DEVELOPMENT PLATTFORM

NTBatteryManagementSystem:
Safety reference design targeting ISO 26262 ASIL C

NewTec NTBatteryManagementSystem (NTBMS) is an e-mobility reference design and complete safety support package for Battery Management Systems. It is constructed with a two board approach: a functional safety System-on-Module board and a Battery Management System (BMS) application board. The NTBMS is a generic safety reference design developed in cooperation with NXP.

The NTBMS is designed for systems with high demand on reliability and safety targeting ISO 26262 ASIL C.

The Battery Management System of Li-Ion battery includes cell monitoring, current sensing, passive cell balancing, battery breaker control, computation unit for Battery parameter extraction and communication to other ECU through LIN or CAN.

Battery management systems are responsible to monitor and control low- and high-voltage batteries on Li-Ion technology of Electric and Hybrid Electric Vehicles. This control unit is essential since several battery cells are unified to a cluster to enhance battery capacity. Lithium-Ion batteries require a prevention of voltage fluctuation during the process of battery charging. Thus BMS are essential to monitor state of charge, load distribution, temperature of each battery cell as well as of the whole battery package and development of the charging capacity.
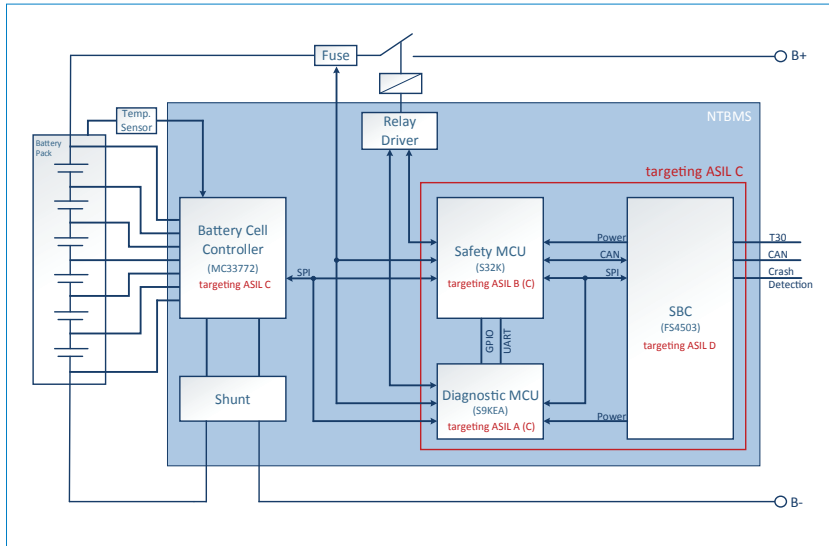
Typical applications

_ Automotive BMS for Starter Battery
  with Li-Ion battery
_ Automotive BMS for Auxillary Battery
_ Smart Grid BMS
_ Other BMS opportunities
  (medical, eBike, light transportation,
  industrial)

Customer Benefits

_ Accelerate time to market
_ Reduction in costs for development
  and certification
_ Safety Development Plattform
  for BMS
_ Reference Design targeting
  ISO 26262 ASIL C

System Overview

Battery Pack

Temp. Sensor

Fuse

B+

Relay Driver

NTBMS

targeting ASIL C

Battery Cell Controller
(MC33772)
targeting ASIL C

SPI

Safety MCU
(S32K)
targeting ASIL B (C)

Power
CAN
SPI

T30
CAN
Crash Detection

SBC
(FS4503)
targeting ASIL D

GPIO
UART

Shunt

Diagnostic MCU
(S9KEA)
targeting ASIL A (C)

Power

B-

Key Features

Integrated system diagnostic functions targeting ASIL C

_ Overcurrent protection
_ Overcharge protection
_ Overtemperature protection
_ Overvoltage protection
_ Undervoltage (short circuit) protection
_ Unintended relay close protection
_ Unintended relay open protection
_ Crash detection

Battery Characteristics

_ Electrical current carrying capability:
  200 A continuous current
  800 A maximum current
_ Intrusive diagnostics (performed by MCU)
_ Memory storage (RAM & flash)
_ Power management (low power and normal mode)
_ LIN for starterbattery
_ CAN for the auxiliary battery

Packages & Services

	Reference design	Board Package	Software Package	Safety Package	Certification Package
Schematic	✓	✓	✓	✓	✓
Layout w/ Gerber Files	✓	✓	✓	✓	✓
Application Software with Driver (Non Safe) Layout w/ Gerber Files	✓	✓	✓	✓	✓
Introduction Guide targeting ASIL C	✓	✓	✓	✓	✓
Templates and FMEDA Introduction	✓	✓	✓	✓	✓
Evaluation Board		✓	✓	✓	✓
HowTo Guide targeting ASIL C		✓	✓	✓	✓
Safety Software License for BMS			✓		✓
Complete Safety Documentation for certification				✓	✓
Certification					✓
Support			✓	✓	✓

(NT) SAFETYFIED SYSTEMS