Remote I/O Platform

NXP's Remote I/O Platform (RIOP) is a modular reference design that accelerates development with validated hardware and software libraries.

With an advanced NAFE13388 analog front-end and a dual-core i.MX RT1189 crossover MCU with an integrated Gb time sensitive networking (TSN) switch and EdgeLock® secure enclave, this module delivers high-accuracy, high-precision data, real-time diagnostics, anomaly detection and multi-protocol industrial real-time ethernet communication support.

Board features

- Analog front-end: 8 analog inputs, 10 digital I/Os
- MCU: 7 digital inputs, 8 digital outputs
- 3 Ethernet ports
- USB interface to the host PC and supply
- Option to use external power supply

Target applications

- Factory automation
- Process automation
- Condition monitoring

Key features

Turnkey platform featuring

- NAFE13388 8-channel configurable analog front-end for multi-sensor input to measure voltage, current, temperature, resistance, load-cells
- i.MX RT1189 dual-core Arm® Cortex®-M7 and Cortex-M33 crossover MCU with integrated Gb time sensitive networking (TSN) switch to support multiple communication protocols and EdgeLock secure enclave

Industrial connectivity

- Supports: EtherCAT®, EtherNet/IP™ and PROFINET®-RT
- Future-ready architecture supports emerging protocols including OPC UA

Safety and diagnostics

- Wide range of diagnostic functions for anomaly detection and failure prediction
- Built-in self-test, calibration and diagnostics for enhanced reliability and safety
- NAFE13388 quality managed SafeAssure® device

Security—EdgeLock secure enclave

- Dedicated security unit, with its own CPU core, immutable memory (ROM) and other memories, physically isolated from the rest of SoC
- Protects SoC integrity and prevents application cores from gaining direct access to sensitive data
- Provides enhanced isolation for execution of critical and sensitive security functions
- Prevents attacks exploiting shared processing/ storage resources typical to some trusted execution environments

Hardware

NAFE13388 analog front end

- Low-power 24-bit universal input AFE
- Voltage and current excitation sources
- Eight single-ended or four differential channels with ranges up to ±12.5 V (AFE capable of ± 25 V)
- Configurable for voltage, current, resistance, RTD, thermocouples and other sensors
- Overvoltage protected up to ±36 V
- 7.5 kV HBM ESD and IEC 61000-4-5 2 kV surge protected inputs

i.MX RT1189 crossover MCU

- Dual-core Arm Cortex-M7 800 MHz and Cortex-M33 300 MHz
- Gbps TSN switch
- Up to 5 Gbps ports including 4x ports on the TSN switch (Layer 2) and 1x port on the TSN endpoint controller
- EtherCAT SubDevice controller
- Up to 1.5 MB SRAM (ECC protected) with 512 KB of TCM for Arm Cortex-M7 and 256 KB of TCM for Arm Cortex-M33
- Robust extended industrial qualification (-40 °C to 125 °C)

Connectivity

- 1x Gbps endpoint ethernet port
- 2x 100 Mb ethernet port switch
- CAN FD BUS
- RS485
- JTAG

Software

Access software and tools through nxp.com/RIOP and our application code hub to browse application code examples from our experts to help kick start your project.

Ordering information

Part number	Description
PLCIOKIT	Remote I/O platform

nxp.com/RIOP

Document Number: REMOTEIOFS REV 1