr>
<tr>
<td>Ping, Pong</td>
<td>0x01</td>
<td>Set, Response</td>
</tr>
<tr>
<td>Login</td>
<td>0x02</td>
<td>Set, Response</td>
</tr>
<tr>
<td>Power Outlet</td>
<td>0x20</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Power Outlet Name</td>
<td>0x21</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Power Outlet Count/Controlled</td>
<td>0x22</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Power Outlet Device Energy Management State</td>
<td>0x23</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Dry Contacts</td>
<td>0x30</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Parameter</td>
<td>Code</td>
<td>Action</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Dry Contacts Name</td>
<td>0x31</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Dry Contacts Count /Controlled</td>
<td>0x32</td>
<td>Get, Response</td>
</tr>
<tr>
<td>*Input Sense</td>
<td>0x33</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>*Input Sense Name</td>
<td>0x34</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>*Input Sense Count /Controlled</td>
<td>0x35</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Sequence Power Outlets</td>
<td>0x36</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>(EPO) Emergency Power Off</td>
<td>0x37</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Register Log Alerts</td>
<td>0x40</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Register Status Change</td>
<td>0x41</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Current Kilowatt Hours</td>
<td>0x50</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Peak Voltage</td>
<td>0x51</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current RMS Voltage</td>
<td>0x52</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Peak Load</td>
<td>0x53</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current RMS Load</td>
<td>0x54</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Temperature</td>
<td>0x55</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Wattage</td>
<td>0x56</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Power Factor</td>
<td>0x57</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Thermal Load</td>
<td>0x58</td>
<td>Get, Response, Status Change</td>
</tr>
<tr>
<td>Current Surge Protection State</td>
<td>0x59</td>
<td>Get, Response, *Status Change</td>
</tr>
<tr>
<td>Current Energy Management State</td>
<td>0x60</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Occupancy State</td>
<td>0x61</td>
<td>Set, Get, Response</td>
</tr>
<tr>
<td>Low Voltage Threshold</td>
<td>0x70</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>High Voltage Threshold</td>
<td>0x71</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Maximum Load</td>
<td>0x73</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Minimum Load</td>
<td>0x74</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Maximum Temperature</td>
<td>0x76</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Minimum Temperature</td>
<td>0x77</td>
<td>Set, Get, Response, Status Change</td>
</tr>
<tr>
<td>Log Entry</td>
<td>0x80</td>
<td>Get, Response, Alert</td>
</tr>
<tr>
<td>Log Count</td>
<td>0x81</td>
<td>Get, Response, *Status Change</td>
</tr>
<tr>
<td>Clear Log</td>
<td>0x82</td>
<td>Set, Response</td>
</tr>
<tr>
<td>Product Part Number</td>
<td>0x90</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Product Rating</td>
<td>0x91</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Product Surge Protection</td>
<td>0x93</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Product Current IP Address</td>
<td>0x94</td>
<td>Get, Response</td>
</tr>
<tr>
<td>Product MAC Address</td>
<td>0x95</td>
<td>Get, Response</td>
</tr>
</tbody>
</table>

*Future
**Sub-Command Table**

<table>
<thead>
<tr>
<th>Sub-Command</th>
<th>Byte Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>0x01</td>
</tr>
<tr>
<td>Get</td>
<td>0x02</td>
</tr>
<tr>
<td>Response</td>
<td>0x10</td>
</tr>
<tr>
<td>Status Change</td>
<td>0x12</td>
</tr>
<tr>
<td>Log Alert</td>
<td>0x30</td>
</tr>
</tbody>
</table>
Data Bytes – NACK (0x10)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
</tr>
<tr>
<td>Get</td>
<td>N / A</td>
</tr>
<tr>
<td>Response</td>
<td>1 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
</tr>
</tbody>
</table>

Nack (1 Byte)

- Byte 1
  - Error Code
    - 0x01 Bad Checksum
    - 0x02 Bad Length
    - 0x03 Escaped Error
    - 0x04 Invalid Command
    - 0x05 Invalid Sub-Command
    - 0x06 Invalid Qty Data Bytes
    - 0x07 Invalid Data Byte Values
    - 0x08 Access Denied (Credentials)
    - 0x10 Unknown
    - 0x11 Access Denied (EPO)

Data Bytes – Ping/Pong (0x01)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>0 Bytes</td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
</tr>
<tr>
<td>Response</td>
<td>0 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
</tr>
</tbody>
</table>
Data Bytes – Login (0x02)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>Variable 50 Max</td>
</tr>
<tr>
<td>Get</td>
<td>N / A</td>
</tr>
<tr>
<td>Response</td>
<td>1 Byte</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
</tr>
</tbody>
</table>

Login (Set)

- Bytes 1 – x (Variable - 50 Bytes Max)
  - Format: (Pipe separating the name and password)
    - “UserName|Password”

Login (Response)

- Byte 1
  - Value: 0x00 (Denied)
  - Value: 0x01 (Accepted)

Data Bytes – Power Outlet (0x20)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>6 Bytes</td>
</tr>
<tr>
<td>Get</td>
<td>1 Byte</td>
</tr>
<tr>
<td>Response</td>
<td>6 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>6 Bytes</td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
</tr>
</tbody>
</table>

Power Outlet (Get)

- Byte 1:
  - Outlet Number: 0x1 – 0x8 (1-8)

Power Outlet (Set, Response, Status Change)

- Byte 1:
  - Outlet Number: 0x1 – 0x8 (1-8)
- Byte 2:
  - State:
    - 0x00 = OFF
    - 0x01 = ON
    - 0x02 = Cycle
    - 0x03 = Not Controllable (Response Only)
- Byte 3 – Byte 6:
On/Off
- ASCII Encoded Decimal
- Valid Value: “0000”

Cycle Time:
- ASCII Encoded Decimal
- “0000” - “3600”

Data Bytes – Power Outlet Name (0x21)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>Variable</td>
<td>51 Bytes</td>
</tr>
<tr>
<td>Get</td>
<td>1 Byte</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Variable</td>
<td>51 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Power Outlet Name (Get)
- Byte 1:
  - Outlet Number 0x01 – 0x08 (1-8)

Power Outlet Name (Set, Response)
- Byte 1:
  - Outlet Number 0x01 – 0x08 (1-8)
- Byte 2 – x: ASCII Name (50 Bytes Max)

Data Bytes – Power Outlet Count /Controlled (0x22)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>8 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Power Outlet Count – Controlled (Response)
- Byte 1:
  - Outlet 1
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist
- Byte 2:
  - Outlet 2
    - C = Controllable
- N = Non-Controllable
- X = Does not Exist

- **Byte 3:**
  - Outlet 3
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 4:**
  - Outlet 4
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 5:**
  - Outlet 5
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 6:**
  - Outlet 6
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 7:**
  - Outlet 7
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 8:**
  - Outlet 8
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

Example: “CCNNNNXX”
Data Bytes – Power Outlet Device Energy Management State (0x23)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>2 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>1 Byte</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>2 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Power Outlet Device Energy Management State (Get)

- Byte 1:
  - Dry Contact Number: 0x1 – 0x8

Power Outlet Device Energy Management State (Set, Response)

- Byte 1:
  - Dry Contact Number: 0x1 – 0x8
- Byte 2:
  - Energy Management State
    - Value: “D” (Disconnected)
    - Value: “S” (Standby)
    - Value: “I” (On)
    - Value: “O” (Off)
    - Value: “U” (Unknown)

Data Bytes – Dry Contacts (0x30)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>1 Byte</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Dry Contacts (Get)

- Byte 1:
  - Dry Contact Number: 0x1 – 0x8

Dry Contacts (Set, Response, Status Change)

- Byte 1:
  - Dry Contact Number: 0x1 – 0x8
- Byte 2:
  - State:
    - 0x00 = OFF
- 0x01 = ON
- 0x02 = Cycle
- 0x03 = Not Controllable (Response Only)

- Byte 3 – Byte 6:
  - On/Off
    - ASCII Encoded Decimal
    - Valid Value: “0000”
  - Cycle Time:
    - ASCII Encoded Decimal
    - “0000” - “3600”
Data Bytes – Dry Contacts Name (0x31)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>Variable</td>
<td>51 Bytes</td>
</tr>
<tr>
<td>Get</td>
<td>1 Byte</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Variable</td>
<td>51 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Dry Contact Name (Get)

- Byte 1:
  - Outlet Number 0x01 – 0x08 (1-8)

Dry Contact Name (Set, Response)

- Byte 1:
  - Outlet Number 0x01 – 0x08 (1-8)
  - Byte 2 – x: ASCII Name (50 Bytes Max)

Data Bytes – Dry Contact Count - Controlled (0x32)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>8 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Dry Contact Count – Controlled (Response)

- Byte 1:
  - Dry Contact 1
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- Byte 2:
  - Dry Contact 2
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- Byte 3:
  - Dry Contact 3
    - C = Controllable
- N = Non-Controllable
- X = Does not Exist

- **Byte 4:**
  - Dry Contact 4
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 5:**
  - Dry Contact 5
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 6:**
  - Dry Contact 6
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 7:**
  - Dry Contact 7
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

- **Byte 8:**
  - Dry Contact 8
    - C = Controllable
    - N = Non-Controllable
    - X = Does not Exist

Example: “CCNNNNXX”
Data Bytes – Sequence Power Outlets (0x36)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>5 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>5 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>5 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Sequence Power Outlets (Set)

- **Byte 1:**
  - State:
    - 0x01 = UP
    - 0x03 = DOWN
- **Byte 2 – Byte 5**
  - Delay Time (Delay Time Between Outlets)
    - ASCII Encoded Decimal
    - “0000” – “0999”

Sequence Power Outlets (Response, Status Change)

- **Byte 1:**
  - State:
    - 0x00 = No Sequence Status (fallback value)
    - 0x01 = Sequencing Up
    - 0x02 = Sequence Up Complete
    - 0x03 = Sequencing Down
    - 0x04 = Sequence Down Complete
- **Byte 2 – Byte 5**
  - Delay Time (Delay Time Between Outlets)
    - ASCII Encoded Decimal
    - “0000” – “0999”
### Data Bytes – Emergency Power Off (EPO) (0x37)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>1 Byte</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>1 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>1 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

**Emergency Power Off (Set)**

- Byte 1:
  - State:
    - 0x00 = EPO Recover
    - 0x01 = EPO Initiate

**Emergency Power Off (Response, Status Change)**

- Byte 1:
  - State:
    - 0x00 = Normal State
    - 0x01 = Emergency Power Off Mode

### Data Bytes – Register Log Alerts (0x40)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>2 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>2 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

**Register Log Alerts (Set, Response)**

- Byte 1:
  - BITMASK
    - BIT 1: Normal Log Alerts
    - BIT 2: Over Voltage
    - BIT 3: Under Voltage
    - BIT 4: Over Temperature
    - BIT 5: Under Temperature
    - BIT 6: Surge Fault
    - BIT 7: <Future>
    - BIT 8: RESERVED

- Byte 2:
  - BITMASK
• BIT 1: Auto Ping Timeout
• BIT 2: RS232 Ping Timeout
• BIT 3: Over Current
• BIT 4: Under Current
• BIT 5: EPO
• BIT 6: <Future>
• BIT 7: <Future>
• BIT 8: RESERVED

Data Bytes – Register Status Change (0x41)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Register Status Change (Set, Response)

• Byte 1:
  o BITMASK
    ▪ BIT 1: Outlet Status Changes
    ▪ BIT 2: <Future>
    ▪ BIT 3: <Future>
    ▪ BIT 4: <Future>
    ▪ BIT 5: <Future>
    ▪ BIT 6: <Future>
    ▪ BIT 7: <Future>
    ▪ BIT 8: RESERVED

• Byte 2:
  o BITMASK
    ▪ BIT 1: Dry Contact Status Changes
    ▪ BIT 2: Input Status Change
    ▪ BIT 3: Sequence Status Change
    ▪ BIT 4: EPO Status Change
    ▪ BIT 5: <Future>
    ▪ BIT 6: <Future>
    ▪ BIT 7: <Future>
    ▪ BIT 8: RESERVED

• Byte 3:
  o BITMASK
    ▪ BIT 1: Low Voltage Threshold Changes
    ▪ BIT 2: High Voltage Threshold Changes
    ▪ BIT 3: <Future>
- BIT 4: Maximum Load Changes
- BIT 5: Minimum Load Changes
- BIT 6: <Future>
- BIT 7: Maximum Temperature Changes
- BIT 8: RESERVED

* Byte 4:
  - BITMASK
    - BIT 1: Minimum Temperature Changes
    - BIT 2: <Future>
    - BIT 3: <Future>
    - BIT 4: <Future>
    - BIT 5: <Future>
    - BIT 6: <Future>
    - BIT 7: <Future>
    - BIT 8: RESERVED

* Byte 5:
  - BITMASK
    - BIT 1: Current Kilowatt Hours Changes
    - BIT 2: Current Peak Voltage Changes
    - BIT 3: Current RMS Voltage Changes
    - BIT 4: Current Peak Load Changes
    - BIT 5: Current RMS Load Changes
    - BIT 6: Current Temperature Changes
    - BIT 7: Current Wattage Changes
    - BIT 8: RESERVED

* Byte 6:
  - BITMASK
    - BIT 1: Current Power Factor Changes
    - BIT 2: Current Thermal Load Changes
    - BIT 3: *Current Log Count Changes
    - BIT 4: *Current Surge Protection State Changes
    - BIT 5: <Future>
    - BIT 6: <Future>
    - BIT 7: <Future>
    - BIT 8: RESERVED

*Future

**Data Bytes – Current Kilowatt Hours (0x50)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>12 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>12 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>
Current Kilowatt Hours (Response, Status Change)

- Byte 1 – Byte 12:
  - ASCII Encoded Double Number
    - Ten Digits before the dot, and one digit after.
    - Example: “0000010200.1”

Data Bytes – Current Peak Voltage (0x51)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current Peak Voltage (Response)

- Byte 1 – Byte 3:
  - ASCII Encoded Decimal Number
  - Example: “010”

Data Bytes – Current RMS Voltage Changes (0x52)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current RMS Voltage Changes (Response, Status Change)

- Byte 1 – Byte 3:
  - ASCII Encoded Decimal Number
  - Example: “010”

Data Bytes – Current Peak Load (0x53)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
</tbody>
</table>
Current Peak Load (Response, Status Change)

- Byte 1 – Byte 4
  - ASCII Encoded Float Number
  - Example: “66.1” (Two Digits before the dot and one digit after dot)

**Data Bytes – Current RMS Load (0x54)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current RMS Load (Response, Status Change)

- Byte 1 – Byte 4
  - ASCII Encoded Float Number
  - Example: “66.1” (Two Digits before the dot and one digit after dot)

**Data Bytes – Current Temperature (0x55)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current Temperature (Response, Status Change)

- Byte 1 – Byte 3
  - ASCII Encoded Decimal Number
  - Example: “098”

**Data Bytes – Current Wattage (0x56)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
</tbody>
</table>
Current Wattage (Response, Status Change)

- Byte 1 – Byte 4
  - ASCII Encoded Decimal Number
  - Example: “1234”

**Data Bytes – Current Power Factor (0x57)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current Power Factor (Response, Status Change)

- Bytes 1 – Bytes 4
  - ASCII Encoded Float Number
  - Example: “0.98” (One Digit before the dot and two digits after dot)

**Data Bytes – Current Thermal Load (BTU) (0x58)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>6 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current Thermal Load (BTU) (Response, Status Change)

- Byte 1 – Byte 6
  - ASCII Encoded Float Number
  - Example: ”1234.5“ (Four Digits before the dot and one digit after dot)

**Data Bytes – Current Surge Protection State (0x59)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>1 Bytes</td>
<td></td>
</tr>
</tbody>
</table>
Current Surge Protection State (Response, Status Change)

- Byte 1
  - Value: 0x00 (Not Supported)
  - Value: 0x01 (Protected)
  - Value: 0x02 (Compromised)

Data Bytes – Current Energy Management State (0x60)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>9 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Current Energy Management State (Response)

- Byte 1
  - Occupancy State
    - Value: “U” (Unoccupied)
    - Value: “O” (Occupied)

- Byte 2
  - Outlet 1 Energy Management State
    - Value: “D” (Disconnected)
    - Value: “S” (Standby)
    - Value: “I” (On)
    - Value: “O” (Off)
    - Value: “U” (Unknown)

- Byte 3
  - Outlet 2 Energy Management State
    - Value: “D” (Disconnected)
    - Value: “S” (Standby)
    - Value: “I” (On)
    - Value: “O” (Off)
    - Value: “U” (Unknown)

- Byte 4
  - Outlet 3 Energy Management State
    - Value: “D” (Disconnected)
    - Value: “S” (Standby)
    - Value: “I” (On)
    - Value: “O” (Off)
- **Value:** “U” (Unknown)

- **Byte 5**
  - Outlet 4 Energy Management State
    - **Value:** “D” (Disconnected)
    - **Value:** “S” (Standby)
    - **Value:** “I” (On)
    - **Value:** “O” (Off)
    - **Value:** “U” (Unknown)

- **Byte 6**
  - Outlet 5 Energy Management State
    - **Value:** “D” (Disconnected)
    - **Value:** “S” (Standby)
    - **Value:** “I” (On)
    - **Value:** “O” (Off)
    - **Value:** “U” (Unknown)

- **Byte 7**
  - Outlet 6 Energy Management State
    - **Value:** “D” (Disconnected)
    - **Value:** “S” (Standby)
    - **Value:** “I” (On)
    - **Value:** “O” (Off)
    - **Value:** “U” (Unknown)

- **Byte 8**
  - Outlet 7 Energy Management State
    - **Value:** “D” (Disconnected)
    - **Value:** “S” (Standby)
    - **Value:** “I” (On)
    - **Value:** “O” (Off)
    - **Value:** “U” (Unknown)

- **Byte 9**
  - Outlet 8 Energy Management State
    - **Value:** “D” (Disconnected)
    - **Value:** “S” (Standby)
    - **Value:** “I” (On)
    - **Value:** “O” (Off)
    - **Value:** “U” (Unknown)

---

**Data Bytes – Occupancy State (0x61)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>1 Bytes</td>
<td>1</td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td>0</td>
</tr>
<tr>
<td>Response</td>
<td>1 Bytes</td>
<td>1</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td>N / A</td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td>N / A</td>
</tr>
</tbody>
</table>
Occupancy State (Set, Response)

- **Byte 1**
  - Occupancy State
    - Value: “U” (Unoccupied)
    - Value: “O” (Occupied)

### Data Bytes – Low Voltage Threshold (0x70)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Low Voltage Threshold (Set, Response, Status Change)

- **Byte 1 – Byte 3**
  - ASCII Encoded Decimal Number
  - Example: “105”
  - Valid Range: “105” – “110”

### Data Bytes – High Voltage Threshold (0x71)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

High Voltage Threshold (Set, Response, Status Change)

- **Byte 1 – Byte 3**
  - ASCII Encoded Decimal
  - Example: “128”
  - Valid Range: “123” – “128”

### Data Bytes – Maximum Load Current (0x73)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
</tbody>
</table>
### Maximum Load Current (Set, Response, Status Change)

- **Byte 1 – Byte 4**
  - ASCII Encoded Float
  - Example: “15.0”
  - Valid Range: “00.0” – “15.0” (15 amp models)
  - Valid Range: “00.0” – “20.0” (20 amp models)

### Data Bytes – Minimum Load Current (0x74)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

### Minimum Load Current (Set, Response, Status Change)

- **Byte 1 – Byte 4**
  - ASCII Encoded Float
  - Example: “00.0”
  - Valid Range: “00.0” – “15.0” (15 amp models)
  - Valid Range: “00.0” – “20.0” (20 amp models)

### Data Bytes – Maximum Temperature (0x76)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

### Maximum Temperature (Set, Response, Status Change)

- **Byte 1 – Byte 3**
  - ASCII Encoded Decimal
  - Example: “100”
  - Valid Range: “000” – “250”
**Data Bytes – Minimum Temperature (0x77)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>3 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Temperature (Set, Response, Status Change)

- Byte 1 – Byte 3
  - ASCII Encoded Decimal
  - Example: “65”
  - Valid Range: “000” – “250”

**Data Bytes – Log Entry (0x80)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>7 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>60 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>60 Bytes</td>
<td></td>
</tr>
</tbody>
</table>

Log Entry (Get)

- Byte 1 – Byte 4
  - Beginning Log Entry
  - ASCII Encoded Decimal
  - Valid Range: “0001” – “2000”
- Byte 5:
  - Valid Value: “|” (Pipe)
- Byte 6 – Byte 7
  - Return Count
  - ASCII Encoded Decimal
  - Valid Range: “00” – “99”

Log Entry (Response, Log Alert)

- Byte 1 – Byte 2
  - Request Item Number (referenced from the count)
  - ASCII Encoded Decimal
  - Valid Range: “00” – “99”
- Byte 3:
  - Valid Value: “|” (Pipe)
- **Byte 4 - Byte 5**
  - Quantity Items to Receive
  - ASCII Encoded Decimal
  - Valid Range: “00” – “99”

- **Byte 6**
  - Valid Value: “|” (Pipe)

- **Byte 7 – Byte 10**
  - Log Entry Number
  - ASCII Encoded Decimal
  - Valid Range: “0000” – “2000”

- **Byte 11**
  - Valid Value: “|” (Pipe)

- **Byte 12 – Byte 13**
  - Log Entry Category
  - ASCII Encoded Decimal
  - Valid Range: “00” - “09”
    - Value: “00” (Normal)
    - Value: “01” (Over Voltage)
    - Value: “02” (Under Voltage)
    - Value: “03” (Over Current)
    - Value: “04” (Under Current)
    - Value: “05” (Over Temperature)
    - Value: “06” (Under Temperature)
    - Value: “07” (Surge Fault)
    - Value: “08” (Auto Ping Fault)
    - Value: “09” (RS-232 Ping Fail)
    - Value: “10” (EPO Initiate)
    - Value: “11” (EPO Recovery)

- **Byte 14**
  - Valid Value: “|” (Pipe)

- **Byte 15 – Byte 78**
  - Log Data
  - Various ASCII Data
  - Description:
    - MM/DD/YYYY HH:MM:SS,TTT,WWWW,F.F,VVR,CC.R,LLLL.L,O,1,2,3,4,5,6,7,8
      1. MM is Month
      2. DD is day
      3. YYYY is 4 digit year
      4. HH is hour
      5. MM is Minutes
      6. SS is seconds
      7. TTT is temperature in Fahrenheit
      8. WWWW is Wattage
      9. F.F is Power Factor
      10. VVR is RMS Voltage
      11. CC.R is RMS Current
      12. LLLLL is Thermal Load
      13. O is Occupancy
      14. 1 is Outlet 1 Energy Management State
15. 2 is Outlet 2 Energy Management State
16. 3 is Outlet 3 Energy Management State
17. 4 is Outlet 4 Energy Management State
18. 5 is Outlet 5 Energy Management State
19. 6 is Outlet 6 Energy Management State
20. 7 is Outlet 7 Energy Management State
21. 8 is Outlet 8 Energy Management State

**Data Bytes – Log Count (0x81)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>*Status Change</td>
<td>4 Bytes</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

*Future

Log Count (Response)

- Byte 1 – Byte 4
  - ASCII Encoded Decimal
  - Valid Range: “0000” – “2000”

**Data Bytes – Clear Log (0x82)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

**Data Bytes – Product Part Number (0x90)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Variable</td>
<td>50 Bytes</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

Product Part Number (Response)

- Bytes 1 – x (50 Bytes Max)
  - ASCII Alpha Numeric

**Data Bytes – Product Rating (0x91)**

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
</table>
### Product Rating (Amp hours) (Response)

- Byte 1 – Byte 2
  - ASCII Encoded Decimal
  - Valid Range: “00” – “99”

### Data Bytes – Product Surge Protection (0x93)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>1 Bytes</td>
<td></td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

### Product Surge Protection (Does this product have surge protection) (Response)

- Byte 1
  - Valid Values
    - “Y” (Yes)
    - “N” (No)

### Data Bytes – Product Current IP Address (0x94)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Get</td>
<td>0 Bytes</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Variable</td>
<td>15</td>
</tr>
<tr>
<td>Status Change</td>
<td>N / A</td>
<td></td>
</tr>
<tr>
<td>Log Alert</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>

### Product Current IP Address (Response)

- Byte 1 – x (Max 15)
  - Example: “192.168.100.10”

### Data Bytes – Product MAC Address (0x95)

<table>
<thead>
<tr>
<th>Sub-Commands</th>
<th>Quantity Data Bytes Required</th>
<th>Max Data Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>N / A</td>
<td></td>
</tr>
</tbody>
</table>
Product MAC Address (Response)

- Byte 1 – Byte 17
  - Example: “58:b0:35:6a:24:35"

**Examples**

<Header><Length><data envelope><Checksum><Tail>

**Example - Initial Login Sequence**

You Send: “Set” Login: (replace “UserName|Password” with actual values)

0xfe 0x14 0x00 0x02 0x01 “UserName|Password” 0x04 0xff

You Get: “Response” Login: (Accepted)

0xfe 0x04 0x00 0x02 0x10 0x01 0x15 0xff

You Get: “Set” Ping

0xfe 0x03 0x00 0x01 0x01 0x03 0xff

You Send: “Response” Ping (Pong)

0xfe 0x03 0x00 0x01 0x10 0x12 0xff

**Example - Get Log Entries**

You Send: Get Log Entries (Starting at Item 1 and return 10 items).

0xfe 0x0b 0x00 0x80 0x02 “0001|05” 0x2c 0xff

You Get: Response Log Entries (1 of 05, Log Entry 1)

0xfe 0x3c 0x00 0x80 0x10 ”01|05|0001|00|06/25/11 10:59:47,075,0013,0.8,119,00.2,0046.4” 0x04 0xff

You Get: Response Log Entries (1 of 05, Log Entry 2)

0xfe 0x3c 0x00 0x80 0x10 ”02|05|0002|00|06/29/11 11:37:02,076,0006,0.6,114,00.0,0023.2” 0x71 0xff
You Get: Response Log Entries (1 of 05, Log Entry 3)
0xfe 0x3c 0x00 0x80 0x10 "03|05|0003|00|06/29/11
11:36:19,076,0003,0.5,115,00.0,0012.2" 0x75 0xff

You Get: Response Log Entries (1 of 05, Log Entry 4)
0xfe 0x3c 0x00 0x80 0x10 "04|05|0004|00|06/29/11
11:31:04,076,0003,0.5,115,00.0,0012.2" 0x6c 0xff

You Get: Response Log Entries (1 of 05, Log Entry 5)
0xfe 0x3c 0x00 0x80 0x10 "05|05|0005|00|06/29/11
11:26:48,076,0003,0.5,115,00.0,0012.2" 0x7a 0xff

Example - Log Alert

You Get: Log Alert (Item 1 of 1 Log Entry 1777, Reason: RS232 Ping Failed)
0xfe 0x3c 0x00 0x80 0x30 "01|01|1777|09|06/29/11
11:31:04,076,0003,0.5,115,00.0,0012.2" 0x4a 0xff

Example – Control Outlet

You Send: “Set” Power Outlet (Turn on Outlet 1)
0xfe 0x09 0x00 0x20 0x01 0x01 0x01 "0000" 0x6a 0xff

You Get: “Response” Power Outlet
0xfe 0x09 0x00 0x20 0x10 0x01 0x01 "0000" 0x79 0xff

You Send: “Set” Power Outlet (Turn off Outlet 2)
0xfe 0x09 0x00 0x20 0x01 0x02 0x00 "0000" 0x6a 0xff

You Get: “Response” Power Outlet
0xfe 0x09 0x00 0x20 0x10 0x02 0x00 "0000" 0x79 0xff

You Send: “Set” Power Outlet (Cycle Outlet 3 for 5 Seconds)
You Get: “Response” Power Outlet (Outlet 3 is off)

You Send: “Set” Register Status (Example: Outlet and Dry Contact Status Change Only)

You Get: “Response” Register Status

You Send: “Set” Power Outlet (Turn on Outlet 1)

You Get: “Response” Power Outlet

(You will NOT get a “Status Change” message in this case because the RackLink device already told you in the above message that the outlet is on)

You Send: “Set” Power Outlet (Cycle Outlet 3 for 5 Seconds)

You Get: “Response” Power Outlet (Outlet 3 is cycling, this response also indicates the outlet is currently off)
(Five Seconds Later)

You Get: “Status Change” Power Outlet (Outlet 3 is on, also this response indicates that the cycling period is over)

0xfe 0x09 0x00 0x20 0x03 0x001"0005" 0x02 0xff