그래픽, 어둠이(가) 표시된 사진

자동 생성된 설명

**KUST 2024 E-FORMULA**

**CAN Protocol**

**목차**

1. System Diagram1

HW System2

2. BAT CAN 3

CAN Communication Parameters4

CAN Data information5

CAN Data Map6

3. SYS CAN 7

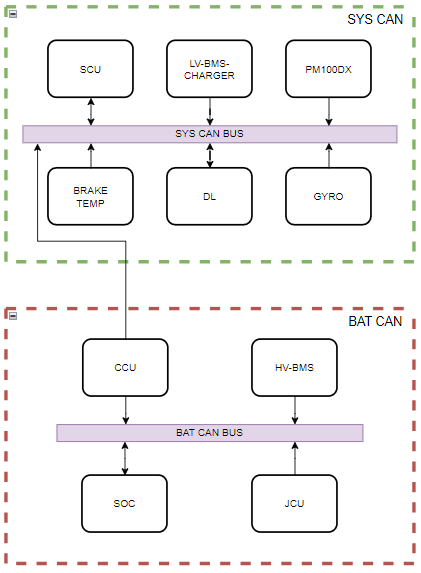
CAN Communication Parameters8

CAN Data information9

CAN Data Map 10

4. 수정사항 11

**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) |

**3. SYS CAN**

**-** CAN Communication Parameters

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

**4. CAN DATA MAP**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte  CAN-ID | 0 | 1 | | 2 | 3 | 4 | | | | 5 | 6 | 7 | | |
| BAT | | | | | | | | | | | | | | |
| HV BMS | | | | | | | | | | | | | | |
| 0x10 | SEG\_1  CELL MAX[[1]](#footnote-1) | | | SEG\_1  CELL MIN | | SEG\_1  TEMP MAX[[2]](#footnote-2) | | | SEG\_1  TEMP MIN | | SEG\_1  BMS STAT[[3]](#footnote-3) | | SEG\_1  VOLTAGE[[4]](#footnote-4) | |
| 0x11 | SEG\_2 CELL MAX | | | SEG\_2 CELL MIN | | SEG\_2  TEMP MAX | | | SEG\_2  TEMP MIN | | SEG\_2  BMS STAT | | SEG\_2  VOLTAGE | |
| 0x12 | SEG\_3  CELL MAX | | | SEG\_3  CELL MIN | | SEG\_3  TEMP MAX | | | SEG\_3  TEMP MIN | | SEG\_3  BMS STAT | | SEG\_3  VOLTAGE | |
| 0x13 | SEG\_4  CELL MAX | | | SEG\_4  CELL MIN | | SEG\_4  TEMP MAX | | | SEG\_4  TEMP MIN | | SEG\_4  BMS STAT | | SEG\_4  VOLTAGE | |
| 0x14 | SEG\_5  CELL MAX | | | SEG\_5  CELL MIN | | SEG\_5  TEMP MAX | | | SEG\_5  TEMP MIN | | SEG\_5  BMS STAT | | SEG\_5  VOLTAGE | |
| 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[[5]](#footnote-5) | | | | | | | | | | | | | | |
| 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[[6]](#footnote-6) | | | | | | | | | | | | | | |
| 0x0A0 | Module A Temp(x0.1) | | | Module B Temp(x0.1) | | Module C Temp(x0.1) | | | | | Gate Driver Board Temp(x0.1) | | | |
| 0x0A1 | Control board Temp(x0.1) | | | ~~RTD#1 Temp~~ | | ~~RTD#2 Temp~~ | | | | | ~~RTD#3 Temp~~ | | | |
| 0x0A2 | ~~Coolant Temp~~ | | | ~~Hot Spot Temp~~ | | Motor Temp(x0.1) | | | | | ~~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[[7]](#footnote-7) | | ~~Electrical Output Frequency~~ | | | | | ~~Delta Resolver Filtered~~ | | | |
| 0x0A6 | Phase A current | | | Phase B current | | Phase C current | | | | | DC Bus Current | | | |
| 0x0A7 | DC Bus Voltage(x0.1) | | | 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 | | | Feedback Torque | | 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 | | | |

**5. 수정사항 -**

2024-07-10 : ~~빨간글씨(텔레메트리 필요x)~~

2024-07-11 : 파란글씨(Little Endian), SEG1~5 VOLTAGE 추가

2024-07-12 : PM100DX, SCU => default : Little Endian/배수, 단위, ~~빨간글씨~~ 추가

2024-07-15 : 영광 test반영 수정사항 반영 완료

1. SEG\_\* CELL MAX, MIN : 4.08~4.10V [↑](#footnote-ref-1)
2. SEG\_\* TEMP MAX, MIN : 27~28°C [↑](#footnote-ref-2)
3. SEG\_\* BMS STAT : 0 뜨는게 정상(0, 1, 2) [↑](#footnote-ref-3)
4. SEG\_\* VOLTAGE : 69-70V [↑](#footnote-ref-4)
5. default : Little Endian [↑](#footnote-ref-5)
6. default : Little Endian [↑](#footnote-ref-6)
7. unit : RPM [↑](#footnote-ref-7)