KONTRONIK Telemetrieprotokoll:

Modus:	8-Bit Übertragung
Baudrate:	115200
Startbit:	1
Stopbit:	1
Paritybit:	even
Intervall:	10 ms
Übertragung:	Two-Wire
Reihenfolge:	Little-Endian

Revision:	V5
Stand:	04.06.2024

Produkt	ab Version
JIVE PRO 80HV/120HV	1.14
KOLIBRI 60LV/90LV/140LV	3.5
KOSMIK 160HV/200HV	4.15
KOSMIK 250HV	1.25

Daten

Live Daten

Name	Kommentar	Min Wert	Max Wert	Auflösung	Einheit	Bitgröße	Vorzeichen	KOSMIK	KOLIBRI	JIVEPro	KONTROL-X
Header 1	'K'	-	-	-	ID	8	unsigned	X	X	X	
Header 2	'O'	-	-	-	ID	8	unsigned	X	X	X	
Header 3	'D' - Data	-	-	-	ID	8	unsigned	X	X	X	
Header 4	'L' - Livedata	-	-	-	ID	8	unsigned	X	X	X	
Drehzahl	elektrische Drehzahl	0	300000	1	U/min	32	unsigned	X	X	X	
Akkuspannung	Spannung der DC-Seite	0	10.000	10	mV	16	unsigned	X	X	X	
Akkustrom	Strom der DC-Seite	-10000	10.000	0,1	A	16	signed	X	X	X	
Motorstrom	Mittelwert	-10000	10.000	0,1	A	16	signed	X	X	X	
Peak Strom	Maximalpeak Motor (KOSMIK, KOLIBRI, KONTROL-X) bzw. Akkustrom (JIVEPro)	-10000	10.000	0,1	A	16	signed	X	X	X	
Kapazität	Errechneter Verbauch	0	65535	1	mAh	16	unsigned	X	X	X	
BEC Strom	Strom des Battery Eliminator Circuit	0	60000	1	mA	16	unsigned	X	X	*)	
BEC Spannung	Spannung des Battery Eliminator Circuit	5000	10000	1	mV	16	unsigned	X	X	X	
PWM_in	externes Gebersignal	500	2500	1	µs	16	unsigned	X	X	X	
Gas_in	Gasöffnung (-100% - 0 = Bremse; 0 - 100% = Motorlauf)	-100	100	1	%	8	signed	X	X	X	
Regleröffnung	Endstufenöffnung (0 - 100% = Motorlauf)	0	100	1	%	8	unsigned	X	X	X	
Endstufe Temperatur	Temperatur des Leistungsteils	-128	127	1	°C	8	signed	X	X	X	
BEC Temperatur	Temperatur des Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Betriebsfehler	Unterspannung 0.Bit // Unterspannung am Akku Ueberspannung 1.Bit // Überspannung am Akku UeberstromE 2.Bit // Überstromintegral-Error hat angesprochen UeberstromW 3.Bit // Überstromintegral-Warning hat angesprochen Uebertemp_EndstufeW 4.Bit // Übertemperatur-Warning der Endstufe Uebertemp_EndstufeE 5.Bit // Übertemperatur-Error der Endstufe Unterspannung_BEC 6.Bit // Unterspannung am BEC Ueberspannung_BEC 7.Bit // Überspannung am BEC Ueberstrom_BEC 8.Bit // Überstrom am BEC Uebertemp_BEC 9.Bit // Übertemperatur am BEC Runterfahren 10.Bit // Abschaltung durch Ruterfahren (bei Drehzahlregelung) Kapazitaetsgrenze 11.Bit // voreingestellte Entladungskapazität wurde erreicht BetriebsFehler 12.Bit // es wurde ein Fehler im Betrieb gefunden BetriebsWarning 13.Bit // es wurde eine Warning im Betrieb gefunden SelbsttestFehler 14.Bit // es wurde ein Fehler beim Selbsttest gefunden EEPROMfehler 15.Bit // es wurde ein EEPROM-Fehler gefunden Watchdog 16.Bit // Watchdog-Fehler war aufgetreten ProgAllow 17.Bit // Programmierung ist noch erlaubt TelmeW_Umin 18.Bit // voreingestellte Unterspannung am Akku wurde erreicht TelmeW_maxStrom 19.Bit // voreingestellte Überstromgrenze wurde erreicht TelmeW_maxTempESC 20.Bit // voreingestellte Übertemperatur der Endstufe erreicht TelmeW_maxTempBEC 21.Bit // voreingestellte Übertemperatur am BEC wurde erreicht TelmeW_maxStromBEC 22.Bit // voreingestellte Überstromgrenze am BEC wurde erreicht TelmeW_maxDischarge 23.Bit // voreingestellte Entladungskapazität wurde erreicht	0	16777215	1	Bit	32	unsigned	X	X	X	
Betriebszustand	"WaitForSignal", // 1 "WaitForMotorOff", // 2 "WaitForMotorOff2", // 3 "", // 4 "", // 5 "", // 6 "Selftest", // 7 "", // 8 "Error_Selftest", // 9 "CutOffDuringOperation", // 10 "AcousticSignal", // 11 "MotorOff", // 12 "StandBy", // 13 "Brake", // 14 "BrakeTargetBackward", // 15 "BrakeTargetForward", // 16 "Programming", // 17 "Sync_Forward", // 18 "Sync_Backward", // 19 "Sync_StandBy", // 20 "Forward", // 21 "Backward", // 22 "SpoolUpFromStill", // 23 "SpoolUpFromTurn", // 24 "SpoolUpQuick", // 25 "RPMcontrol", // 26	0	26	1	Bit	8	unsigned	X	X	X	
Timing	Vorkommutierung	0	30	1	°	8	unsigned	X	X	X	
Reserved	Reserved1	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved2	0	255	1	-	8	unsigned	X	X		
CRC32	Zyklische Redundanzprüfung	0	4294967295	1	-	32	unsigned	X	X	X	

Maximalwerte + Info Daten (Jedes 100. Paket)

Name	Kommentar	Min Wert	Max Wert	Auflösung	Einheit	Bitgröße	Vorzeichen	KOSMIK	KOLIBRI	JIVEPro	KONTROL-X
Header 1	'K'	-	-	-	ID	8	unsigned	X	X	X	
Header 2	'O'	-	-	-	ID	8	unsigned	X	X	X	
Header 3	'D' - Data	-	-	-	ID	8	unsigned	X	X	X	
Header 4	'I' - Info	-	-	-	ID	8	unsigned	X	X	X	
Device und Variante	Device (High 6 Bit) 0=Reserviert, 1=KOSMIK, 2=KOLIBRI, 3=JIVEPro, 4=KONTROL-X, 5=UHV Variante (Low 10 Bit)	0	65535	1	ID	16	unsigned	X	X	X	
Firmware Version	Hauptnummer (High 8 Bit)Unternummer (Low 8 Bit)	0	65535	1	ID	16	unsigned	X	X	X	
Selbsttestfehler	U_Motor_low // 0.Bit Motorphase Lowside schaltet nicht U_Motor_high // 1.Bit Motorphase Highside schaltet nicht Ruhepegel // 2.Bit Kurzschluss auf GND oder Ruhespannung U_Offset // 3.Bit BackEMF-Offset I_Offset // 4.Bit Nullpunkt der Strommessung S_Unterspannung // 5.Bit Unterspannung S_Ueberspannung // 6.Bit Ueberspannung S_BEC_Unterspannung // 7.Bit BEC-Unterspannung S_BEC_Ueberspannung // 8.Bit BEC-Ueberspannung VerpolFuse // 9.Bit Verpolsicherung UeberspannungFuse // 10.Bit Ueberspannungssicherung S_UebertempEndstufe // 11.Bit Uebertemperatur Endstufe S_UebertempBEC // 12.Bit Uebertemperatur BEC Motorkontakt // 13.Bit Kontakt mit allen 3 Motorphasen fehlt EE_leer // 14.Bit EEPROM leer EE_Knueppelposition // 15.Bit Stickpositionen der EEPROM-Konfiguration EE_Checksumme // 16.Bit Checksumme des EEPROMs EE_Size // 17.Bit Große des EEPROMs EE_Version // 18.Bit Version des EEPROMs	0	524287	1	Bit	32	unsigned	X	X	X	
Zellenzahl	Erkannte Akkuzellen	0	255	1	Anzahl	8	unsigned	X	X	X	
Max. Drehzahl	Maximal protokollierte Drehzahl (elektrisch)	0	300000	1	RPM	32	unsigned	X	X	X	
Min. Akkuspannung	Minimal protokollierte Spannung an der DC-Seite	0	10.000	10	mV	16	unsigned	X	X	X	
Max. Akkuspannung	Maximal protokollierte Spannung an der DC-Seite	0	10.000	10	mV	16	unsigned	X	X	X	
Max. Akkustrom	Maximal protokollierter Strom an der DC-Seite	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. Motorstrom	Maximal protokollierter Motorstrom gemittelt	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. Peak Motorstrom	Maximal protokollierter Motorstrom	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. BEC Strom	Maximal protokollierter Strom am Battery Eliminator Circuit	0	60000	1	mA	16	unsigned	X	X	*)	
Min. BEC Spannung	Minimal protokollierte Spannung am Battery Eliminator Circuit	5000	10000	1	mV	16	unsigned	X	X	X	
Max. Gas_in	Maximal protokollierte Gasöffnung	-100	100	1	%	8	signed	X	X	X	
Max. Regleröffnung	Maximal protokollierte Endstufenöffnung	0	100	1	%	8	unsigned	X	X	X	
Min. Endstufen Temp.	Minimal protokollierte Temperatur am Leistungsteil	-128	127	1	°C	8	signed	X	X	X	
Max. Endstufen Temp.	Maximal protokollierte Temperatur am Leistungsteil	-128	127	1	°C	8	signed	X	X	X	
Min. BEC Temperatur	Minimal protokollierte Temperatur am Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Max. BEC Temperatur	Maximal protokollierte Temperatur am Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Reserved	Reserved1	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved2	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved3	0	255	1	-	8	unsigned	X	X		
CRC32	Zyklische Redundanzprüfung	0	4294967295	1	-	32	unsigned	X	X	X	

CRC-check

```
  public static byte[] CRC32(byte[] Data, int offset, int count)
    {
      UInt32[] crctab =
        {
0x00000000, 0x77073096, 0xee0e612c, 0x990951ba, 0x076dc419,
0x706af48f, 0xe963a535, 0x9e6495a3, 0x0edb8832, 0x79dcb8a4,
0xe0d5e91e, 0x97d2d988, 0x09b64c2b, 0x7eb17cbd, 0xe7b82d07,
0x90bf1d91, 0x1db71064, 0x6ab020f2, 0xf3b97148, 0x84be41de,
0x1adad47d, 0x6ddde4eb, 0xf4d4b551, 0x83d385c7, 0x136c9856,
0x646ba8c0, 0xfd62f97a, 0x8a65c9ec, 0x14015c4f, 0x63066cd9,
0xfa0f3d63, 0x8d080df5, 0x3b6e20c8, 0x4c69105e, 0xd56041e4,
0xa2677172, 0x3c03e4d1, 0x4b04d447, 0xd20d85fd, 0xa50ab56b,
0x35b5a8fa, 0x42b2986c, 0xdbbbc9d6, 0xacbcf940, 0x32d86ce3,
0x45df5c75, 0xdcd60dcf, 0xabd13d59, 0x26d930ac, 0x51de003a,
0xc8d75180, 0xbfd06116, 0x21b4f4b5, 0x56b3c423, 0xcfba9599,
0xb8bda50f, 0x2802b89e, 0x5f058808, 0xc60cd9b2, 0xb10be924,
0x2f6f7c87, 0x58684c11, 0xc1611dab, 0xb6662d3d, 0x76dc4190,
0x01db7106, 0x98d220bc, 0xefd5102a, 0x71b18589, 0x06b6b51f,
0x9fbfe4a5, 0xe8b8d433, 0x7807c9a2, 0x0f00f934, 0x9609a88e,
0xe10e9818, 0x7f6a0dbb, 0x086d3d2d, 0x91646c97, 0xe6635c01,
0x6b6b51f4, 0x1c6c6162, 0x856530d8, 0xf262004e, 0x6c0695ed,
0x1b01a57b, 0x8208f4c1, 0xf50fc457, 0x65b0d9c6, 0x12b7e950,
0x8bbeb8ea, 0xfcb9887c, 0x62dd1ddf, 0x15da2d49, 0x8cd37cf3,
0xfbd44c65, 0x4db26158, 0x3ab551ce, 0xa3bc0074, 0xd4bb30e2,
0x4adfa541, 0x3dd895d7, 0xa4d1c46d, 0xd3d6f4fb, 0x4369e96a,
0x346ed9fc, 0xad678846, 0xda60b8d0, 0x44042d73, 0x33031de5,
0xaa0a4c5f, 0xdd0d7cc9, 0x5005713c, 0x270241aa, 0xbe0b1010,
0xc90c2086, 0x5768b525, 0x206f85b3, 0xb966d409, 0xce61e49f,
0x5edef90e, 0x29d9c998, 0xb0d09822, 0xc7d7a8b4, 0x59b33d17,
0x2eb40d81, 0xb7bd5c3b, 0xc0ba6cad, 0xedb88320, 0x9abfb3b6,
0x03b6e20c, 0x74b1d29a, 0xead54739, 0x9dd277af, 0x04db2615,
0x73dc1683, 0xe3630b12, 0x94643b84, 0x0d6d6a3e, 0x7a6a5aa8,
0xe40ecf0b, 0x9309ff9d, 0x0a00ae27, 0x7d079eb1, 0xf00f9344,
0x8708a3d2, 0x1e01f268, 0x6906c2fe, 0xf762575d, 0x806567cb,
0x196c3671, 0x6e6b06e7, 0xfed41b76, 0x89d32be0, 0x10da7a5a,
0x67dd4acc, 0xf9b9df6f, 0x8ebeeff9, 0x17b7be43, 0x60b08ed5,
0xd6d6a3e8, 0xa1d1937e, 0x38d8c2c4, 0x4fdff252, 0xd1bb67f1,
0xa6bc5767, 0x3fb506dd, 0x48b2364b, 0xd80d2bda, 0xaf0a1b4c,
0x36034af6, 0x41047a60, 0xdf60efc3, 0xa867df55, 0x316e8eef,
0x4669be79, 0xcb61b38c, 0xbc66831a, 0x256fd2a0, 0x5268e236,
0xcc0c7795, 0xbb0b4703, 0x220216b9, 0x5505262f, 0xc5ba3bbe,
0xb2bd0b28, 0x2bb45a92, 0x5cb36a04, 0xc2d7ffa7, 0xb5d0cf31,
0x2cd99e8b, 0x5bdeae1d, 0x9b64c2b0, 0xec63f226, 0x756aa39c,
0x026d930a, 0x9c0906a9, 0xeb0e363f, 0x72076785, 0x05005713,
0x95bf4a82, 0xe2b87a14, 0x7bb12bae, 0x0cb61b38, 0x92d28e9b,
0xe5d5be0d, 0x7cdcefb7, 0x0bdbdf21, 0x86d3d2d4, 0xf1d4e242,
0x68ddb3f8, 0x1fda836e, 0x81be16cd, 0xf6b9265b, 0x6fb077e1,
0x18b74777, 0x88085ae6, 0xff0f6a70, 0x66063bca, 0x11010b5c,
0x8f659eff, 0xf862ae69, 0x616bffd3, 0x166ccf45, 0xa00ae278,
0xd70dd2ee, 0x4e048354, 0x3903b3c2, 0xa7672661, 0xd06016f7,
0x4969474d, 0x3e6e77db, 0xaed16a4a, 0xd9d65adc, 0x40df0b66,
0x37d83bf0, 0xa9bcae53, 0xdebb9ec5, 0x47b2cf7f, 0x30b5ffe9,
0xbdbdf21c, 0xcabac28a, 0x53b39330, 0x24b4a3a6, 0xbad03605,
0xcdd70693, 0x54de5729, 0x23d967bf, 0xb3667a2e, 0xc4614ab8,
0x5d681b02, 0x2a6f2b94, 0xb40bbe37, 0xc30c8ea1, 0x5a05df1b,
0x2d02ef8d
        };
      UInt32 crc = 0xffffffff;
      for (int i = offset; i < count; i++)
        crc = (crc >> 8) ^ crctab[(crc & 0xff) ^ Data[i]];
      crc ^= 0xffffffff;
      byte[] output = new byte[4];

      output[0] = (byte)(crc >> 24);
      output[1] = (byte)(crc >> 16);
      output[2] = (byte)(crc >> 8);
      output[3] = (byte)(crc);

      return output;
    }
```

KONTRONIK Telemetry protocol:

Mode:	8-Bit transmission
Live Data	115200
Start bit:	1
Stop bit:	1
Parity:	even
Interval:	10 ms
Transmission:	Two-Wire
Order:	Little-Endian

Revision:	V5
Stand:	04.06.2024

Product	from Version
JIVE PRO 80HV/120HV	1.14
KOLIBRI 60LV/90LV/140LV	3.5
KOSMIK 160HV/200HV	4.15
KOSMIK 250HV	1.25

Live Data

Live Data

Name	Comment	Min value	Max value	Resolution	Unit	Bit size	Sign	KOSMIK	KOLIBRI	JIVEPro	KONTROL-X
Header 1	'K'	-	-	-	ID	8	unsigned	X	X	X	
Header 2	'O'	-	-	-	ID	8	unsigned	X	X	X	
Header 3	'D' - Data	-	-	-	ID	8	unsigned	X	X	X	
Header 4	'L' - Livedata	-	-	-	ID	8	unsigned	X	X	X	
Revolution speed	electrical Speed	0	300000	1	U/min	32	unsigned	X	X	X	
Battery voltage	DC Voltage	0	10.000	10	mV	16	unsigned	X	X	X	
Battery current	DC Current	-10000	10.000	0,1	A	16	signed	X	X	X	
Motor current	Mean motor Current (AC)	-10000	10.000	0,1	A	16	signed	X	X	X	
Peak current	motor peak current (KOSMIK, KOLIBRI, KONTROL-X) resp. Battery current (JIVEPro)	-10000	10.000	0,1	A	16	signed	X	X	X	
Capacity	calculated	0	65535	1	mAh	16	unsigned	X	X	X	
BEC current	Current of Battery Eliminator Circuit	0	60000	1	mA	16	unsigned	X	X		
BEC Voltage	Voltage of Battery Eliminator Circuit	5000	10000	1	mV	16	unsigned	X	X	X	
PWM_in	external Command	500	2500	1	µs	16	unsigned	X	X	X	
Throttle_in	Throttle (-100% - 0 = Brake; 0 - 100% = motor running)	-100	100	1	%	8	signed	X	X	X	
PWM opening	PWM-Opening (0 - 100% = motor running)	0	100	1	%	8	unsigned	X	X	X	
Power amp temperature	Temperature of power stage	-128	127	1	°C	8	signed	X	X	X	
BEC temperature	Temperature of Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Operation error	undervoltage // 0.Bit undervoltage of the battery overvoltage // 1.Bit overvoltage of the battery overcurrentE // 2.Bit overcurrent integral-warning has responded overcurrentW // 3.Bit overcurrent integral-warning has adressed overtemperature_ampW // 4.Bit overtemperature warning of the power amplifier overtemperature_ampE //5.Bit overtemperature error of the power amplifier undervoltage_BEC // 6.Bit undervoltage at the BEC overvoltage_BEC // 7.Bit overvoltage at the BEC overcurrent_BEC // 8.Bit overcurrent at the BEC overtemperature_BEC // 9.Bit overtemperature at the BEC shutdown // 10.Bit shutdown by driving on the ground (with speed control) dischargeCapacity // 11.Bit preset discharge capacity has been reached OperationError // 12.Bit an error has been found in the operation OperationWarning // 13.Bit an error was found during operation SelftestError // 14.Bit an error was found during the self-test EEPROMError // 15.Bit an EEPROM error was found Watchdog // 16.Bit Watchdog error had occurred ProgAllow // 17.Bit programming is still allowed TelmeW_Umin // 18.Bit preset undervoltage on the battery has been reached TelmeW_maxCurrent // 19.Bit preset overcurrent limit has been reached TelmeW_maxTempESC // 20.Bit preset overtemperature of the output stage reached TelmeW_maxTempBEC // 21.Bit preset overtemperature at the BEC has been reached TelmeW_maxCurrentBEC // 22.Bit preset overcurrent at the BEC has been reached TelmeW_maxDischarge // 23.Bit preset discharge capacity has been reached	0	16777215	1	Bit	32	unsigned	X	X	X	
Operation condition	"WaitForSignal", // 1 "WaitForMotorOff", // 2 "WaitForMotorOff2", // 3 "", // 4 "", // 5 "", // 6 "Selftest", // 7 "", // 8 "Error_Selftest", // 9 "CutOffDuringOperation", // 10 "AcousticSignal", // 11 "MotorOff", // 12 "StandBy", // 13 "Brake", // 14 "BrakeTargetBackward", // 15 "BrakeTargetForward", // 16 "Programming", // 17 "Sync_Forward", // 18 "Sync_Backward", // 19 "Sync_StandBy", // 20 "Forward", // 21 "Backward", // 22 "SpoolUpFromStill", // 23 "SpoolUpFromTurn", // 24 "SpoolUpQuick", // 25 "RPMcontrol", // 26	0	26	1	Bit	8	unsigned	X	X	X	
Timing	Pre commutation	0	30	1	°	8	unsigned	X	X	X	
Reserved	Reserved1	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved2	0	255	1	-	8	unsigned	X	X		
CRC32	Cyclic redundancy check	0	4294967295	1	-	32	unsigned	X	X	X	

Maximum value + info data (every 100th package)

Name	Comment	Min value	Max value	Resolution	Unit	Bit size	signed	KOSMIK	KOLIBRI	JIVEPro	KONTROL-X
Header 1	'K'	-	-	-	ID	8	unsigned	X	X	X	
Header 2	'O'	-	-	-	ID	8	unsigned	X	X	X	
Header 3	'D' - Data	-	-	-	ID	8	unsigned	X	X	X	
Header 4	'I' - Info	-	-	-	ID	8	unsigned	X	X	X	
Device and variant	Device (High 6 Bit) 0=Reserved, 1=KOSMIK, 2=KOLIBRI, 3=JIVEPro, 4=KONTROL-X, 5=UHV Variant (Low 10 Bit)	0	65535	1	ID	16	unsigned	X	X	X	
Firmware version	Main number(High 8 Bit) Sub number (Low 8 Bit)	0	65535	1	ID	16	unsigned	X	X	X	
Self-test error	U_Motor_low // 0.Bit motor phase lowsite does not switch U_Motor_high // 1.Bit motor phase highside does not switch Ruhepegel // 2.Bit short circuit to GND or open circuit U_Offset // 3.Bit BackEMF-Offset I_Offset // 4.Bit Zero point of the current measurement S_Unterspannung // 5.Bit undervoltage S_Ueberspannung // 6.Bit overvoltage S_BEC_Unterspannung // 7.Bit BEC-undervoltage S_BEC_Ueberspannung // 8.Bit BEC-overvoltage RevPolarityFuse // 9.Bit reverse polarity protection UeberspannungFuse // 10.Bit overvoltage protection S_OvertempAmp // 11.Bit over temperature output stage S_OvertempBEC // 12.Bit overtemperature BEC Phasecontact // 13.Bit contact with all 3 motor phases is missing EE_Empty // 14.Bit EEPROM empty EE_EmbroideryPosition // 15.Bit embroidery positions of the EEPROM-configuration EE_Checksum // 16.Bit checksum of the EEPROM EE_Size // 17.Bit Size of the EEPROM EE_Version // 18.Bit version of the EEPROM	0	524287	1	Bit	32	unsigned	X	X	X	
Cell number	Detected battery cells	0	255	1	Number	8	unsigned	X	X	X	
Max. RPM	Maximal logged RPM (electric)	0	300000	1	RPM	32	unsigned	X	X	X	
Min. Battery voltage	Minimum logged voltage on the DC-Side	0	10.000	10	mV	16	unsigned	X	X	X	
Max. Battery voltage	Maximum logged voltage on the the DC-Side	0	10.000	10	mV	16	unsigned	X	X	X	
Max. Battery current	Maximum logged current on the DC-Side	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. Motor current	Maximum logged motor current averaged	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. Peak Motor current	Maximum logged motor current	-10000	10.000	0,1	A	16	signed	X	X	X	
Max. BEC current	Maximum logged current at the Battery Eliminator Circuit	0	60000	1	mA	16	unsigned	X	X		
Min. BEC voltage	Minimum logged voltage on the Battery Eliminator Circuit	5000	10000	1	mV	16	unsigned	X	X	X	
Max. Throttle_in	Maximum recorded throttle opening	-100	100	1	%	8	signed	X	X	X	
Max. Regulator opening	Maximum recorded power power amp opening	0	100	1	%	8	unsigned	X	X	X	
Min. Power amp temp.	Minimum logged temperature on the power unit	-128	127	1	°C	8	signed	X	X	X	
Max. Output stages temp.	Maximum logged temperature on the power unit	-128	127	1	°C	8	signed	X	X	X	
Min. BEC temperature	Minimum logged temperature at the Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Max. BEC temperature	Maximum logged temperature at the Battery Eliminator Circuit	-128	127	1	°C	8	signed	X	X	X	
Reserved	Reserved1	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved2	0	255	1	-	8	unsigned	X	X		
Reserved	Reserved3	0	255	1	-	8	unsigned	X	X		
CRC32	Cyclic redundancy check	0	4294967295	1	-	32	unsigned	X	X	X	

Live Data

```
  public static byte[] CRC32(byte[] Data, int offset, int count)
    {
      UInt32[] crctab =
        {
0x00000000, 0x77073096, 0xee0e612c, 0x990951ba, 0x076dc419,
0x706af48f, 0xe963a535, 0x9e6495a3, 0x0edb8832, 0x79dcb8a4,
0xe0d5e91e, 0x97d2d988, 0x09b64c2b, 0x7eb17cbd, 0xe7b82d07,
0x90bf1d91, 0x1db71064, 0x6ab020f2, 0xf3b97148, 0x84be41de,
0x1adad47d, 0x6ddde4eb, 0xf4d4b551, 0x83d385c7, 0x136c9856,
0x646ba8c0, 0xfd62f97a, 0x8a65c9ec, 0x14015c4f, 0x63066cd9,
0xfa0f3d63, 0x8d080df5, 0x3b6e20c8, 0x4c69105e, 0xd56041e4,
0xa2677172, 0x3c03e4d1, 0x4b04d447, 0xd20d85fd, 0xa50ab56b,
0x35b5a8fa, 0x42b2986c, 0xdbbbc9d6, 0xacbcf940, 0x32d86ce3,
0x45df5c75, 0xdcd60dcf, 0xabd13d59, 0x26d930ac, 0x51de003a,
0xc8d75180, 0xbfd06116, 0x21b4f4b5, 0x56b3c423, 0xcfba9599,
0xb8bda50f, 0x2802b89e, 0x5f058808, 0xc60cd9b2, 0xb10be924,
0x2f6f7c87, 0x58684c11, 0xc1611dab, 0xb6662d3d, 0x76dc4190,
0x01db7106, 0x98d220bc, 0xefd5102a, 0x71b18589, 0x06b6b51f,
0x9fbfe4a5, 0xe8b8d433, 0x7807c9a2, 0x0f00f934, 0x9609a88e,
0xe10e9818, 0x7f6a0dbb, 0x086d3d2d, 0x91646c97, 0xe6635c01,
0x6b6b51f4, 0x1c6c6162, 0x856530d8, 0xf262004e, 0x6c0695ed,
0x1b01a57b, 0x8208f4c1, 0xf50fc457, 0x65b0d9c6, 0x12b7e950,
0x8bbeb8ea, 0xfcb9887c, 0x62dd1ddf, 0x15da2d49, 0x8cd37cf3,
0xfbd44c65, 0x4db26158, 0x3ab551ce, 0xa3bc0074, 0xd4bb30e2,
0x4adfa541, 0x3dd895d7, 0xa4d1c46d, 0xd3d6f4fb, 0x4369e96a,
0x346ed9fc, 0xad678846, 0xda60b8d0, 0x44042d73, 0x33031de5,
0xaa0a4c5f, 0xdd0d7cc9, 0x5005713c, 0x270241aa, 0xbe0b1010,
0xc90c2086, 0x5768b525, 0x206f85b3, 0xb966d409, 0xce61e49f,
0x5edef90e, 0x29d9c998, 0xb0d09822, 0xc7d7a8b4, 0x59b33d17,
0x2eb40d81, 0xb7bd5c3b, 0xc0ba6cad, 0xedb88320, 0x9abfb3b6,
0x03b6e20c, 0x74b1d29a, 0xead54739, 0x9dd277af, 0x04db2615,
0x73dc1683, 0xe3630b12, 0x94643b84, 0x0d6d6a3e, 0x7a6a5aa8,
0xe40ecf0b, 0x9309ff9d, 0x0a00ae27, 0x7d079eb1, 0xf00f9344,
0x8708a3d2, 0x1e01f268, 0x6906c2fe, 0xf762575d, 0x806567cb,
0x196c3671, 0x6e6b06e7, 0xfed41b76, 0x89d32be0, 0x10da7a5a,
0x67dd4acc, 0xf9b9df6f, 0x8ebeeff9, 0x17b7be43, 0x60b08ed5,
0xd6d6a3e8, 0xa1d1937e, 0x38d8c2c4, 0x4fdff252, 0xd1bb67f1,
0xa6bc5767, 0x3fb506dd, 0x48b2364b, 0xd80d2bda, 0xaf0a1b4c,
0x36034af6, 0x41047a60, 0xdf60efc3, 0xa867df55, 0x316e8eef,
0x4669be79, 0xcb61b38c, 0xbc66831a, 0x256fd2a0, 0x5268e236,
0xcc0c7795, 0xbb0b4703, 0x220216b9, 0x5505262f, 0xc5ba3bbe,
0xb2bd0b28, 0x2bb45a92, 0x5cb36a04, 0xc2d7ffa7, 0xb5d0cf31,
0x2cd99e8b, 0x5bdeae1d, 0x9b64c2b0, 0xec63f226, 0x756aa39c,
0x026d930a, 0x9c0906a9, 0xeb0e363f, 0x72076785, 0x05005713,
0x95bf4a82, 0xe2b87a14, 0x7bb12bae, 0x0cb61b38, 0x92d28e9b,
0xe5d5be0d, 0x7cdcefb7, 0x0bdbdf21, 0x86d3d2d4, 0xf1d4e242,
0x68ddb3f8, 0x1fda836e, 0x81be16cd, 0xf6b9265b, 0x6fb077e1,
0x18b74777, 0x88085ae6, 0xff0f6a70, 0x66063bca, 0x11010b5c,
0x8f659eff, 0xf862ae69, 0x616bffd3, 0x166ccf45, 0xa00ae278,
0xd70dd2ee, 0x4e048354, 0x3903b3c2, 0xa7672661, 0xd06016f7,
0x4969474d, 0x3e6e77db, 0xaed16a4a, 0xd9d65adc, 0x40df0b66,
0x37d83bf0, 0xa9bcae53, 0xdebb9ec5, 0x47b2cf7f, 0x30b5ffe9,
0xbdbdf21c, 0xcabac28a, 0x53b39330, 0x24b4a3a6, 0xbad03605,
0xcdd70693, 0x54de5729, 0x23d967bf, 0xb3667a2e, 0xc4614ab8,
0x5d681b02, 0x2a6f2b94, 0xb40bbe37, 0xc30c8ea1, 0x5a05df1b,
0x2d02ef8d
        };
      UInt32 crc = 0xffffffff;
      for (int i = offset; i < count; i++)
        crc = (crc >> 8) ^ crctab[(crc & 0xff) ^ Data[i]];
      crc ^= 0xffffffff;
      byte[] output = new byte[4];

      output[0] = (byte)(crc >> 24);
      output[1] = (byte)(crc >> 16);
      output[2] = (byte)(crc >> 8);
      output[3] = (byte)(crc);

      return output;
    }
```