# 

Cornel Frey Firmware upgrade

Document Number: 00000

# Introduction

This document will describe in detail the Smart Battery Interface communications protocol between the ISC Ventis Pro instrument and the smart battery (can be Wi-Fi or Cellular) when the firmware is upgraded through Modbus Terminal. The actual interface will be defined here, not the actual values that are passed between the two devices. The Smart Battery communications for the Ventis Pro is done serially using SPI.

## Firmware Start Message:

This is the first message that will be sent by Modbus Terminal to smart battery (through Ventis Pro) for firmware update:

**Start Firmware Downloading:**

|  |  |  |
| --- | --- | --- |
| **Bytes** | **Value** | **Description** |
| 0~1 | "$$" (0x2424) | Framing character (start) |
| 2 | 0x5A | Firmware Start Downloading |
| 3 | 1 | Version of message |
| 4 | x | Smart Battery type |
| 5 | n | Payload length (from byte 5 till framing character). |
| 6 | File Type | Type of file which will be received. |
| 7-10 | Total No of Packets | No of Packets that will be received. |
| 11-14 | File CRC | This is the total CRC of the file. |
| 15-16 | Checksum | This is the Checksum of the Packet. |
| 17-18 | "##" (0x2323) | Framing character (end). |

**Notes:**

Smart Battery type:

|  |  |
| --- | --- |
| Value | Definition |
| 0 | Unknown |
| 1 | Wi-Fi |
| 2 | Cellular |

File Type:

|  |  |
| --- | --- |
| Value | Definition |
| 0 | Unknown |
| 1 | Main Firmware |
| 2 | CA Certificate |
| 3 | Hash Key |
| 4 | Service Pack |

## Commit Firmware Message:

This is the last message that will be sent by Modbus Terminal to smart battery (through Ventis Pro) after firmware update:

**Stop Firmware Downloading:**

|  |  |  |
| --- | --- | --- |
| **Bytes** | **Value** | **Description** |
| 0~1 | "$$" (0x2424) | Framing character (start) |
| 2 | 0x5C | Commit Firmware |
| 3 | 1 | Version of message |
| 4 | x | Smart Battery type |
| 5 | n | Payload length (from byte 5 till framing character) |
| 6 | File Type | Type of file which will be received. |
| 7-10 | Total No of Packets | No of Packets that were sent. |
| 11-14 | File CRC | This is the total CRC of the file. |
| 15-16 | Checksum | This is the Checksum of the Packet. |
| 17-18 | "##" (0x2323) | Framing character (end) |

## Firmware Data Message:

This is the firmware packet that will be sent by Modbus Terminal to smart battery (through Ventis Pro) for firmware update:

**Receive Firmware Data:**

|  |  |  |
| --- | --- | --- |
| **Bytes** | **Value** | **Description** |
| 0~1 | "$$" (0x2424) | Framing character (start) |
| 2 | 0x5E | Receive Firmware |
| 3 | 1 | Version of message |
| 4 | x | Smart Battery type |
| 5 | n | Payload length (from byte 5 till framing character) |
| 6 | File Type | Type of file which will be received. |
| 7-10 | Sequence No | Current received Packet sequence number. |
| 11-74 | Payload | Firmware Data (Max 64 Bytes can be less). |
| 75-76 | Checksum | This is the Checksum of the Packet. |
| 77-78 | "##" (0x2323) | Framing character (end) |

## Firmware Response Message:

This is the response message that Cornell/Frey will send back to Ventis Pro during firmware update:

**ACK/NACK Message:**

|  |  |  |
| --- | --- | --- |
| **Bytes** | **Value** | **Description** |
| 0~1 | "$$" (0x2424) | Framing character (start) |
| 2 | 0x5F | ACK/NACK |
| 3 | 0/1 | 1=Ack, 0=NACK |
| 4 | Error | Error Type encountered. |
| 5 | n | Payload length (from byte 5 till framing character), will be 11 always. |
| 6 | File Type | Type of the file. |
| 7-10 | Sequence No | Current received Packet. |
| 11-14 | Error Code | Error Code returned from Battery Board |
| 15-18 | Failure Pack Sequence Number | Failed Packet Sequence number |
| 19-20 | Checksum | This is the Checksum of the Packet. |
| 21-22 | "##" (0x2323) | Framing character (end) |

**Notes:**

Error type:

|  |  |
| --- | --- |
| Value | Definition |
| 0 | No Error |
| 1 | Bad Length |
| 2 | Invalid CRC |
| 3 | Bad Frame Number |
| 4 | Packet Allocation Error |
| -101 | Main Header Identifier Error |
| -102 | File Header Identifier Error |
| -103 | Main Header CRC Error |
| -104 | File Header CRC Error |
| -105 | Descriptor Header Identifier Error |
| -106 | File Failed To Open |
| -107 | File Writing Failed |
| -108 | File Length Error |
| -109 | File Descriptor Length Error |
| -110 | File CRC Error |
| -111 | File Closing Error |