# WatchMon - Canbus Native 2.0 messages

Extended canbus identifiers
Default baud rate : 500kB
Little indian for multibyte fields

### *Version*

1.0 – 6/07/2018 – intial draft

### *Device versioning*

Identifier: Base Address + Hex 0x00
Tx Frequency: 10 Seconds
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Hardware version | uint16 | 0 to 65000 | i.e. 4.0 |
| 2 | Firmware version | uint16 | 0 to 65000 | i.e. 1.29 |
| 4 | Device Serial no | Uint32 | | |

### *Cell voltage limits*

Identifier: Base Address + Hex 0x01
Tx Frequency: 100mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Min Cell Voltage | Uint16 | 0 to 6,500 mV | 1mV / bit and nil offset |
| 2 | Max Cell Voltage | Uint16 | 0 to 6,500 mV | 1mV / bit and nil offset |
| 4 | Avg Cell Voltage | Uint16 | 0 to 6,500 mV | 1mV / bit and nil offset |
| 6 | Min V @ Cell# | uint8 | 0 to 250 | |
| 7 | Max V @ Cell# | uint8 | 0 to 250 | |

### *Cell temperature limits*

Identifier: Base Address + Hex 0x02
Tx Frequency: 1000mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Min Cell Temperature | uint8 | -40ºC to 125ºC | 1ºC/bit and 40ºC offset |
| 1 | Max Cell Temperature | uint8 | -40ºC to 125ºC | 1ºC/bit and 40ºC offset |
| 2 | Avg Cell Temperature | uint8 | -40ºC to 125ºC | 1ºC/bit and 40ºC offset |
| 3 | Min T @ cell # | uint8 | 0 to 250 | |
| 4 | Max T @ cell # | uint8 | 0 to 250 | |
| 5..7 | Reserved | | | |

### *Cell bypass summary*

Identifier:  Base Address + Hex 0x03
Tx Frequency: 1000mSec
Data Length: 8

| | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Number in Bypass | uint8 | 0 to 250 | |
| 1 | Number in Initial Bypass | uint8 | 0 to 250 | |
| 2 | Number in Final Bypass | uint8 | 0 to 250 | |
| 3..7 | Reserved | | | |

### *Shunt power monitoring*

Identifier: Base Address + Hex 0x04
Tx Frequency: 100mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Shunt Voltage | int16 | 0 to 400.0 V | 100mV / bit signed |
| 2 | Shunt Amperes | Int16 | +/- 350.0 A | 100mA/bit signed<br>pos = charge , neg = discharge |
| 4 | Shunt Power | Int16 | +/-150.00kW | 10mW / bit signed<br>pos = charge , neg = discharge |
| 6..7 | Reserved | | | |

### *Shunt state monitoring*

Identifier: Base Address + Hex 0x05
Tx Frequency: 1000mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | State of Charge SoC% | Int15 | -10.00% to +110.00% | 0.01% / bit  2 dec.pt |
| 2 | State of Health SoH% | Int16 | -40ºC to 125ºC | 0.01% / bit  2 dec.pt |
| 4 | Remaining Ah | uint16 | 0 to 1000.0 Ah | 10mAh / bit  1 dec.pt |
| 6 | Nominal Capacity Ah | Uint16 | 0 to 1000.0 Ah | 10mAh / bit  1 dec.pt |

### *Remote control target limits*

Identifier: Base Address + Hex 0x06
Tx Frequency: 100mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Charge Target Voltage | uint16 | 0 to 65000 | per remote scale16 configuration<br>(i.e. 10mV / bit, 5400 = 54.00V) |
| 2 | Charge Target Amp | uint16 | 0 to 65000 | per remote scale16 configuration<br>(i.e. 100mA / bit, 1200 = 120.0A) |
| 4 | Discharge Target Voltage | uint16 | 0 to 65000 | User-defined per remote scale16 config<br>(i.e. 10mV / bit, 5400 = 54.00V) |
| 6 | Discharge Target Amp | uint16 | 0 to 65000 | per remote scale16 configuration<br>(i.e. 100mA / bit, 1200 = 120.0A) |

### *Control flag logic state*

Identifier: Base Address + Hex 0x07
Tx Frequency: 100mSec
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Critical control flags | Byte | 0 to 255 | Bit0: Ok State (relay state)<br>Bit1: Transisition of state<br>Bit2: Precharge |
| 1 | Charge control flags | Byte | 0 to 255 | Bit0: On State (relay state)<br>Bit1: Transisition of state<br>Bit2: limited power evoked |
| 2 | Discharge control flags | Byte | 0 to 255 | Bit0: On State (relay state)<br>Bit1: Transisition of state<br>Bit2: limited power evoked |
| 3 | Heat control flags | Byte | 0 to 255 | Bit0: On State (relay state)<br>Bit1: Transisition of state |
| 4 | Cool control flags | Byte | 0 to 255 | Bit0: On State (relay state)<br>Bit1: Transisition of state |
| 5 | Cell balancing flags | Byte | 0 to 255 | Bit0: Cells in Bypass<br>Bit1: Bypass Temp Relief |
| 6..7 | Reserved | | | |

### *Programming / Telemetry configuration – Status TX data stream*

Identifier: Base Address + Hex 0x10
Tx Frequency: Adhoc
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Reserved | Uint64 | | |

Status TX from supervisor to console app

### *Programming / Telemetry configuration – Command RX data stream*

Identifier: Base Address + Hex 0x11
Tx Frequency: Adhoc
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Reserved | Uint64 | | |

Command RX to supervisor from console app

### *Programming - Device Discovery broadcast*

Identifier: Group Address + Hex 0x00
Tx Frequency: 10 Seconds
Data Length: 8

| Offset | Field | Data Type | Range | Resolution |
|---|---|---|---|---|
| 0 | Base address | Uint32 | | Where to find details about device |
| 4 | Reserved | Uint32 | | |