

| Byte position | Bit Position | Value | Length [bits] | Description / Example | Conversion | Physical unit |
|---------------|--------------|---------------------------------------|---------------|--|------------------|---------------|
| 0 | 0 | ASM (attached synchronisation marker) | 32 | 0x1ACFFC1D | | |
| 4 | 0 | TFVN (transfer frame version number) | 2 | 0 | | |
| 4 | 2 | SCID (spacecraft Identifier) | 10 | 0xBE | | |
| 5 | 4 | VCID (virtual channel Identifier) | 3 | 0x0..0x7 | | |
| 5 | 7 | OCFF (operational control field flag) | 1 | 0 | | |
| 6 | 0 | MCFC (master channel frame count) | 8 | 0..255 | | |
| 7 | 0 | VCFC (virtual channel frame count) | 8 | 0..255 | | |
| 8 | 0 | TF_SHF (TF secondary header flag) | 1 | 0 | | |
| 8 | 1 | synchronisation flag | 1 | 0 | | |
| 8 | 2 | POF (packet order flag) | 1 | 0 | | |
| 8 | 3 | SLID (segment length identifier) | 2 | 0x3 | | |
| 8 | 5 | FHP (first header pointer) | 11 | 0x0 | | |
| 10 | 0 | PVN (packet version number) | 3 | 0x0 | | |
| 10 | 3 | PT (packet type) | 1 | 0 | | |
| 10 | 4 | SHF (secondary header flag) | 1 | 0 | | |
| 10 | 5 | APID (application process identifier) | 11 | 0x0..0x7FF | | |
| 12 | 0 | sequence flag | 2 | 0x0..0x3 | | |
| 12 | 2 | PSC (packet sequence control) | 14 | 0x0..0x3FFF | | |
| 14 | 0 | PDL (packet data length) | 16 | 0x007F | | |
| 16 | 0 | analog value #1 | 12 | Voltage solar array | 0,001620 · value | V |
| 17 | 4 | PSANT0 | 1 | Power state antenna release mechanism #0 | - | On / Off |
| 17 | 5 | PSANT1 | 1 | Power state antenna release mechanism #1 | - | On / Off |
| 17 | 6 | PSCOM0 | 1 | inactive! | | |
| 17 | 7 | PSCOM1 | 1 | inactive! | | |
| 18 | 0 | analog value #2 | 12 | Voltage battery #0 | 0,003373 · value | V |
| 19 | 4 | PSUHF0 | 1 | Power state TRX #0 | - | On / Off |
| 19 | 5 | PSUHF1 | 1 | Power state TRX #1 | - | On / Off |
| 19 | 6 | PSTNC0 | 1 | Power state TNC #0 | - | On / Off |
| 19 | 7 | PSTNC1 | 1 | Power state TNC #1 | - | On / Off |
| 20 | 0 | analog value #3 | 12 | Voltage battery #1 | 0,003373 · value | V |
| 21 | 4 | PSGYRO | 1 | Power state gyro System | - | On / Off |
| 21 | 5 | PSMCSX | 1 | Power state magnetic coil system x | - | On / Off |
| 21 | 6 | PSMCSY | 1 | Power state magnetic coil system y | - | On / Off |

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|----|---|------------------|----|---|-----------------------|----------|
| 21 | 7 | PSMCSZ | 1 | Power state magnetic coil system z | - | On / Off |
| 22 | 0 | analog value #4 | 12 | Voltage bus 5V | 0,001620 · value | V |
| 23 | 4 | PSWHEE | 1 | Power state wheel system | - | On / Off |
| 23 | 5 | PSOBC0 | 1 | Power state OBC #0 | - | On / Off |
| 23 | 6 | PSOBC1 | 1 | Power state OBC #1 | - | On / Off |
| 23 | 7 | PSPDH0 | 1 | Power state PHD | - | On / Off |
| 24 | 0 | analog value #5 | 12 | Voltage bus 3.3V | 0,001221 · value | V |
| 25 | 4 | PSCAM0 | 1 | Power state payload camera | - | On / Off |
| 25 | 5 | PSSUNS | 1 | Power state sun sensor system | - | On / Off |
| 25 | 6 | PSMFS0 | 1 | Power state magnetic field sensor system #0 | - | On / Off |
| 25 | 7 | PSMFS1 | 1 | Power state magnetic field sensor system #1 | - | On / Off |
| 26 | 0 | analog value #6 | 12 | Current charger #0 output | 0,610352 · value | mA |
| 27 | 4 | PSTEMP | 1 | Power state temperature sensors | - | On / Off |
| 27 | 5 | PSCAN0 | 1 | Power state CAN bus #0 | - | On / Off |
| 27 | 6 | PSCAN1 | 1 | Power state CAN bus #1 | - | On / Off |
| 27 | 7 | PSCCW0 | 1 | Power state WDE can controller #0 | - | On / Off |
| 28 | 0 | analog value #7 | 12 | Current charger #1 output | 0,610352 · value | mA |
| 29 | 4 | PSCCW1 | 1 | Power state WDE can controller #1 | - | On / Off |
| 29 | 5 | PS5VCN | 1 | Power state 5V main switch | - | On / Off |
| 29 | 6 | reserved | 1 | | | |
| 29 | 7 | PCBOBC | 1 | startup OBDH Id | - | 0 / 1 |
| 30 | 0 | analog value #8 | 12 | Temperature battery #0 | 0,244141 · value - 50 | °C |
| 31 | 4 | PCBEXT | 1 | boot external flash | - | 0 / 1 |
| 31 | 5 | PCCH00 | 1 | PCDU check channel 00 | - | On / Off |
| 31 | 6 | PCCH01 | 1 | PCDU check channel 01 | - | On / Off |
| 31 | 7 | PCCH02 | 1 | PCDU check channel 02 | - | On / Off |
| 32 | 0 | analog value #9 | 12 | Temperature battery #1 | 0,244141 · value - 50 | °C |
| 33 | 4 | PCCH03 | 1 | PCDU check channel 03 | - | On / Off |
| 33 | 5 | PCCH04 | 1 | PCDU check channel 04 | - | On / Off |
| 33 | 6 | PCCH05 | 1 | PCDU check channel 05 | - | On / Off |
| 33 | 7 | PCCH06 | 1 | PCDU check channel 06 | - | On / Off |
| 34 | 0 | analog value #10 | 12 | signal strength TNC #0 | 1 | S-meter |
| 35 | 4 | PCCH07 | 1 | PCDU check channel 07 | - | On / Off |
| 35 | 5 | PCCH08 | 1 | PCDU check channel 08 | - | On / Off |
| 35 | 6 | PCCH09 | 1 | PCDU check channel 09 | - | On / Off |
| 35 | 7 | PCCH10 | 1 | PCDU check channel 10 | - | On / Off |

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| 36 | 0 | analog value #11 | 12 | signal strength TNC #1 | 1 | S-meter |
| 37 | 4 | PCCH11 | 1 | PCDU check channel 11 | - | On / Off |
| 37 | 5 | PCCH12 | 1 | PCDU check channel 12 | - | On / Off |
| 37 | 6 | PCCH13 | 1 | PCDU check channel 13 | - | On / Off |
| 37 | 7 | PCCH14 | 1 | PCDU check channel 14 | - | On / Off |
| 38 | 0 | analog value #12 | 12 | Current wheel drive electronics | $0,305176 \cdot \text{value}$ | mA |
| 39 | 4 | PCCH15 | 1 | PCDU check channel 15 | - | On / Off |
| 39 | 5 | PCCH16 | 1 | PCDU check channel 16 | - | On / Off |
| 39 | 6 | PCCH17 | 1 | PCDU check channel 17 | - | On / Off |
| 39 | 7 | PCCH18 | 1 | PCDU check channel 18 | - | On / Off |
| 40 | 0 | analog value #13 | 12 | Temperature wheel X | $0,061035 \cdot \text{value} - 50$ | °C |
| 41 | 4 | PCCH19 | 1 | PCDU check channel 19 | - | On / Off |
| 41 | 5 | PCCH20 | 1 | PCDU check channel 20 | - | On / Off |
| 41 | 6 | PCCH21 | 1 | PCDU check channel 21 | - | On / Off |
| 41 | 7 | PCCH22 | 1 | PCDU check channel 22 | - | On / Off |
| 42 | 0 | analog value #14 | 12 | Temperature wheel Y | $0,061035 \cdot \text{value} - 50$ | °C |
| 43 | 4 | PCCH23 | 1 | PCDU check channel 23 | - | On / Off |
| 43 | 5 | PCCH24 | 1 | PCDU check channel 24 | - | On / Off |
| 43 | 6 | PCCH25 | 1 | PCDU check channel 25 | - | On / Off |
| 43 | 7 | PCCH26 | 1 | PCDU check channel 26 | - | On / Off |
| 44 | 0 | analog value #15 | 12 | Temperature wheel Z | $0,061035 \cdot \text{value} - 50$ | °C |
| 45 | 4 | TCRXID | 1 | receiving TNC Id | - | 0 / 1 |
| 45 | 5 | OBCAID | 1 | active OBDAH Id | - | 0 / 1 |
| 45 | 6 | TMTXRT | 1 | TX baudrate | $4800 \cdot \text{value} + 4800$ | bps |
| 45 | 7 | PCCH27 | 1 | PCDU check channel 27 | - | On / Off |
| 46 | 0 | analog value #16 | 12 | Current charger #0 input | $0,305176 \cdot \text{value}$ | mA |
| 47 | 4 | PCCH28 | 1 | PCDU check channel 28 | - | On / Off |
| 47 | 5 | PCCH29 | 1 | PCDU check channel 29 | - | On / Off |
| 47 | 6 | PCCH30 | 1 | PCDU check channel 30 | - | On / Off |
| 47 | 7 | PCCH31 | 1 | PCDU check channel 31 | - | On / Off |
| 48 | 0 | CCTICC | 8 | immediate command counter | value | 1 |
| 49 | 0 | CCTCTT | 8 | time tagged command counter | value | 1 |
| 50 | 0 | CCETCS | 8 | Error counter: command checksum | value | 1 |
| 51 | 0 | CCEIMC | 8 | Error counter: immediate command | value | 1 |
| 52 | 0 | CCETTC | 8 | Error counter: time tagged command | value | 1 |
| 53 | 0 | CCETTG | 8 | Error counter: time tag | value | 1 |

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|----|------|------------------|----|--|--|---------------|
| 54 | 0 | CCETCC | 8 | Error counter: unknown command code | value | 1 |
| 55 | 0 | TCRXQU | 8 | receiving TNC quality byte | $0,054878 \cdot \text{value} + 1,573172$ | dB |
| 56 | 0 | TCFRCP | 16 | free command pool | value | 1 |
| 58 | 0 | TMHKUR | 16 | housekeeping update rate | value | seconds |
| 60 | 0 | CSTUTC | 32 | on board time in utc | value | seconds |
| 64 | 0 | CSTSYS | 32 | obc uptime | value | seconds |
| 68 | 0 | OBCBAD | 8 | boot address | - | 0 / 1 / 2 / 3 |
| 69 | 0 | CESWMC | 8 | error counter for missing magic code | value | 1 |
| 70 | 0 | reserved | 8 | | | |
| 71 | 0 | BEACON | 8 | beacon mode | - | On / Off |
| 72 | 0 | OBCABC | 8 | active OBDH boot counter | value | 1 |
| 73 | 0 | MODOBC | 8 | Satellite mode | value | 1 |
| 74 | 0 | CCECAN | 8 | CAN error counter | value | |
| 75 | 0 | OBCCAN | 8 | CAN bus ID | - | 0 / 1 |
| 76 | 0 | PCSYST | 16 | PCDU uptime | value | seconds |
| 78 | 0 | PCBCNT | 8 | PCDU boot counter | value | 1 |
| 79 | 0 | PCTXEC | 8 | PCDU CAN msg transmit error counter | value | 1 |
| 80 | 0 | PCRXEC | 8 | PCDU CAN msg receive error counter | value | 1 |
| 81 | 0 | PCOFFC | 8 | PCDU CAN bus offline error counter | value | 1 |
| 82 | 0 | PCACKC | 8 | PCDU CAN bus acknowledge error counter | value | 1 |
| 83 | 0 | PCCH32 | 1 | PCDU check channel 32 | - | On / Off |
| 83 | 1 | PCCH33 | 1 | PCDU check channel 33 | - | On / Off |
| 83 | 2 | PCCH34 | 1 | PCDU check channel 34 | - | On / Off |
| 83 | 3 | PCCH35 | 1 | PCDU check channel 35 | - | On / Off |
| 83 | 4 | PCCH36 | 1 | PCDU check channel 36 | - | On / Off |
| 83 | 5 | PCCH37 | 1 | PCDU check channel 37 | - | On / Off |
| 83 | 6 | PCCH38 | 1 | PCDU check channel 38 | - | On / Off |
| 83 | 7 | PCCH39 | 1 | PCDU check channel 39 | - | On / Off |
| 84 | 0 | PCCH40 | 1 | PCDU check channel 40 | - | On / Off |
| 84 | 1 | PCCH41 | 1 | PCDU check channel 41 | - | On / Off |
| 84 | 2..7 | reserved | 14 | | | |
| 86 | 0 | analog value #17 | 12 | Current charger #1 input | $0,305176 \cdot \text{value}$ | mA |
| 87 | 4 | reserved | 4 | | | |
| 88 | 0 | analog value #18 | 12 | Temperature PCDU ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 89 | 4 | reserved | 4 | | | |
| 90 | 0 | analog value #19 | 12 | Temperature magnetic field sensor #0 | $0,061035 \cdot \text{value} - 50$ | °C |

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|-----|------|------------------|----|--------------------------------------|--|-------|
| 91 | 4..7 | reserved | 4 | | | |
| 92 | 0 | ACSWHX | 16 | Reaction wheel speed X | value | rpm |
| 94 | 0 | ACSWHY | 16 | Reaction wheel speed Y | value | rpm |
| 96 | 0 | ACSWHZ | 16 | Reaction wheel speed Z | value | rpm |
| 98 | 0 | ACSQ00 | 16 | ACS quaternion 00 | $0,0001 \cdot \text{value}$ | 1 |
| 100 | 0 | ACSQ01 | 16 | ACS quaternion 01 | $0,0001 \cdot \text{value}$ | 1 |
| 102 | 0 | ACSQ02 | 16 | ACS quaternion 02 | $0,0001 \cdot \text{value}$ | 1 |
| 104 | 0 | ACSQ03 | 16 | ACS quaternion 03 | $0,0001 \cdot \text{value}$ | 1 |
| 106 | 0 | ACSSUX | 16 | ACS sun vector X | $0,0001 \cdot \text{value}$ | 1 |
| 108 | 0 | ACSSUY | 16 | ACS sun vector Y | $0,0001 \cdot \text{value}$ | 1 |
| 110 | 0 | ACSSUZ | 16 | ACS sun vector Z | $0,0001 \cdot \text{value}$ | 1 |
| 112 | 0 | ACSM0X | 16 | ACS magnetic field sensor 0 vector X | $10 \cdot \text{value}$ | nT |
| 114 | 0 | ACSM0Y | 16 | ACS magnetic field sensor 0 vector Y | $10 \cdot \text{value}$ | nT |
| 116 | 0 | ACSM0Z | 16 | ACS magnetic field sensor 0 vector Z | $10 \cdot \text{value}$ | nT |
| 118 | 0 | ACSM1X | 16 | ACS magnetic field sensor 1 vector X | $10 \cdot \text{value}$ | nT |
| 120 | 0 | ACSM1Y | 16 | ACS magnetic field sensor 1 vector Y | $10 \cdot \text{value}$ | nT |
| 122 | 0 | ACSM1Z | 16 | ACS magnetic field sensor 1 vector Z | $10 \cdot \text{value}$ | nT |
| 124 | 0 | ACSMOD | 4 | ACS mode | value | 1 |
| 124 | 4 | ACSGSC | 1 | ground station contact flag | - | 0 / 1 |
| 124 | 5 | ACSSHD | 1 | shadow flag | - | 0 / 1 |
| 124 | 6..7 | reserved | 2 | | | |
| 125 | 0 | ACSERR | 8 | ACS Error Code | value | 1 |
| 126 | 0 | ACSGYX | 16 | Gyro rate X | $0,0573 \cdot \text{value} + 19,7097$ | deg/s |
| 128 | 0 | ACSGYY | 16 | Gyro rate Y | $-0,0573 \cdot \text{value} + 21,9443$ | deg/s |
| 130 | 0 | ACSGYZ | 16 | Gyro rate Z | $-0,0573 \cdot \text{value} + 2,5210$ | deg/s |
| 132 | 0 | analog value #20 | 12 | Temperature OBC ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 133 | 4 | reserved | 4 | | | |
| 134 | 0 | analog value #21 | 12 | Current solar array x+ | $0,152588 \cdot \text{value}$ | mA |
| 135 | 4..7 | reserved | 4 | | | |
| 136 | 0 | analog value #22 | 12 | Current solar array y+ | $0,152588 \cdot \text{value}$ | mA |
| 137 | 4..7 | reserved | 4 | | | |
| 138 | 0 | analog value #23 | 12 | Current solar array z+ | $0,152588 \cdot \text{value}$ | mA |
| 139 | 4..7 | reserved | 4 | | | |
| 140 | 0 | analog value #24 | 12 | Temperature Gyro rate X | $0,48577 \cdot \text{value} - 270,595$ | °C |
| 141 | 4..7 | reserved | 4 | | | |
| 142 | 0 | FECF | 16 | frame error control field (CCSDS) | - | - |

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|-----|---|---------------------------------------|----|--|------------------|----------|
| 144 | 0 | ASM (attached synchronisation marker) | 32 | 0x1ACFFC1D | | |
| 148 | 0 | TFVN (transfer frame version number) | 2 | 0 | | |
| 148 | 2 | SCID (spacecraft Identifier) | 10 | 0xBE | | |
| 149 | 4 | VCID (virtual channel Identifier) | 3 | 0x0..0x7 | | |
| 149 | 7 | OCCF (operational control field flag) | 1 | 0 | | |
| 150 | 0 | MCFC (master channel frame count) | 8 | 0..255 | | |
| 151 | 0 | VCFC (virtual channel frame count) | 8 | 0..255 | | |
| 152 | 0 | TF_SHF (TF secondary header flag) | 1 | 0 | | |
| 152 | 1 | synchronisation flag | 1 | 0 | | |
| 152 | 2 | POF (packet order flag) | 1 | 0 | | |
| 152 | 3 | SLID (segment length identifier) | 2 | 0x3 | | |
| 152 | 5 | FHP (first header pointer) | 11 | 0x0 | | |
| 154 | 0 | PVN (packet version number) | 3 | 0x0 | | |
| 154 | 3 | PT (packet type) | 1 | 0 | | |
| 154 | 4 | SHF (secondary header flag) | 1 | 0 | | |
| 154 | 5 | APID (application process identifier) | 11 | 0x0..0x7FF | | |
| 156 | 0 | sequence flag | 2 | 0x0..0x3 | | |
| 156 | 2 | PSC (packet sequence control) | 14 | 0x0..0x3FFF | | |
| 158 | 0 | PDL (packet data length) | 16 | 0x007F | | |
| 160 | 0 | analog value #1 | 12 | Voltage solar array | 0,001620 · value | V |
| 161 | 4 | PSANT0 | 1 | Power state antenna release mechanism #0 | - | On / Off |
| 161 | 5 | PSANT1 | 1 | Power state antenna release mechanism #1 | - | On / Off |
| 161 | 6 | PSCOM0 | 1 | inactive! | | |
| 161 | 7 | PSCOM1 | 1 | inactive! | | |
| 162 | 0 | analog value #2 | 12 | Voltage battery #0 | 0,003373 · value | V |
| 163 | 4 | PSUHF0 | 1 | Power state TRX #0 | - | On / Off |
| 163 | 5 | PSUHF1 | 1 | Power state TRX #1 | - | On / Off |
| 163 | 6 | PSTNC0 | 1 | Power state TNC #0 | - | On / Off |
| 163 | 7 | PSTNC1 | 1 | Power state TNC #1 | - | On / Off |
| 164 | 0 | analog value #3 | 12 | Voltage battery #1 | 0,003373 · value | V |
| 165 | 4 | PSGYRO | 1 | Power state gyro System | - | On / Off |
| 165 | 5 | PSMCSX | 1 | Power state magnetic coil system x | - | On / Off |
| 165 | 6 | PSMCSY | 1 | Power state magnetic coil system y | - | On / Off |
| 165 | 7 | PSMCSZ | 1 | Power state magnetic coil system z | - | On / Off |
| 166 | 0 | analog value #4 | 12 | Voltage bus 5V | 0,001620 · value | V |
| 167 | 4 | PSWHEEL | 1 | Power state wheel system | - | On / Off |

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|-----|---|------------------|----|---|-----------------------|----------|
| 167 | 5 | PSOBC0 | 1 | Power state OBC0 | - | On / Off |
| 167 | 6 | PSOBC1 | 1 | Power state OBC1 | - | On / Off |
| 167 | 7 | PSPDH0 | 1 | Power state PHD | - | On / Off |
| 168 | 0 | analog value #5 | 12 | Voltage bus 3.3V | 0,001221 · value | V |
| 169 | 4 | PSCAM0 | 1 | Power state payload camera | - | On / Off |
| 169 | 5 | PSSUNS | 1 | Power state sun sensor system | - | On / Off |
| 169 | 6 | PSMFS0 | 1 | Power state magnetic field sensor system #0 | - | On / Off |
| 169 | 7 | PSMFS1 | 1 | Power state magnetic field sensor system #1 | - | On / Off |
| 170 | 0 | analog value #6 | 12 | Current charger #0 output | 0,610352 · value | mA |
| 171 | 4 | PSTEMP | 1 | Power state temperature sensors | - | On / Off |
| 171 | 5 | PSCAN0 | 1 | Power state CAN bus #0 | - | On / Off |
| 171 | 6 | PSCAN1 | 1 | Power state CAN bus #1 | - | On / Off |
| 171 | 7 | PSCCW0 | 1 | Power state WDE can controller #0 | - | On / Off |
| 172 | 0 | analog value #7 | 12 | Current charger #1 output | 0,610352 · value | mA |
| 173 | 4 | PSCCW1 | 1 | Power state WDE can controller #1 | - | On / Off |
| 173 | 5 | PS5VCN | 1 | Power state 5V main switch | - | On / Off |
| 173 | 6 | PCUAID | 1 | active PCDU Id | | |
| 173 | 7 | PCBOBC | 1 | startup OBDH Id | - | 0 / 1 |
| 174 | 0 | analog value #8 | 12 | Temperature battery #0 | 0,244141 · value - 50 | °C |
| 175 | 4 | PCBEXT | 1 | boot external flash | - | 0 / 1 |
| 175 | 5 | PCCH00 | 1 | PCDU check channel 00 | - | On / Off |
| 175 | 6 | PCCH01 | 1 | PCDU check channel 01 | - | On / Off |
| 175 | 7 | PCCH02 | 1 | PCDU check channel 02 | - | On / Off |
| 176 | 0 | analog value #9 | 12 | Temperature battery #1 | 0,244141 · value - 50 | °C |
| 177 | 4 | PCCH03 | 1 | PCDU check channel 03 | - | On / Off |
| 177 | 5 | PCCH04 | 1 | PCDU check channel 04 | - | On / Off |
| 177 | 6 | PCCH05 | 1 | PCDU check channel 05 | - | On / Off |
| 177 | 7 | PCCH06 | 1 | PCDU check channel 06 | - | On / Off |
| 178 | 0 | analog value #10 | 12 | signal strength TNC #0 | 1 | S-meter |
| 179 | 4 | PCCH07 | 1 | PCDU check channel 07 | - | On / Off |
| 179 | 5 | PCCH08 | 1 | PCDU check channel 08 | - | On / Off |
| 179 | 6 | PCCH09 | 1 | PCDU check channel 09 | - | On / Off |
| 179 | 7 | PCCH10 | 1 | PCDU check channel 10 | - | On / Off |
| 180 | 0 | analog value #11 | 12 | signal strength TNC #1 | 1 | S-meter |
| 181 | 4 | PCCH11 | 1 | PCDU check channel 11 | - | On / Off |
| 181 | 5 | PCCH12 | 1 | PCDU check channel 12 | - | On / Off |

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| 181 | 6 | PCCH13 | 1 | PCDU check channel 13 | - | On / Off |
| 181 | 7 | PCCH14 | 1 | PCDU check channel 14 | - | On / Off |
| 182 | 0 | analog value #12 | 12 | Current wheel drive electronics | $0,305176 \cdot \text{value}$ | mA |
| 183 | 4 | PCCH15 | 1 | PCDU check channel 15 | - | On / Off |
| 183 | 5 | PCCH16 | 1 | PCDU check channel 16 | - | On / Off |
| 183 | 6 | PCCH17 | 1 | PCDU check channel 17 | - | On / Off |
| 183 | 7 | PCCH18 | 1 | PCDU check channel 18 | - | On / Off |
| 184 | 0 | analog value #13 | 12 | Temperature wheel X | $0,061035 \cdot \text{value} - 50$ | °C |
| 185 | 4 | PCCH19 | 1 | PCDU check channel 19 | - | On / Off |
| 185 | 5 | PCCH20 | 1 | PCDU check channel 20 | - | On / Off |
| 185 | 6 | PCCH21 | 1 | PCDU check channel 21 | - | On / Off |
| 185 | 7 | PCCH22 | 1 | PCDU check channel 22 | - | On / Off |
| 186 | 0 | analog value #14 | 12 | Temperature wheel Y | $0,061035 \cdot \text{value} - 50$ | °C |
| 187 | 4 | PCCH23 | 1 | PCDU check channel 23 | - | On / Off |
| 187 | 5 | PCCH24 | 1 | PCDU check channel 24 | - | On / Off |
| 187 | 6 | PCCH25 | 1 | PCDU check channel 25 | - | On / Off |
| 187 | 7 | PCCH26 | 1 | PCDU check channel 26 | - | On / Off |
| 188 | 0 | analog value #15 | 12 | Temperature wheel Z | $0,061035 \cdot \text{value} - 50$ | °C |
| 189 | 4 | TCRXID | 1 | receiving TNC Id | - | 0 / 1 |
| 189 | 5 | OBCAID | 1 | active OBDH Id | - | 0 / 1 |
| 189 | 6 | TMTXRT | 1 | TX baudrate | $4800 \cdot \text{value} + 4800$ | bps |
| 189 | 7 | PCCH27 | 1 | PCDU check channel 27 | - | On / Off |
| 190 | 0 | analog value #16 | 12 | Current charger #0 input | $0,305176 \cdot \text{value}$ | mA |
| 191 | 4 | PCCH28 | 1 | PCDU check channel 28 | - | On / Off |
| 191 | 5 | PCCH29 | 1 | PCDU check channel 29 | - | On / Off |
| 191 | 6 | PCCH30 | 1 | PCDU check channel 30 | - | On / Off |
| 191 | 7 | PCCH31 | 1 | PCDU check channel 31 | - | On / Off |
| 192 | 0 | CCTICC | 8 | immediate command counter | value | 1 |
| 193 | 0 | CCTCTT | 8 | time tagged command counter | value | 1 |
| 194 | 0 | CCETCS | 8 | command checksum error counter | value | 1 |
| 195 | 0 | CCEIMC | 8 | immediate command error counter | value | 1 |
| 196 | 0 | CCETTC | 8 | time tagged command error counter | value | 1 |
| 197 | 0 | CCETTG | 8 | time tag error counter | value | 1 |
| 198 | 0 | CCETCC | 8 | command code error counter | value | 1 |
| 199 | 0 | TCRXQU | 8 | receiving TNC quality byte | $0,054878 \cdot \text{value} + 1,573172$ | dB |
| 200 | 0 | TCFRCP | 16 | free command pool | value | 1 |

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|-----|------|------------------|----|--------------------------------------|------------------------------------|---------------|
| 202 | 0 | TMHKUR | 16 | housekeeping update rate | value | seconds |
| 204 | 0 | CSTUTC | 32 | on board time in utc | value | seconds |
| 208 | 0 | CSTSYS | 32 | obc uptime | value | seconds |
| 212 | 0 | OBCBAD | 8 | boot address | - | 0 / 1 / 2 / 3 |
| 213 | 0 | CESWMC | 8 | error counter for missing magic code | value | 1 |
| 214 | 0 | reserved | 8 | | | |
| 215 | 0 | BEACON | 8 | beacon mode | - | On / Off |
| 216 | 0 | OBCABC | 8 | active OBDH boot counter | value | 1 |
| 217 | 0 | MODOBC | 8 | Satellite mode | value | 1 |
| 218 | 0 | CCECAN | 8 | CAN error counter | value | |
| 219 | 0 | OBCCAN | 8 | selected CAN bus at active OBDH | - | 0 / 1 |
| 220 | 0 | PCSYST | 16 | PCDU uptime | value | seconds |
| 222 | 0 | PCBCNT | 8 | PCDU boot counter | value | 1 |
| 223 | 0 | PCTXEC | 8 | PCDU CAN transmitt error counter | value | 1 |
| 224 | 0 | PCRxec | 8 | PCDU CAN receive error counter | value | 1 |
| 225 | 0 | PCOFFC | 8 | PCDU CAN offline error counter | value | 1 |
| 226 | 0 | PCACKC | 8 | PCDU CAN acknowledge error counter | value | 1 |
| 227 | 0 | PCCH32 | 1 | PCDU check channel 32 | - | On / Off |
| 227 | 1 | PCCH33 | 1 | PCDU check channel 33 | - | On / Off |
| 227 | 2 | PCCH34 | 1 | PCDU check channel 34 | - | On / Off |
| 227 | 3 | PCCH35 | 1 | PCDU check channel 35 | - | On / Off |
| 227 | 4 | PCCH36 | 1 | PCDU check channel 36 | - | On / Off |
| 227 | 5 | PCCH37 | 1 | PCDU check channel 37 | - | On / Off |
| 227 | 6 | PCCH38 | 1 | PCDU check channel 38 | - | On / Off |
| 227 | 7 | PCCH39 | 1 | PCDU check channel 39 | - | On / Off |
| 228 | 0 | PCCH40 | 1 | PCDU check channel 40 | - | On / Off |
| 228 | 1 | PCCH41 | 1 | PCDU check channel 41 | - | On / Off |
| 228 | 2..7 | reserved | 14 | | | |
| 230 | 0 | analog value #17 | 12 | Current charger #1 input | $0,305176 \cdot \text{value}$ | mA |
| 231 | 4 | reserved | 4 | | | |
| 232 | 0 | analog value #18 | 12 | Temperature PCDU ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 233 | 4 | reserved | 4 | | | |
| 234 | 0 | analog value #19 | 12 | Temperature MFS0 | $0,061035 \cdot \text{value} - 50$ | °C |
| 235 | 4..7 | reserved | 4 | | | |
| 236 | 0 | ACSWHX | 16 | wheel speed X | value | rpm |
| 238 | 0 | ACSWHY | 16 | wheel speed Y | value | rpm |

| | | | | | | |
|-----|------|---------------------------------------|----|--------------------------------------|--|-------|
| 240 | 0 | ACSWHZ | 16 | wheel speed Z | value | rpm |
| 242 | 0 | ACSQ00 | 16 | ACS quaternion 00 | $0,0001 \cdot \text{value}$ | 1 |
| 244 | 0 | ACSQ01 | 16 | ACS quaternion 01 | $0,0001 \cdot \text{value}$ | 1 |
| 246 | 0 | ACSQ02 | 16 | ACS quaternion 02 | $0,0001 \cdot \text{value}$ | 1 |
| 248 | 0 | ACSQ03 | 16 | ACS quaternion 03 | $0,0001 \cdot \text{value}$ | 1 |
| 250 | 0 | ACSSUX | 16 | ACS sun vector X | $0,0001 \cdot \text{value}$ | 1 |
| 252 | 0 | ACSSUY | 16 | ACS sun vector Y | $0,0001 \cdot \text{value}$ | 1 |
| 254 | 0 | ACSSUZ | 16 | ACS sun vector Z | $0,0001 \cdot \text{value}$ | 1 |
| 256 | 0 | ACSM0X | 16 | ACS magnetic field sensor 0 vector X | $10 \cdot \text{value}$ | nT |
| 258 | 0 | ACSM0Y | 16 | ACS magnetic field sensor 0 vector Y | $10 \cdot \text{value}$ | nT |
| 260 | 0 | ACSM0Z | 16 | ACS magnetic field sensor 0 vector Z | $10 \cdot \text{value}$ | nT |
| 262 | 0 | ACSM1X | 16 | ACS magnetic field sensor 1 vector X | $10 \cdot \text{value}$ | nT |
| 264 | 0 | ACSM1Y | 16 | ACS magnetic field sensor 1 vector Y | $10 \cdot \text{value}$ | nT |
| 266 | 0 | ACSM1Z | 16 | ACS magnetic field sensor 1 vector Z | $10 \cdot \text{value}$ | nT |
| 268 | 0 | ACSMOD | 4 | ACS mode | value | 1 |
| 268 | 4 | ACSGSC | 1 | ground station contact | - | 0 / 1 |
| 268 | 5 | ACSSHD | 1 | shadow flag | - | 0 / 1 |
| 268 | 6..7 | reserved | 2 | | | |
| 269 | 0 | ACSERR | 8 | ACS Error Code | value | 1 |
| 270 | 0 | ACSGYX | 16 | Gyro rate X | $0,0573 \cdot \text{value} + 19,7097$ | deg/s |
| 272 | 0 | ACSGYY | 16 | Gyro rate Y | $-0,0573 \cdot \text{value} + 21,9443$ | deg/s |
| 274 | 0 | ACSGYZ | 16 | Gyro rate Z | $-0,0573 \cdot \text{value} + 2,5210$ | deg/s |
| 276 | 0 | analog value #20 | 12 | Temperature OBC ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 277 | 4 | reserved | 4 | | | |
| 278 | 0 | analog value #21 | 12 | Current solar array x+ | $0,152588 \cdot \text{value}$ | mA |
| 279 | 4..7 | reserved | 4 | | | |
| 280 | 0 | analog value #22 | 12 | Current solar array y+ | $0,152588 \cdot \text{value}$ | mA |
| 281 | 4..7 | reserved | 4 | | | |
| 282 | 0 | analog value #23 | 12 | Current solar array z+ | $0,152588 \cdot \text{value}$ | mA |
| 283 | 4..7 | reserved | 4 | | | |
| 284 | 0 | analog value #24 | 12 | Temperature Gyro rate X | $0,48577 \cdot \text{value} - 270,595$ | °C |
| 285 | 4..7 | reserved | 4 | | | |
| 286 | 0 | FECF | 16 | frame error control field (CCSDS) | - | - |
| 288 | 0 | ASM (attached synchronisation marker) | 32 | 0x1ACFFC1D | | |
| 292 | 0 | TFVN (transfer frame version number) | 2 | 0 | | |
| 292 | 2 | SCID (spacecraft Identifier) | 10 | 0xBE | | |

| | | | | | | |
|-----|---|---------------------------------------|----|--|------------------|----------|
| 293 | 4 | VCID (virtual channel Identifier) | 3 | 0x0..0x7 | | |
| 293 | 7 | OCFF (operational control field flag) | 1 | 0 | | |
| 294 | 0 | MCFC (master channel frame count) | 8 | 0..255 | | |
| 295 | 0 | VCFC (virtual channel frame count) | 8 | 0..255 | | |
| 296 | 0 | TF_SHF (TF secondary header flag) | 1 | 0 | | |
| 296 | 1 | synchronisation flag | 1 | 0 | | |
| 296 | 2 | POF (packet order flag) | 1 | 0 | | |
| 296 | 3 | SLID (segment length identifier) | 2 | 0x3 | | |
| 296 | 5 | FHP (first header pointer) | 11 | 0x0 | | |
| 298 | 0 | PVN (packet version number) | 3 | 0x0 | | |
| 298 | 3 | PT (packet type) | 1 | 0 | | |
| 298 | 4 | SHF (secondary header flag) | 1 | 0 | | |
| 298 | 5 | APID (application process identifier) | 11 | 0x0..0x7FF | | |
| 300 | 0 | sequence flag | 2 | 0x0..0x3 | | |
| 300 | 2 | PSC (packet sequence control) | 14 | 0x0..0x3FFF | | |
| 302 | 0 | PDL (packet data length) | 16 | 0x007F | | |
| 304 | 0 | analog value #1 | 12 | Voltage solar array | 0,001620 · value | V |
| 305 | 4 | PSANT0 | 1 | Power state antenna release mechanism #0 | - | On / Off |
| 305 | 5 | PSANT1 | 1 | Power state antenna release mechanism #1 | - | On / Off |
| 305 | 6 | PSCOM0 | 1 | inactive! | | |
| 305 | 7 | PSCOM1 | 1 | inactive! | | |
| 306 | 0 | analog value #2 | 12 | Voltage battery #0 | 0,003373 · value | V |
| 307 | 4 | PSUHF0 | 1 | Power state TRX #0 | - | On / Off |
| 307 | 5 | PSUHF1 | 1 | Power state TRX #1 | - | On / Off |
| 307 | 6 | PSTNC0 | 1 | Power state TNC #0 | - | On / Off |
| 307 | 7 | PSTNC1 | 1 | Power state TNC #1 | - | On / Off |
| 308 | 0 | analog value #3 | 12 | Voltage battery #1 | 0,003373 · value | V |
| 309 | 4 | PSGYRO | 1 | Power state gyro System | - | On / Off |
| 309 | 5 | PSMCSX | 1 | Power state magnetic coil system x | - | On / Off |
| 309 | 6 | PSMCSY | 1 | Power state magnetic coil system y | - | On / Off |
| 309 | 7 | PSMCSZ | 1 | Power state magnetic coil system z | - | On / Off |
| 310 | 0 | analog value #4 | 12 | Voltage bus 5V | 0,001620 · value | V |
| 311 | 4 | PSWHEE | 1 | Power state wheel system | - | On / Off |
| 311 | 5 | PSOBC0 | 1 | Power state OBC0 | - | On / Off |
| 311 | 6 | PSOBC1 | 1 | Power state OBC1 | - | On / Off |
| 311 | 7 | PSPDH0 | 1 | Power state PHD | - | On / Off |

| | | | | | | |
|-----|---|------------------|----|---|-----------------------|----------|
| 312 | 0 | analog value #5 | 12 | Voltage bus 3.3V | 0,001221 · value | V |
| 313 | 4 | PSCAM0 | 1 | Power state payload camera | - | On / Off |
| 313 | 5 | PSSUNS | 1 | Power state sun sensor system | - | On / Off |
| 313 | 6 | PSMFS0 | 1 | Power state magnetic field sensor system #0 | - | On / Off |
| 313 | 7 | PSMFS1 | 1 | Power state magnetic field sensor system #1 | - | On / Off |
| 314 | 0 | analog value #6 | 12 | Current charger #0 output | 0,610352 · value | mA |
| 315 | 4 | PSTEMP | 1 | Power state temperature sensors | - | On / Off |
| 315 | 5 | PSCAN0 | 1 | Power state CAN bus #0 | - | On / Off |
| 315 | 6 | PSCAN1 | 1 | Power state CAN bus #1 | - | On / Off |
| 315 | 7 | PSCCW0 | 1 | Power state WDE can controller #0 | - | On / Off |
| 316 | 0 | analog value #7 | 12 | Current charger #1 output | 0,610352 · value | mA |
| 317 | 4 | PSCCW1 | 1 | Power state WDE can controller #1 | - | On / Off |
| 317 | 5 | PS5VCN | 1 | Power state 5V main switch | - | On / Off |
| 317 | 6 | PCUAID | 1 | active PCDU Id | | |
| 317 | 7 | PCBOBC | 1 | startup OBDH Id | - | 0 / 1 |
| 318 | 0 | analog value #8 | 12 | Temperature battery #0 | 0,244141 · value - 50 | °C |
| 319 | 4 | PCBEXT | 1 | boot external flash | - | 0 / 1 |
| 319 | 5 | PCCH00 | 1 | PCDU check channel 00 | - | On / Off |
| 319 | 6 | PCCH01 | 1 | PCDU check channel 01 | - | On / Off |
| 319 | 7 | PCCH02 | 1 | PCDU check channel 02 | - | On / Off |
| 320 | 0 | analog value #9 | 12 | Temperature battery #1 | 0,244141 · value - 50 | °C |
| 321 | 4 | PCCH03 | 1 | PCDU check channel 03 | - | On / Off |
| 321 | 5 | PCCH04 | 1 | PCDU check channel 04 | - | On / Off |
| 321 | 6 | PCCH05 | 1 | PCDU check channel 05 | - | On / Off |
| 321 | 7 | PCCH06 | 1 | PCDU check channel 06 | - | On / Off |
| 322 | 0 | analog value #10 | 12 | signal strength TNC #0 | 1 | S-meter |
| 323 | 4 | PCCH07 | 1 | PCDU check channel 07 | - | On / Off |
| 323 | 5 | PCCH08 | 1 | PCDU check channel 08 | - | On / Off |
| 323 | 6 | PCCH09 | 1 | PCDU check channel 09 | - | On / Off |
| 323 | 7 | PCCH10 | 1 | PCDU check channel 10 | - | On / Off |
| 324 | 0 | analog value #11 | 12 | signal strength TNC #1 | 1 | S-meter |
| 325 | 4 | PCCH11 | 1 | PCDU check channel 11 | - | On / Off |
| 325 | 5 | PCCH12 | 1 | PCDU check channel 12 | - | On / Off |
| 325 | 6 | PCCH13 | 1 | PCDU check channel 13 | - | On / Off |
| 325 | 7 | PCCH14 | 1 | PCDU check channel 14 | - | On / Off |
| 326 | 0 | analog value #12 | 12 | Current wheel drive electronics | 0,305176 · value | mA |

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|-----|---|------------------|----|-----------------------------------|--|----------|
| 327 | 4 | PCCH15 | 1 | PCDU check channel 15 | - | On / Off |
| 327 | 5 | PCCH16 | 1 | PCDU check channel 16 | - | On / Off |
| 327 | 6 | PCCH17 | 1 | PCDU check channel 17 | - | On / Off |
| 327 | 7 | PCCH18 | 1 | PCDU check channel 18 | - | On / Off |
| 328 | 0 | analog value #13 | 12 | Temperature wheel X | $0,061035 \cdot \text{value} - 50$ | °C |
| 329 | 4 | PCCH19 | 1 | PCDU check channel 19 | - | On / Off |
| 329 | 5 | PCCH20 | 1 | PCDU check channel 20 | - | On / Off |
| 329 | 6 | PCCH21 | 1 | PCDU check channel 21 | - | On / Off |
| 329 | 7 | PCCH22 | 1 | PCDU check channel 22 | - | On / Off |
| 330 | 0 | analog value #14 | 12 | Temperature wheel Y | $0,061035 \cdot \text{value} - 50$ | °C |
| 331 | 4 | PCCH23 | 1 | PCDU check channel 23 | - | On / Off |
| 331 | 5 | PCCH24 | 1 | PCDU check channel 24 | - | On / Off |
| 331 | 6 | PCCH25 | 1 | PCDU check channel 25 | - | On / Off |
| 331 | 7 | PCCH26 | 1 | PCDU check channel 26 | - | On / Off |
| 332 | 0 | analog value #15 | 12 | Temperature wheel Z | $0,061035 \cdot \text{value} - 50$ | °C |
| 333 | 4 | TCRXID | 1 | receiving TNC Id | - | 0 / 1 |
| 333 | 5 | OBCAID | 1 | active OBDH Id | - | 0 / 1 |
| 333 | 6 | TMTXRT | 1 | TX baudrate | $4800 \cdot \text{value} + 4800$ | bps |
| 333 | 7 | PCCH27 | 1 | PCDU check channel 27 | - | On / Off |
| 334 | 0 | analog value #16 | 12 | Current charger #0 input | $0,305176 \cdot \text{value}$ | mA |
| 335 | 4 | PCCH28 | 1 | PCDU check channel 28 | - | On / Off |
| 335 | 5 | PCCH29 | 1 | PCDU check channel 29 | - | On / Off |
| 335 | 6 | PCCH30 | 1 | PCDU check channel 30 | - | On / Off |
| 335 | 7 | PCCH31 | 1 | PCDU check channel 31 | - | On / Off |
| 336 | 0 | CCTICC | 8 | immediate command counter | value | 1 |
| 337 | 0 | CCTCTT | 8 | time tagged command counter | value | 1 |
| 338 | 0 | CCETCS | 8 | command checksum error counter | value | 1 |
| 339 | 0 | CCEIMC | 8 | immediate command error counter | value | 1 |
| 340 | 0 | CCETTC | 8 | time tagged command error counter | value | 1 |
| 341 | 0 | CCETTG | 8 | time tag error counter | value | 1 |
| 342 | 0 | CCETCC | 8 | command code error counter | value | 1 |
| 343 | 0 | TCRXQU | 8 | receiving TNC quality byte | $0,054878 \cdot \text{value} + 1,573172$ | dB |
| 344 | 0 | TCFRCP | 16 | free command pool | value | 1 |
| 346 | 0 | TMHKUR | 16 | housekeeping update rate | value | seconds |
| 348 | 0 | CSTUTC | 32 | on board time in utc | value | seconds |
| 352 | 0 | CSTSYS | 32 | obc uptime | value | seconds |

| | | | | | | |
|-----|------|------------------|----|--------------------------------------|------------------------------------|---------------|
| 356 | 0 | OBCBAD | 8 | boot address | - | 0 / 1 / 2 / 3 |
| 357 | 0 | CESWMC | 8 | error counter for missing magic code | value | 1 |
| 358 | 0 | reserved | 8 | | | |
| 359 | 0 | BEACON | 8 | beacon mode | - | On / Off |
| 360 | 0 | OBCABC | 8 | active OBDH boot counter | value | 1 |
| 361 | 0 | MODOBC | 8 | Satellite mode | value | 1 |
| 362 | 0 | CCECAN | 8 | CAN error counter | value | |
| 363 | 0 | OBCCAN | 8 | selected CAN bus at active OBDH | - | 0 / 1 |
| 364 | 0 | PCSYST | 16 | PCDU uptime | value | seconds |
| 366 | 0 | PCBCNT | 8 | PCDU boot counter | value | 1 |
| 367 | 0 | PCTXEC | 8 | PCDU CAN transmitt error counter | value | 1 |
| 368 | 0 | PCRXEC | 8 | PCDU CAN receive error counter | value | 1 |
| 369 | 0 | PCOFFC | 8 | PCDU CAN offline error counter | value | 1 |
| 370 | 0 | PCACKC | 8 | PCDU CAN acknowledge error counter | value | 1 |
| 371 | 0 | PCCH32 | 1 | PCDU check channel 32 | - | On / Off |
| 371 | 1 | PCCH33 | 1 | PCDU check channel 33 | - | On / Off |
| 371 | 2 | PCCH34 | 1 | PCDU check channel 34 | - | On / Off |
| 371 | 3 | PCCH35 | 1 | PCDU check channel 35 | - | On / Off |
| 371 | 4 | PCCH36 | 1 | PCDU check channel 36 | - | On / Off |
| 371 | 5 | PCCH37 | 1 | PCDU check channel 37 | - | On / Off |
| 371 | 6 | PCCH38 | 1 | PCDU check channel 38 | - | On / Off |
| 371 | 7 | PCCH39 | 1 | PCDU check channel 39 | - | On / Off |
| 372 | 0 | PCCH40 | 1 | PCDU check channel 40 | - | On / Off |
| 372 | 1 | PCCH41 | 1 | PCDU check channel 41 | - | On / Off |
| 372 | 2..7 | reserved | 14 | | | |
| 374 | 0 | analog value #17 | 12 | Current charger #1 input | $0,305176 \cdot \text{value}$ | mA |
| 375 | 4 | reserved | 4 | | | |
| 376 | 0 | analog value #18 | 12 | Temperature PCDU ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 377 | 4 | reserved | 4 | | | |
| 378 | 0 | analog value #19 | 12 | Temperature MFS0 | $0,061035 \cdot \text{value} - 50$ | °C |
| 379 | 4..7 | reserved | 4 | | | |
| 380 | 0 | ACSWHX | 16 | wheel speed X | value | rpm |
| 382 | 0 | ACSWHY | 16 | wheel speed Y | value | rpm |
| 384 | 0 | ACSWHZ | 16 | wheel speed Z | value | rpm |
| 386 | 0 | ACSQ00 | 16 | ACS quaternion 00 | $0,0001 \cdot \text{value}$ | 1 |
| 388 | 0 | ACSQ01 | 16 | ACS quaternion 01 | $0,0001 \cdot \text{value}$ | 1 |

| | | | | | | |
|-----|------|---------------------------------------|----|--------------------------------------|--|-------|
| 390 | 0 | ACSQ02 | 16 | ACS quaternion 02 | $0,0001 \cdot \text{value}$ | 1 |
| 392 | 0 | ACSQ03 | 16 | ACS quaternion 03 | $0,0001 \cdot \text{value}$ | 1 |
| 394 | 0 | ACSSUX | 16 | ACS sun vector X | $0,0001 \cdot \text{value}$ | 1 |
| 396 | 0 | ACSSUY | 16 | ACS sun vector Y | $0,0001 \cdot \text{value}$ | 1 |
| 398 | 0 | ACSSUZ | 16 | ACS sun vector Z | $0,0001 \cdot \text{value}$ | 1 |
| 400 | 0 | ACSM0X | 16 | ACS magnetic field sensor 0 vector X | $10 \cdot \text{value}$ | nT |
| 402 | 0 | ACSM0Y | 16 | ACS magnetic field sensor 0 vector Y | $10 \cdot \text{value}$ | nT |
| 404 | 0 | ACSM0Z | 16 | ACS magnetic field sensor 0 vector Z | $10 \cdot \text{value}$ | nT |
| 406 | 0 | ACSM1X | 16 | ACS magnetic field sensor 1 vector X | $10 \cdot \text{value}$ | nT |
| 408 | 0 | ACSM1Y | 16 | ACS magnetic field sensor 1 vector Y | $10 \cdot \text{value}$ | nT |
| 410 | 0 | ACSM1Z | 16 | ACS magnetic field sensor 1 vector Z | $10 \cdot \text{value}$ | nT |
| 412 | 0 | ACSMOD | 4 | ACS mode | value | 1 |
| 412 | 4 | ACSGSC | 1 | ground station contact | - | 0 / 1 |
| 412 | 5 | ACSSHD | 1 | shadow flag | - | 0 / 1 |
| 412 | 6..7 | reserved | 2 | | | |
| 413 | 0 | ACSERR | 8 | ACS Error Code | value | 1 |
| 414 | 0 | ACSGYX | 16 | Gyro rate Z | $0,0573 \cdot \text{value} + 19,7097$ | deg/s |
| 416 | 0 | ACSGYY | 16 | Gyro rate Y | $-0,0573 \cdot \text{value} + 21,9443$ | deg/s |
| 418 | 0 | ACSGYZ | 16 | Gyro rate Z | $-0,0573 \cdot \text{value} + 2,5210$ | deg/s |
| 420 | 0 | analog value #20 | 12 | Temperature OBC ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 421 | 4 | reserved | 4 | | | |
| 422 | 0 | analog value #21 | 12 | Current solar array x+ | $0,152588 \cdot \text{value}$ | mA |
| 423 | 4..7 | reserved | 4 | | | |
| 424 | 0 | analog value #22 | 12 | Current solar array y+ | $0,152588 \cdot \text{value}$ | mA |
| 425 | 4..7 | reserved | 4 | | | |
| 426 | 0 | analog value #23 | 12 | Current solar array z+ | $0,152588 \cdot \text{value}$ | mA |
| 427 | 4..7 | reserved | 4 | | | |
| 428 | 0 | analog value #24 | 12 | Temperature Gyro rate X | $0,48577 \cdot \text{value} - 270,595$ | °C |
| 429 | 4..7 | reserved | 4 | | | |
| 430 | 0 | FECF | 16 | frame error control field (CCSDS) | - | - |
| 432 | 0 | ASM (attached synchronisation marker) | 32 | 0x1ACFFC1D | | |
| 436 | 0 | TFVN (transfer frame version number) | 2 | 0 | | |
| 436 | 2 | SCID (spacecraft Identifier) | 10 | 0xBE | | |
| 437 | 4 | VCID (virtual channel Identifier) | 3 | 0x0..0x7 | | |
| 437 | 7 | OCFF (operational control field flag) | 1 | 0 | | |
| 438 | 0 | MCFC (master channel frame count) | 8 | 0..255 | | |

| | | | | | | |
|-----|---|---------------------------------------|----|--|------------------|----------|
| 439 | 0 | VCFC (virtual channel frame count) | 8 | 0..255 | | |
| 440 | 0 | TF_SHF (TF secondary header flag) | 1 | 0 | | |
| 440 | 1 | synchronisation flag | 1 | 0 | | |
| 440 | 2 | POF (packet order flag) | 1 | 0 | | |
| 440 | 3 | SLID (segment length identifier) | 2 | 0x3 | | |
| 440 | 5 | FHP (first header pointer) | 11 | 0x0 | | |
| 442 | 0 | PVN (packet version number) | 3 | 0x0 | | |
| 442 | 3 | PT (packet type) | 1 | 0 | | |
| 442 | 4 | SHF (secondary header flag) | 1 | 0 | | |
| 442 | 5 | APID (application process identifier) | 11 | 0x0..0x7FF | | |
| 444 | 0 | sequence flag | 2 | 0x0..0x3 | | |
| 444 | 2 | PSC (packet sequence control) | 14 | 0x0..0x3FFF | | |
| 446 | 0 | PDL (packet data length) | 16 | 0x007F | | |
| 448 | 0 | analog value #1 | 12 | Voltage solar array | 0,001620 · value | V |
| 449 | 4 | PSANT0 | 1 | Power state antenna release mechanism #0 | - | On / Off |
| 449 | 5 | PSANT1 | 1 | Power state antenna release mechanism #1 | - | On / Off |
| 449 | 6 | PSCOM0 | 1 | inactive! | | |
| 449 | 7 | PSCOM1 | 1 | inactive! | | |
| 450 | 0 | analog value #2 | 12 | Voltage battery #0 | 0,003373 · value | V |
| 451 | 4 | PSUHF0 | 1 | Power state TRX #0 | - | On / Off |
| 451 | 5 | PSUHF1 | 1 | Power state TRX #1 | - | On / Off |
| 451 | 6 | PSTNC0 | 1 | Power state TNC #0 | - | On / Off |
| 451 | 7 | PSTNC1 | 1 | Power state TNC #1 | - | On / Off |
| 452 | 0 | analog value #3 | 12 | Voltage battery #1 | 0,003373 · value | V |
| 453 | 4 | PSGYRO | 1 | Power state gyro System | - | On / Off |
| 453 | 5 | PSMCSX | 1 | Power state magnetic coil system x | - | On / Off |
| 453 | 6 | PSMCSY | 1 | Power state magnetic coil system y | - | On / Off |
| 453 | 7 | PSMCSZ | 1 | Power state magnetic coil system z | - | On / Off |
| 454 | 0 | analog value #4 | 12 | Voltage bus 5V | 0,001620 · value | V |
| 455 | 4 | PSWHEE | 1 | Power state wheel system | - | On / Off |
| 455 | 5 | PSOBC0 | 1 | Power state OBC0 | - | On / Off |
| 455 | 6 | PSOBC1 | 1 | Power state OBC1 | - | On / Off |
| 455 | 7 | PSPDH0 | 1 | Power state PHD | - | On / Off |
| 456 | 0 | analog value #5 | 12 | Voltage bus 3.3V | 0,001221 · value | V |
| 457 | 4 | PSCAM0 | 1 | Power state payload camera | - | On / Off |
| 457 | 5 | PSSUNS | 1 | Power state sun sensor system | - | On / Off |

| | | | | | | |
|-----|---|------------------|----|---|-----------------------|----------|
| 457 | 6 | PSMFS0 | 1 | Power state magnetic field sensor system #0 | - | On / Off |
| 457 | 7 | PSMFS1 | 1 | Power state magnetic field sensor system #1 | - | On / Off |
| 458 | 0 | analog value #6 | 12 | Current charger #0 output | 0,610352 · value | mA |
| 459 | 4 | PSTEMP | 1 | Power state temperature sensors | - | On / Off |
| 459 | 5 | PSCAN0 | 1 | Power state CAN bus #0 | - | On / Off |
| 459 | 6 | PSCAN1 | 1 | Power state CAN bus #1 | - | On / Off |
| 459 | 7 | PSCCW0 | 1 | Power state WDE can controller #0 | - | On / Off |
| 460 | 0 | analog value #7 | 12 | Current charger #1 output | 0,610352 · value | mA |
| 461 | 4 | PSCCW1 | 1 | Power state WDE can controller #1 | - | On / Off |
| 461 | 5 | PS5VCN | 1 | Power state 5V main switch | - | On / Off |
| 461 | 6 | PCUAID | 1 | active PCDU Id | | |
| 461 | 7 | PCBOBC | 1 | startup OBDH Id | - | 0 / 1 |
| 462 | 0 | analog value #8 | 12 | Temperature battery #0 | 0,244141 · value - 50 | °C |
| 463 | 4 | PCBEXT | 1 | boot external flash | - | 0 / 1 |
| 463 | 5 | PCCH00 | 1 | PCDU check channel 00 | - | On / Off |
| 463 | 6 | PCCH01 | 1 | PCDU check channel 01 | - | On / Off |
| 463 | 7 | PCCH02 | 1 | PCDU check channel 02 | - | On / Off |
| 464 | 0 | analog value #9 | 12 | Temperature battery #1 | 0,244141 · value - 50 | °C |
| 465 | 4 | PCCH03 | 1 | PCDU check channel 03 | - | On / Off |
| 465 | 5 | PCCH04 | 1 | PCDU check channel 04 | - | On / Off |
| 465 | 6 | PCCH05 | 1 | PCDU check channel 05 | - | On / Off |
| 465 | 7 | PCCH06 | 1 | PCDU check channel 06 | - | On / Off |
| 466 | 0 | analog value #10 | 12 | signal strength TNC #0 | 1 | S-meter |
| 467 | 4 | PCCH07 | 1 | PCDU check channel 07 | - | On / Off |
| 467 | 5 | PCCH08 | 1 | PCDU check channel 08 | - | On / Off |
| 467 | 6 | PCCH09 | 1 | PCDU check channel 09 | - | On / Off |
| 467 | 7 | PCCH10 | 1 | PCDU check channel 10 | - | On / Off |
| 468 | 0 | analog value #11 | 12 | signal strength TNC #1 | 1 | S-meter |
| 469 | 4 | PCCH11 | 1 | PCDU check channel 11 | - | On / Off |
| 469 | 5 | PCCH12 | 1 | PCDU check channel 12 | - | On / Off |
| 469 | 6 | PCCH13 | 1 | PCDU check channel 13 | - | On / Off |
| 469 | 7 | PCCH14 | 1 | PCDU check channel 14 | - | On / Off |
| 470 | 0 | analog value #12 | 12 | Current wheel drive electronics | 0,305176 · value | mA |
| 471 | 4 | PCCH15 | 1 | PCDU check channel 15 | - | On / Off |
| 471 | 5 | PCCH16 | 1 | PCDU check channel 16 | - | On / Off |
| 471 | 6 | PCCH17 | 1 | PCDU check channel 17 | - | On / Off |

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|-----|---|------------------|----|--------------------------------------|-----------------------------|---------------|
| 471 | 7 | PCCH18 | 1 | PCDU check channel 18 | - | On / Off |
| 472 | 0 | analog value #13 | 12 | Temperature wheel X | 0,061035 · value - 50 | °C |
| 473 | 4 | PCCH19 | 1 | PCDU check channel 19 | - | On / Off |
| 473 | 5 | PCCH20 | 1 | PCDU check channel 20 | - | On / Off |
| 473 | 6 | PCCH21 | 1 | PCDU check channel 21 | - | On / Off |
| 473 | 7 | PCCH22 | 1 | PCDU check channel 22 | - | On / Off |
| 474 | 0 | analog value #14 | 12 | Temperature wheel Y | 0,061035 · value - 50 | °C |
| 475 | 4 | PCCH23 | 1 | PCDU check channel 23 | - | On / Off |
| 475 | 5 | PCCH24 | 1 | PCDU check channel 24 | - | On / Off |
| 475 | 6 | PCCH25 | 1 | PCDU check channel 25 | - | On / Off |
| 475 | 7 | PCCH26 | 1 | PCDU check channel 26 | - | On / Off |
| 476 | 0 | analog value #15 | 12 | Temperature wheel Z | 0,061035 · value - 50 | °C |
| 477 | 4 | TCRXID | 1 | receiving TNC Id | - | 0 / 1 |
| 477 | 5 | OBCAID | 1 | active OBDM Id | - | 0 / 1 |
| 477 | 6 | TMTXRT | 1 | TX baudrate | 4800 · value + 4800 | bps |
| 477 | 7 | PCCH27 | 1 | PCDU check channel 27 | - | On / Off |
| 478 | 0 | analog value #16 | 12 | Current charger #0 input | 0,305176 · value | mA |
| 479 | 4 | PCCH28 | 1 | PCDU check channel 28 | - | On / Off |
| 479 | 5 | PCCH29 | 1 | PCDU check channel 29 | - | On / Off |
| 479 | 6 | PCCH30 | 1 | PCDU check channel 30 | - | On / Off |
| 479 | 7 | PCCH31 | 1 | PCDU check channel 31 | - | On / Off |
| 480 | 0 | CCTICC | 8 | immediate command counter | value | 1 |
| 481 | 0 | CCTCTT | 8 | time tagged command counter | value | 1 |
| 482 | 0 | CCETCS | 8 | command checksum error counter | value | 1 |
| 483 | 0 | CCEIMC | 8 | immediate command error counter | value | 1 |
| 484 | 0 | CCETTC | 8 | time tagged command error counter | value | 1 |
| 485 | 0 | CCETTG | 8 | time tag error counter | value | 1 |
| 486 | 0 | CCETCC | 8 | command code error counter | value | 1 |
| 487 | 0 | TCRXQU | 8 | receiving TNC quality byte | 0,054878 · value + 1,573172 | dB |
| 488 | 0 | TCFRCP | 16 | free command pool | value | 1 |
| 490 | 0 | TMHKUR | 16 | housekeeping update rate | value | seconds |
| 492 | 0 | CSTUTC | 32 | on board time in utc | value | seconds |
| 496 | 0 | CSTSYS | 32 | obc uptime | value | seconds |
| 500 | 0 | OBCBAD | 8 | boot address | - | 0 / 1 / 2 / 3 |
| 501 | 0 | CESWMC | 8 | error counter for missing magic code | value | 1 |
| 502 | 0 | reserved | 8 | | | |

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|-----|------|------------------|----|------------------------------------|------------------------------------|----------|
| 503 | 0 | BEACON | 8 | beacon mode | - | On / Off |
| 504 | 0 | OBCABC | 8 | active OBDH boot counter | value | 1 |
| 505 | 0 | MODOBC | 8 | Satellite mode | value | 1 |
| 506 | 0 | CCECAN | 8 | CAN error counter | value | |
| 507 | 0 | OBCCAN | 8 | selected CAN bus at active OBDH | - | 0 / 1 |
| 508 | 0 | PCSYST | 16 | PCDU uptime | value | seconds |
| 510 | 0 | PCBCNT | 8 | PCDU boot counter | value | 1 |
| 511 | 0 | PCTXEC | 8 | PCDU CAN transmitt error counter | value | 1 |
| 512 | 0 | PCRXEC | 8 | PCDU CAN receive error counter | value | 1 |
| 513 | 0 | PCOFFC | 8 | PCDU CAN offline error counter | value | 1 |
| 514 | 0 | PCACKC | 8 | PCDU CAN acknowledge error counter | value | 1 |
| 515 | 0 | PCCH32 | 1 | PCDU check channel 32 | - | On / Off |
| 515 | 1 | PCCH33 | 1 | PCDU check channel 33 | - | On / Off |
| 515 | 2 | PCCH34 | 1 | PCDU check channel 34 | - | On / Off |
| 515 | 3 | PCCH35 | 1 | PCDU check channel 35 | - | On / Off |
| 515 | 4 | PCCH36 | 1 | PCDU check channel 36 | - | On / Off |
| 515 | 5 | PCCH37 | 1 | PCDU check channel 37 | - | On / Off |
| 515 | 6 | PCCH38 | 1 | PCDU check channel 38 | - | On / Off |
| 515 | 7 | PCCH39 | 1 | PCDU check channel 39 | - | On / Off |
| 516 | 0 | PCCH40 | 1 | PCDU check channel 40 | - | On / Off |
| 516 | 1 | PCCH41 | 1 | PCDU check channel 41 | - | On / Off |
| 516 | 2..7 | reserved | 14 | | | |
| 518 | 0 | analog value #17 | 12 | Current charger #1 input | $0,305176 \cdot \text{value}$ | mA |
| 519 | 4 | reserved | 4 | | | |
| 520 | 0 | analog value #18 | 12 | Temperature PCDU ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 521 | 4 | reserved | 4 | | | |
| 522 | 0 | analog value #19 | 12 | Temperature MFS0 | $0,061035 \cdot \text{value} - 50$ | °C |
| 523 | 4..7 | reserved | 4 | | | |
| 524 | 0 | ACSWHX | 16 | wheel speed X | value | rpm |
| 526 | 0 | ACSWHY | 16 | wheel speed Y | value | rpm |
| 528 | 0 | ACSWHZ | 16 | wheel speed Z | value | rpm |
| 530 | 0 | ACSQ00 | 16 | ACS quaternion 00 | $0,0001 \cdot \text{value}$ | 1 |
| 532 | 0 | ACSQ01 | 16 | ACS quaternion 01 | $0,0001 \cdot \text{value}$ | 1 |
| 534 | 0 | ACSQ02 | 16 | ACS quaternion 02 | $0,0001 \cdot \text{value}$ | 1 |
| 536 | 0 | ACSQ03 | 16 | ACS quaternion 03 | $0,0001 \cdot \text{value}$ | 1 |
| 538 | 0 | ACSSUX | 16 | ACS sun vector X | $0,0001 \cdot \text{value}$ | 1 |

| | | | | | | |
|-----|------|------------------|----|--------------------------------------|--|-------|
| 540 | 0 | ACSSUY | 16 | ACS sun vector Y | $0,0001 \cdot \text{value}$ | 1 |
| 542 | 0 | ACSSUZ | 16 | ACS sun vector Z | $0,0001 \cdot \text{value}$ | 1 |
| 544 | 0 | ACSM0X | 16 | ACS magnetic field sensor 0 vector X | $10 \cdot \text{value}$ | nT |
| 546 | 0 | ACSM0Y | 16 | ACS magnetic field sensor 0 vector Y | $10 \cdot \text{value}$ | nT |
| 548 | 0 | ACSM0Z | 16 | ACS magnetic field sensor 0 vector Z | $10 \cdot \text{value}$ | nT |
| 550 | 0 | ACSM1X | 16 | ACS magnetic field sensor 1 vector X | $10 \cdot \text{value}$ | nT |
| 552 | 0 | ACSM1Y | 16 | ACS magnetic field sensor 1 vector Y | $10 \cdot \text{value}$ | nT |
| 554 | 0 | ACSM1Z | 16 | ACS magnetic field sensor 1 vector Z | $10 \cdot \text{value}$ | nT |
| 556 | 0 | ACSMOD | 4 | ACS mode | value | 1 |
| 556 | 4 | ACSGSC | 1 | ground station contact | - | 0 / 1 |
| 556 | 5 | ACSSHD | 1 | shadow flag | - | 0 / 1 |
| 556 | 6..7 | reserved | 2 | | | |
| 557 | 0 | ACSERR | 8 | ACS Error Code | value | 1 |
| 558 | 0 | ACSGYX | 16 | Gyro rate X | $0,0573 \cdot \text{value} + 19,7097$ | deg/s |
| 560 | 0 | ACSGYY | 16 | Gyro rate Y | $-0,0573 \cdot \text{value} + 21,9443$ | deg/s |
| 562 | 0 | ACSGYZ | 16 | Gyro rate Z | $-0,0573 \cdot \text{value} + 2,5210$ | deg/s |
| 564 | 0 | analog value #20 | 12 | Temperature OBC ext. ADC #0 | $0,125 \cdot \text{value}$ | °C |
| 565 | 4 | reserved | 4 | | | |
| 566 | 0 | analog value #21 | 12 | Current solar array x+ | $0,152588 \cdot \text{value}$ | mA |
| 567 | 4..7 | reserved | 4 | | | |
| 568 | 0 | analog value #22 | 12 | Current solar array y+ | $0,152588 \cdot \text{value}$ | mA |
| 569 | 4..7 | reserved | 4 | | | |
| 570 | 0 | analog value #23 | 12 | Current solar array z+ | $0,152588 \cdot \text{value}$ | mA |
| 571 | 4..7 | reserved | 4 | | | |
| 572 | 0 | analog value #24 | 12 | Temperature Gyro rate X | $0,48577 \cdot \text{value} - 270,595$ | °C |
| 573 | 4..7 | reserved | 4 | | | |
| 574 | 0 | FECF | 16 | frame error control field (CCSDS) | - | - |