Deterministic communications with TSN

LS1021A Time-Sensitive Networking Reference Design

Start designing with TSN for your industrial networking application.

OVERVIEW

o The LS1021A Time-Sensitive Networking (TSN) Reference Design platform allows developers to design with the new IEEE Time-Sensitive Networking (TSN) standard. The board includes the QorIQ Layerscape LS1021A industrial applications processor and SJA1105T TSN switch. The LS1021ATSN is supported by an industrial Linux SDK with Xenomai real time Linux, which provides utilities for configuring TSN on the SJA1105T.

With virtualization support, QorIQ Layerscape Secure Platform Trust Architecture, Gigabit Ethernet, SATA interface, and an Arduino Shield connector for multiple wireless modules, the LS1021ATSN is ready to support industrial IoT requirements.

KEY FEATURES

▶ LS1021A - Industrial Applications Processor
  o Dual ARM Cortex A7 cores at 1.2 GHz

  o 32 bit DDR3L/DDR4 at 1600 MT/sec

  o ECC on all internal and external memories

  o Trusted platform with Security Engine

▶ SJA1105T — TSN Ethernet Switch
  o 4 external Gigabit Ethernet Interfaces with TSN

  o Per-stream policing

  o Credit based shaper (802.1Qav)

  o Time aware shaper (802.1Qbv)

▶ Memory
  o 1GB DDR4 Memory

  o 1600 MT/sec

▶ Storage
  o 1 GB SPI Flash

▶ Flexible IO
  o SATA connector

  o mPCIe connector (PCIe Gen 2.0)

  o CAN interface

  o 2 UART interfaces

  o 2 USB interfaces (USB 3.0 + USB 2.0)
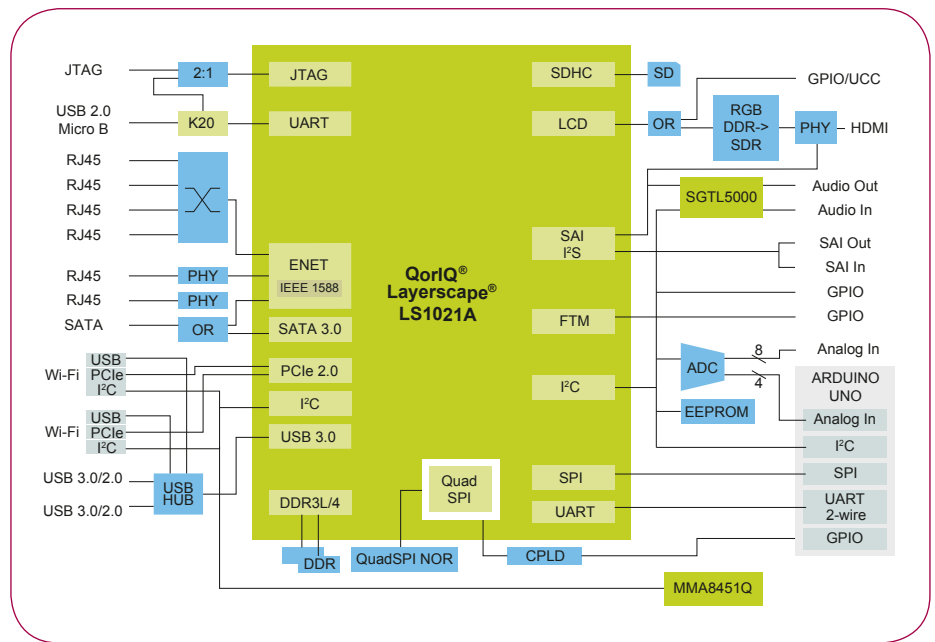
  o SD Card

  o Arduino Shield

READY-TO-MANUFACTURE DESIGN

The LS1021ATSN reference design can significantly reduce investment costs for OEM or ODM manufacturers seeking to design new TSN-capable industrial automation systems. The LS1021ATSN is provided with the OpenIL industrial Linux® distribution with support for netconf configuration of the TSN features and real-time performance with Xenomai. NXP provides the complete design files for the board, as well as detailed bill of materials (BOM) at no additional charge.

RELATED PRODUCTS

▸ **LS1021A:** QorIQ® Layerscape Dual Core Communications Processor with LCD Controller

▸ **SJA1105TEL:** Five port AVB and TSN Ethernet Switch

▸ **MC34VR500:** Multi-output DC/DC Regulator

▸ **SGTL5000:** Ultra-Low Power Audio Codec

▸ **K22:** MBED Kinetis Full-Speed USB microcontroller

▸ **FXLS8471Q:** 3-Axis 14-bit Accelerometer

▸ **FXAS21002CQR1:** 3-Axis Digital Gyroscope
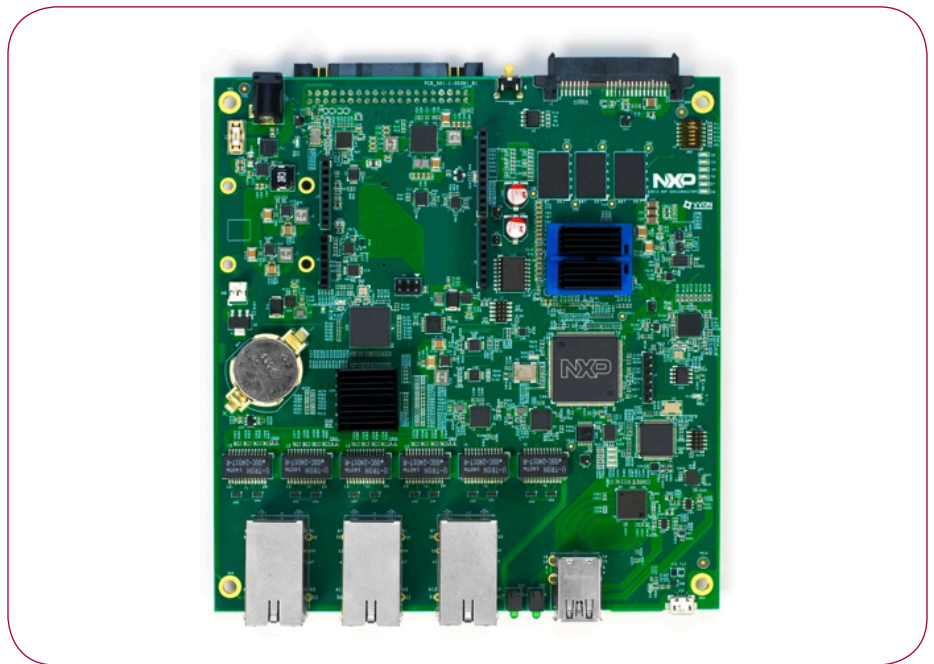
SYSTEM BLOCK DIAGRAM

BOARD ENCLOSURE

HARDWARE KIT CONTENTS

▸ 12 Volt DC Power Supply
▸ Universal Plug Adaptor
▸ USB 2.0 Cable – A Male to Micro B Male
▸ Ethernet Cable
▸ SD Card, Micro SD Card

SDK ENABLEMENT

▸ Boot loader
  o uboot Secure Boot support
  o Boot from flash, disk (QSPI, SD card)
▸ OpenIL Industrial Linux®
  o Linux platform (32-bit)
  o Real-time support with Xenomai (Cobalt and Mercury mode)
  o 1588 Linux PTP
  o Netconf/Yang model for TSN configuration
▸ Tools
  o CodeWarrior®, for 32-bit ARM, GNU tool chain

LS1021A TSN REFERENCE DESIGN — TOP OF BOARD

ORDERING INFORMATION

Orderable Part Number	Price (USD Suggested Resale)
LS1021ATSN-PA	$829