

Designing for rugged and demanding environments: embedded products in off-shore oil rigs



Design Challenges:

While drilling for oil and gas on oil rigs, the content of the extracted media needs to be analyzed in “real-time” to control pressure and drill pipe speed, and eliminate dangerous situations. The equipment also needs to operate both above and below water at varying temperatures and great depths.

Other requirements include:

- Maximum reliability, highest MTTF
- Highest possible operating temperature
- Withstanding vibrations up to 30g
- Fast (low latency) connection to a FPGA for serial interfaces
- Smallest possible size, because of very limited space being available
- Storage of data on a rugged media
- Second NOR-Flash device for maximum data retention and firmware update

Design Solutions

- Data storage on a mSATA-module
- TQ Systems QorIQ embedded module (Freescale P2020 QorIQ™ P2 platform MCU) provides:
 - A reliable NOR-Flash to boot from
 - PCIe express line for the connection to the mSATA device
 - SPI-Bus for second NOR-Flash
 - FPGA-interconnection via Local Bus for lowest latency
 - 3x Ethernet interfaces (1x to measuring board, 1x for SW-update, 1x for data upload)
 - ECC for DDR3 to detect & correct bit-failures
 - Double-precision FPU for calculation of ADC-Data
 - Industrial grade temperature range: -40°C...+85°C
 - Ruggedized connector system for highest reliability



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