VICOR

Case study: Delivery robots



Lightweight and efficient power modules extend delivery routes and save space to carry more goods

Customer's challenge

Last-mile consumer delivery of groceries, take-out food and online consumer items is the mission-critical task of these autonomous robots. While payloads vary in size and weight, these robots typically have long run times and are typically powered by 48V to 100V batteries. Delivery robots are equipped with a variety of sensors, cameras, and GPS technology to navigate their surroundings safely and efficiently. These robots depend on batteries, which pose a challenge for their operational range. The key goals were:

- Extend range and run time
- Compact and lightweight solution to save space
- Supporting a variety of point-of-load voltages

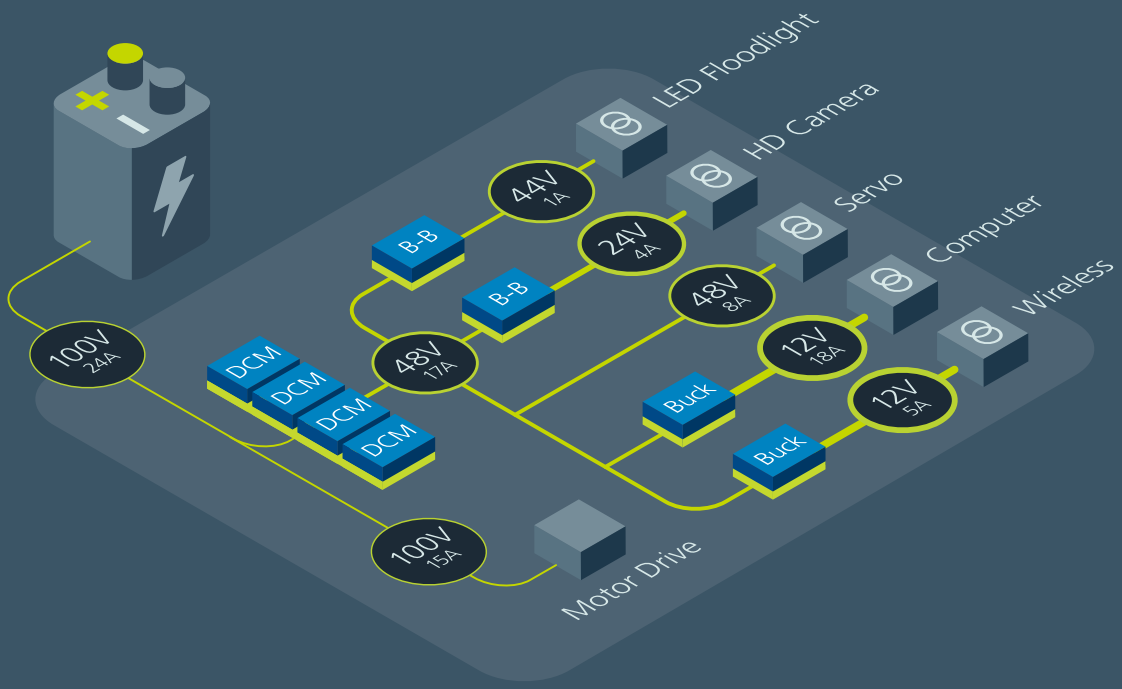
The Vicor solution

Vicor high-performance power modules reduce space and weight on board, increasing space for sensors and navigation systems and enabling delivery robots to carry larger loads and objects. The high efficiency levels of Vicor power modules increase operating time allowing them to reach more distant destinations safely. Key benefits were:

- Modular design supports flexible design requirements
- Compact high-density power modules optimize available design space
- High efficiency solution extends available battery life

The Power Delivery Network

The DCM™ converter series fits the needs for this class with operation from 43 – 154V input. The DCM3623 enables a regulated 24 or 48V distribution from the battery for servo drives, other payloads and downstream converters. The DCM3623 provides 240W of power at 90% efficiency from a 36.38 x 22.8 x 7.26mm package. With a 24 – 48V rail established, ZVS buck or buck-boost regulators can typically be used to power lower voltage rails.





DCM™ DC-DC converter

Isolated regulated

Input: 9 – 420V

Output: 3.3, 5, 12, 13.8, 15, 24, 28, 36, 48V

Power: Up to 1300W

Peak efficiency: 96%

As small as
24.8 x 22.8 x 7.21mm

vicorpower.com/dcm



ZVS buck-boost regulator

Non-isolated regulated

Input: 8 – 60V

Output: 10 – 54V

Power: Up to 150W continuous

Peak efficiency: 97%

10 x 14 x 2.56mm

vicorpower.com/buck-boost



ZVS buck regulator

Non-isolated regulated

Input:12V (8 – 18V),
24V (8 – 42V), 48V (30 – 60V)

Output: 2.2 – 16V

Current: Up to 22A

Peak efficiency: 98%

As small as
10.0 x 10.0 x 2.56mm

vicorpower.com/buck

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