

Where the wheels meet the rails: designing embedded equipment to monitor axles on a running train



Design Challenges:

Rolling stock is the most maintenance intensive part of the railway system and train axles, wheels and brakes are the most vulnerable. The axles of a running train have to be constantly measured in “real-time” for diagnostics and safety.

Other requirements include:

- Measurement and storage of the temperature profile of brakes, wheels and axle bearing to detect cracks and overheated parts
- Time synchronized measurements by up to 6 units at individual parts of the axis
- Storage of data on a rugged media and encryption of all data sent to the base station
- Temperature range as wide as possible
- Power dissipation as low as possible to avoid self-heating
- High reliability plus long-term product availability and support

Design Solutions

- 2x SATA SSD for storage of measured temperature data
- The QorIQ embedded module (Freescale P2020 QorIQ™ P2 platform MCU) provides:
 - A reliable NOR-Flash to boot from
 - 2x Gbit Ethernet for system interconnection and connection to the base station
 - 2x SATA interfaces and IEEE1588 support for time synchronisation amongst the units for all data being stored
 - Security Engine for encryption of data transferred to the base station
 - Industrial grade temperature range: -40°C...+85°C
 - A fanless design with lowest power consumption
 - A module size being more than 22% smaller than comparable ones from the competition
 - Product longevity support for more than 10 years



A TQMP2020 module with a Freescale QorIQ can save you design time and money

TQ embedded modules (shown here ready for mounting on a starter kit)



- Are the smallest in the industry, without compromising quality and reliability
- Bring out all the processor signals to the Tyco connectors
- Can reduce development time by as much as 12 months
- The TQMP2020 module comes with a Freescale QorIQ™ Power Architecture® MCU and supports Linux and QNX operating systems
- The full-function STKP2020 Starter Kit is an easy and inexpensive platform to test and evaluate the TQMP2020 module.

For more information on the TQMP2020 and other modules, or to purchase modules or starter kits:

www.convergencepromotions.com/TQ-USA

TQ-USA is a brand of modules distributed in North America by Convergence Promotions