그래픽, 어둠이(가) 표시된 사진

자동 생성된 설명

**KUST 2024 E-FORMULA**

**CAN Protocol**

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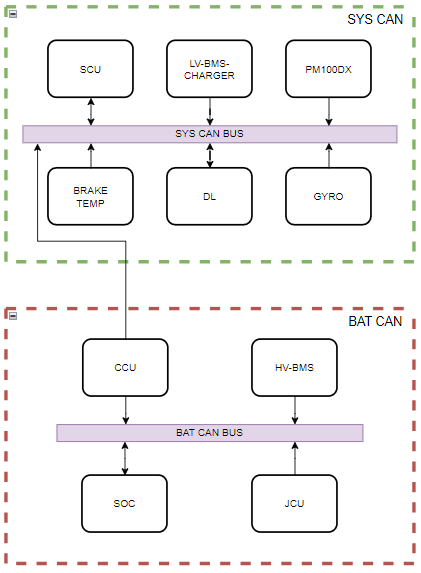
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**1. System Diagram  
-** HW System

  
**SCU** : SYS CAN BUS  
LV-BMS-CHARGER  
PM100DX  
BRAKE TEMP   
GYRO  
DL  
  
**CCU** : BAT CAN BUS  
HV-BMS  
SOC  
JCU

**2. BAT CAN**

**-** CAN Communication Parameters

|  |  |
| --- | --- |
| CAN TYPE | CAN 2.0A(standard) |
| Bit Rate | 500kbit/sec |
| ID | 11bit |
| DLC | 8(byte) |

**-** CAN Data information

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | CAN  ID | CAN BYTE | Data type | Scale | Unit | Min | Max | Default | Description |
| Data1 | 0x00 | 0,1 | U16 | 1 | N/m |  |  |  | EX |
| Data2 | 2,3 | U16 | 1 | V |  |  |  | EX |
| Data3 | 4,5 | U16 | 1 | A |  |  |  | EX |
| Data4 | 6,7 | S16 | 1 | t |  |  |  | EX |
|  |  |  |  |  |  |  |  |  |  |
| A | 0X21 | 0 |  |  |  |  |  |  |  |
| B | 1 |  |  |  |  |  |  |  |
| C | 2 |  |  |  |  |  |  |  |
| D | 3 |  |  |  |  |  |  |  |
| E | 4 |  |  |  |  |  |  |  |
| F | 5 |  |  |  |  |  |  |  |
| G | 6 |  |  |  |  |  |  |  |
| H | 7 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

… 아래에 셀추가로

**-** CAN Data map

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte  CAN-ID | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| EX)0x00 | DATA 1 | | DATA2 | | DATA3 | | DATA4 | |
| HV BMS | | | | | | | | |
| 0x10 | SEG\_1  CELL MAX | | SEG\_1  CELL MIN | | SEG\_1 TEMP MAX | SEG\_1 TEMP MIN | SEG\_1  BMS STAT | RESERVED |
| 0x11 | SEG\_2 CELL MAX | | SEG\_2 CELL MIN | | SEG\_2 TEMP MAX | SEG\_2 TEMP MIN | SEG\_2  BMS STAT | RESERVED |
| 0x12 | SEG\_3  CELL MAX | | SEG\_3  CELL MIN | | SEG\_3 TEMP MAX | SEG\_3 TEMP MIN | SEG\_3  BMS STAT | RESERVED |
| 0x13 | SEG\_4  CELL MAX | | SEG\_4  CELL MIN | | SEG\_4 TEMP MAX | SEG\_4 TEMP MIN | SEG\_4  BMS STAT | RESERVED |
| 0x14 | SEG\_5  CELL MAX | | SEG\_5  CELL MIN | | SEG\_5 TEMP MAX | SEG\_5 TEMP MIN | SEG\_5  BMS STAT | RESERVED |
| 0x15 | HV PACK | | RESERVED | | RESERVED | | RESERVED | |
| 0x16 | RESERVED | | RESERVED | | RESERVED | | RESERVED | |
| 0x17 | RESERVED | | RESERVED | | RESERVED | | RESERVED | |
| 0x18 | RESERVED | | RESERVED | | RESERVED | | RESERVED | |
| 0x19 | RESERVED | | RESERVED | | RESERVED | | RESERVED | |
| JCU | | | | | | | | |
| 0x20 | TSAL | AIR1\_SIG | AIR2\_SIG | AIR\_REL\_PWR | AIR\_REL\_PWR | SDC | 0 | PRE\_REL |
| 0X21 | HV\_V | | PRE\_REL\_MC\_V | | | DIS\_REL\_MC\_V | | |
| SOC | | | | | | | | |
| 0x30~39 | RESERVED | RESERVED | RESERVED | RESERVED | RESERVED | RESERVED | RESERVED | RESERVED |

… 아래에 셀추가로

**3. SYS CAN**

**-** CAN Communication Parameters

|  |  |
| --- | --- |
| CAN TYPE | CAN 2.0A(standard) |
| Bit Rate | 500kbit/sec |
| ID | 11bit |
| DLC | 8(byte) |

**-** CAN Data information

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | CAN  ID | CAN BYTE | Data type | Scale | Unit | Min | Max | Default | Description |
| Data1 | 0x00 | 0,1 | U16 | 1 | N/m |  |  |  | EX |
| Data2 | 2,3 | U16 | 1 | V |  |  |  | EX |
| Data3 | 4,5 | U16 | 1 | A |  |  |  | EX |
| Data4 | 6,7 | S16 | 1 | t |  |  |  | EX |
|  |  |  |  |  |  |  |  |  |  |
| A | 0X00 | 0 |  |  |  |  |  |  |  |
| B | 1 |  |  |  |  |  |  |  |
| C | 2 |  |  |  |  |  |  |  |
| D | 3 |  |  |  |  |  |  |  |
| E | 4 |  |  |  |  |  |  |  |
| F | 5 |  |  |  |  |  |  |  |
| G | 6 |  |  |  |  |  |  |  |
| H | 7 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

… 아래에 셀추가로

**-** CAN Data map

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte  CAN-ID | 0 | 1 | | 2 | 3 | 4 | | | | 5 | 6 | 7 | | |
| BAT | | | | | | | | | | | | | | |
| HV BMS | | | | | | | | | | | | | | |
| 0x10 | SEG\_1  CELL MAX | | | SEG\_1  CELL MIN | | SEG\_1 TEMP MAX | | | SEG\_1 TEMP MIN | | SEG\_1  BMS STAT | | RESERVED | |
| 0x11 | SEG\_2 CELL MAX | | | SEG\_2 CELL MIN | | SEG\_2 TEMP MAX | | | SEG\_2 TEMP MIN | | SEG\_2  BMS STAT | | RESERVED | |
| 0x12 | SEG\_3  CELL MAX | | | SEG\_3  CELL MIN | | SEG\_3 TEMP MAX | | | SEG\_3 TEMP MIN | | SEG\_3  BMS STAT | | RESERVED | |
| 0x13 | SEG\_4  CELL MAX | | | SEG\_4  CELL MIN | | SEG\_4 TEMP MAX | | | SEG\_4 TEMP MIN | | SEG\_4  BMS STAT | | RESERVED | |
| 0x14 | SEG\_5  CELL MAX | | | SEG\_5  CELL MIN | | SEG\_5 TEMP MAX | | | SEG\_5 TEMP MIN | | SEG\_5  BMS STAT | | RESERVED | |
| 0x15 | HV PACK | | | RESERVED | | RESERVED | | | | | RESERVED | | | |
| 0x16 | RESERVED | | | RESERVED | | RESERVED | | | | | RESERVED | | | |
| 0x17 | RESERVED | | | RESERVED | | RESERVED | | | | | RESERVED | | | |
| 0x18 | RESERVED | | | RESERVED | | RESERVED | | | | | RESERVED | | | |
| 0x19 | RESERVED | | | RESERVED | | RESERVED | | | | | RESERVED | | | |
| JCU | | | | | | | | | | | | | | |
| 0x20 | TSAL | AIR1\_SIG | | AIR2\_SIG | AIR\_REL\_PWR | AIR\_REL\_PWR | | | | SDC | - | PRE\_REL | | |
| 0X21 | HV\_V | | | PRE\_REL\_MC\_V | | | | | | DIS\_REL\_MC\_V | | | | |
| SOC | | | | | | | | | | | | | | |
| 0x30~39 | RESERVED | RESERVED | | RESERVED | RESERVED | RESERVED | | | | RESERVED | RESERVED | RESERVED | | |
| SYS | | | | | | | | | | | | | | |
| LV BMS | | | | | | | | | | | | | | |
| 0x50 | MaxCellVoltage | | | MinCellVoltage | | Pack\_Voltage | | | | | Stack\_Voltage | | | |
| 0x51 | Pack\_Current | | | CELL\_Temp | | FET\_Temp | | | | | RESERVED | RESERVED | | |
| 0x52 | CB\_ActiveCells | | | SafetyStatuA | SafetyStatusB | SafetyStatusC | | | | PFStatusA | PFStatusB | PFStatusC | | |
| 0x53 | AlarmRawBits | | | FET\_Status | RESERVED | Accumulated\_Charge\_Time | | | | | | | | |
| LV CHARGER | | | | | | | | | | | | | | |
| 0x54 | STAT\_1 | STAT\_2 | | STAT\_3 | Fault\_STAT | RESERVED | | | | RESERVED | RESERVED | RESERVED | | |
| 0x55 | IAC\_ADC | | | IBAT\_ADC | | VAC\_ADC | | | | | VFB\_ADC | | | |
| 0x56~0x59 | RESERVED | | | | | | | | | | | | | |
| SCU | | | | | | | | | | | | | | |
| 0x60 | FR\_Linear | | | FL\_Linear | | RR\_Linear | | | | | RL\_Linear | | | |
| 0x61 | FR\_WheelSpeed | | | FL\_WheelSpeed | | RR\_WheelSpeed | | | | | RL\_WheelSpeed | | | |
| 0x62 | Steer\_Linear | | | Brake\_Pressure | | - | | - | | | - | | | - |
| DL | | | | | | | | | | | | | | |
| 0x70 |  |  | |  |  |  | | | |  |  |  | | |
| PM100DX | | | | | | | | | | | | | | |
| 0x0A0 | Module A Temp | | | Module B Temp | | Module C Temp | | | | | Gate Driver Board Temp | | | |
| 0x0A1 | Control board Temp | | | RTD#1 Temp | | RTD#2 Temp | | | | | RTD#3 Temp | | | |
| 0x0A2 | ~~Coolant Temp~~ | | | ~~Hot Spot Temp~~ | | Motor Temp | | | | | Torque Shudder | | | |
|  |  | | |  | |  | | | | |  | | | |
| ~~0x0A4~~ | ~~Forward switch~~ | ~~Reverse switch~~ | | ~~Brake switch~~ | ~~REGEN Disable Switch~~ | ~~Ignition switch~~ | | | | ~~Start switch~~ | ~~Valet Mode~~ | ~~Status of Digital Input~~ | | |
| 0x0A5 | ~~Motor Angle~~ | | | Motor Speed 1 | | ~~Electrical Output Frequency~~ | | | | | ~~Delta Resolver Filtered~~ | | | |
| 0x0A6 | Phase A current | | | Phase B current | | Phase C current | | | | | DC Bus Voltage 1 | | | |
| 0x0A7 | DC Bus Voltage 2 | | | Output Voltage | | VAB\_Vd\_Voltage | | | | | VBC\_Vd\_Voltage | | | |
| 0x0A8 | ~~Flux command~~ | | | ~~Flux feedback~~ | | Id\_feedback | | | | | Iq\_feedback | | | |
| 0x0A9 | ~~1.5V Reference voltage~~ | | | ~~2.5V Reference voltage~~ | | ~~5V Reference voltage~~ | | | | | ~~12V Reference voltage~~ | | | |
| 0x0AA | VSM State | ~~PWM~~  ~~Frequency~~ | | Inverter State | Relay State | ~~1. Inverter Run mode(Bit 0)~~  ~~2. Inverter Active Discharge State(Bits 5-7)~~ | | | | ~~1. Inverter Command Mode(5-Bit0)~~  ~~2. Rolling Counter Value(5-Bit4 thru 5-Bit7)~~ | ~~1. Inverter Enable State(Bit0)~~  ~~2. Start Mode Active(Bit6)~~  ~~3. Inverter Enable Lockout(Bit7)~~ | ~~1. Direction Command(Bit 0)~~  ~~2. BMS Active(Bit 1)~~  ~~3. BMS Limiting Torque(Bit 2)~~  ~~4. Limit Max Speed(Bit 3)~~  ~~5. Limit Hot Spot(Bit 4)~~  ~~6. Low Speed Limiting(Bit 5)~~  ~~7. Coolant Temperature Limiting(Bit 6)~~ | | |
| 0x0AB | POST Fault Lo | | | POST Fault Hi | | Run Fault Lo | | | | | Run Fault Hi | | | |
| 0x0AC | Command Torque | | | Torque Feedback | | Power on Timer | | | | | | | | |
| 0x0AD | Modulation Index | | | Flux Weakening Output | | Id\_command | | | | | Iq\_command | | | |
| 0x0B0 | Torque Command | | | Torque Feedback | | Motor Speed 2 | | | | | DC Bus Voltage 3 | | | |
| ~~0x0C0~~ | ~~Torque Command~~ | | | ~~Speed Command~~ | | ~~Direction Command~~ | ~~Inverter Enable(5.0)~~  ~~Inverter Discharge(5.1)~~  ~~Speed Mode Enable(5.2)~~ | | | | ~~Command Torque Limit~~ | | | |
| ~~0x0C1~~ | ~~Parameter Address~~ | | | ~~R/W Command~~ | ~~Reserved~~ | ~~Data~~ | | | | | ~~Reserved~~ | | | |
| ~~0x0C2~~ | ~~Parameter Address~~ | | | ~~Write Success~~ | ~~Reserved~~ | ~~Data~~ | | | | | ~~Reserved~~ | | | |
| Gyro | | | | | | | | | | | | | | |
| 0xff | - | | ID | X\_Data | | Y\_Data | | | | | Z\_Data | | | |