< Organization >

- Established Year : 2006
- Located in Anyang City, KOREA
- Business Item :
  - Battery Management System (BMS)
  - Battery Test Equipment
  - Solar Tracking System
  - Motor Controller
Company History

2006
Misum Systech Co.,Ltd established
Developed the test equipment (40ch) PCM of cellular phone

2007
Developed the test equipment (7, 10, 13-cell) of EV & Scooter BMS.

2008
Developed the Solar tracking system used in Solar power plant (1MWh).
Developed the test equipment (108-cell) of HEV BMS
Developed the test equipment (4cell) of Notebook SCM

2009
Developed the BMS (73-cell) of UPS

2010
Got Certification of ISO 9001/14001, Venture & INNO BIZ
Company Certification
Why use BMS?

- Battery is not a stable voltage source, so it is necessary to know its status, especially to be used HEV(EV).
Why use BMS?

HEV(EV) Power Pattern Analysis
Why use BMS?

- Management & Maintenance on Battery System
  - To respond to the cell characteristic inside the Battery System
  - To respond to Battery Heating
  - To respond to the trouble of Battery System
  - BMS Diagnosis Function Error
  - Each Cell Characteristic difference by Environmental temperatures
    (Charge/Discharge Effectiveness and self-discharging rate)

- Battery Pack Cell Change

- Isolation trouble on the Battery System
Why use BMS?

- To deliver the correct information of Battery System to the controller in Automobile
  - Battery’s State Of Charge (SOC)
  - Charge/Discharge Power Limit
  - Battery Diagnostic Trouble Code (DTC)
  - Battery Stage Of Health (SOH)
Protection & Balancing

Protection

- Over Voltage & Reverse Charge
- Under Voltage Discharge
- Over Current & Short
- Over Temperature

Balancing

- Charging
- Discharging
- Charging & Discharging
BMS Design Issue

- Need to develop the optimized circuit considering Performance, Reliability, & Price
  - BMS’s performance, reliability/durability, Price
  - Correlation with the Battery (Characteristic, Durability, & Stability, etc.,)

| BMS Configuration issue | • Master + Slave structure?  
|                         | • BMS alone vs. attached to package?  
|                         | • Volume?  
|                         | • How to integrate all electric components using 12V from battery? |

| Circuit Configuration issue | • Pack voltage measuring circuit?  
|                            | • Current sensors?  
|                            | • Cell voltage sensing method?  
|                            | • Temperature sensing method?  
|                            | • Balancing circuit implementation method  
|                            | • Micro controller specification (8-bit ~ 32-bit)  
|                            | • Memory capacity? |

| Reliability/ Durability | • How to secure electromagnetic Tolerance, Ecology |

- Cell Voltage sensing reduction method?  
  - Module unit sensing  
  - Chip usage?

- Balancing or not.

- Circuit’s precision level?
# Type of BMS

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<th>Application</th>
<th>NEV</th>
<th>E-Bike</th>
<th>UPS</th>
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<td>Function</td>
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<td>I²C Charger Comm.</td>
<td>Cell Capacity 150Ah</td>
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<td>CAN Comm.</td>
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<td>IGBT Control</td>
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Test Equipment _ Products

Tester for BMS

- 1Cell PCM Tester
  20ch (40ch Available)
  Mobile Battery Protection

- 1~2Cell Battery Pack Tester
  (Soft & Hard Pack)

- Notebook Smart Module
  Calibration Equipment
  Function Tester

Tester for PCM & SCM

- 25~108 Cell BMS

25~108 Cell BMS
Test Equipment for Battery PCM

- Tool Concept
  
  This test tool is used for inspecting the current, voltage, & temperature of PCM & SCM in the mobile phone battery. It can measure the consuming current, do calibration thru the communication with PCM, and reconfirm the accuracy.

- Main features
  
  - 1~2-Cell inspection
  - Calibration & Accuracy Test
  - Protection inspection on V, C, & T
  - EEPROM Write & Verify
  - Data Flash Setup and Inspection thru RS-232C

- Proven Performance
  
  - TI, Seiko, Mitsumi, Hitachi, Ricoh IC Test
  - Apple i-Phone SCM inspection
  - Nokia & Samsung PCM Test
Test Equipment for Lap-top

- Tool Concept
  This test tool is used for inspecting the current, voltage, & temperature of SM-Smart Module in the Lap-top battery. It can do EEPROM Data Read/Write, do calibration thru the communication with SM, and reconfirm the accuracy.

- Main Features
  - Max. 4-Cell Inspection
  - Calibration & Accuracy Test Smart Module products
  - Protection inspection on V, C, & T
  - Firmware Write & Verify
  - Data Flash Setup and Inspection thru RS-232C

- Proven Performance
  - TI, Maxim-Dallas, Renesas IC
Test Equipment for HEV BMS

- Tool Concept

This test tool is used for inspecting the current, voltage, & temperature of BMS in HEV.

It can do calibration thru the communication, and reconfirm the Register Data.

- Main Features

  - Max. 108-Cell Inspection
  - Calibration & Accuracy Test on BMS Products
  - Protection inspection on V, C, & T
  - Simulation on V, C, & T
  - Data Flash Setup and Inspection thru RS-232C