Fact Sheet
Zonal Aggregator/
Controller Reference Design

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Proven System Solution With Extensive Collaterals

Based on the latest generation of high performance devices, the NXP Zonal Aggregator/Controller Reference Design accelerates system foundations for developing your end system by integrating computing, networking, I/O detection and power distribution functions.

Accelerate Time To Market

The aim of this system solution offer is to accelerate, de-risk and ease customer design by providing system solution collaterals such as hardware, complete SW offering and extensive documentation like system application note, functional safety and security documentation.

Ensure Reliable Communication

With 8 CAN FD channels, 8 LIN channels, 3 X 100Base T1 and 2X 1000BaseT1 Ethernet channels, the reference design offers large communication versatility. The Ethernet switch ensures reliable switching of different hosts channels.

Designing With Safety

From a functional safety point of view, a detailed documentation will outline the safety concepts essential for achieving ASIL B compliance, leveraging both the implemented internal safety mechanisms in the NXP components and suggested software safety mechanisms for safe communication and compute.

Designing With Security

From security point of view, an extensive documentation will describe how to ensure secure firmware update, secure boot and secure communication.

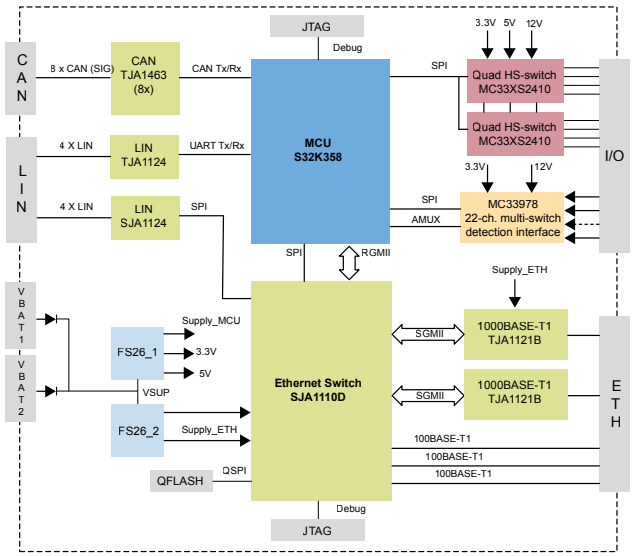
Enable System Design Flexibility

With different sources of communication, I/O source and load control, system offers flexibility to adapt to customer needs. On top of the NXP S32K358 MCU M7 Arm® cores available, the system offers an extended computation capability with the M7™ Core of the SJA1110 Ethernet switch. The FS26 SBC also offers low power consumption capability depending on the customer use case.

Target Applications

- Zonal Aggregator ECU
- Zonal Controller ECU
- Zonal IO Aggregator ECU (Instrument Panel IO, Console IO, Headliner IO, Drive/Passenger Door IO)

System Block Diagram



Extensive System Solution Offer

Optimized Hardware

- Including all NXP automotive-qualified components to support communication, compute & power distribution uses cases
- Using automotive-qualified connectors & housing
- Optimized board in terms of form & factor, layout and BOM according to NXP recommendations
- Provides debug options

System software

- Real Time Drivers for all NXP components.
  Production Grade: S32K3, SJA1110, FS26, TJA1463
  Code Drop: TJA1124/SJA1124, MC33978, MC33XS2410
- Library of sample zonal use cases
- Third party AUTOSAR™ evaluation stack

Extensive documentation

- Reference Design User Manual
- HW schematic, Gerber, BOM
- Rainbow System application note including system overview (device connection & recommendation, BOM recommendation) & system performance according to defined uses cases
- Rainbow System Safety Application Note
- Rainbow System Security Application Note
- Device dedicated documentation: DS, AN, Safety Manual

System Platform Summary

Parameters	Value
Computation Performance S32K358	1x Lock Step M7 Arm® Core + 1x M7 Arm Core 240 MHz 2.5 KDMIPS
Extended Computation Performance SJA1110D	1 x M7 Arm Core 200 MHz 500 DMIPS
CAN FD SIC	8-ch. x 5 Mbps
LIN	8-ch.
Ethernet	3 x 100Base-T1 (with PHY) 2 x 1000Base-T1
Multi Switch Detection Ch.	22-ch.
Load Control	4 to 8 High Side 5A capability by single channel or 10A in dual configuration
System Low Power Consumption	<100µA
System Capability	ASIL B
Security Backbone	Secure firmware update, secure boot, secure communication (MACsec)

New Zonal Aggregator Portfolio Keys Features

S32K358 MCU	• Main host controller • Enabling safe & secure bi-directional communication on Ethernet/CAN & LIN • Over-the-air firmware updates
SJA1110 Ethernet Switch	• Performs Switching of 100BASE-T1 / 1000BASE-T1 and host channels • Use of 3 x 100BASE-T1 interfaces
2 x TJA1121 1000BASE-T1 Interface	• Supports upload link(s) to Central Computing Unit • Provides secure (MACsec) communication from zonal to central computing
TJA1124 LIN Interface	• Quad LIN (Tx/Rx to MCU)
SJA1124 LIN Interface	• Quad LIN (SPI to MCU)
8 X TJA1463 CAN FD Interface	• CAN SIC transceiver with sleep mode • Supporting zonal aggregation link to sensors and actuators
2 x FS26 Safety SBC	• Provides power supply rails for all module functions • Supports safety concept, incl. voltage monitoring, reset
MC33978	• 22 channel multiple switch detection interface
2 x MC33XC2410	• Quad high side to control LED, Solenoid, Lamp, DC motor load • 5A capability by single channel or 10A in dual configuration

Zonal Use Cases Covered

- CAN2CAN (8XCAN) performance. This use case will show CAN messages routing to different CAN instances
- CAN/CAN-FD to CAN/CAN-FD Gateway
- CAN/CAN-FD to LIN Gateway
- CAN/CAN-FD/LIN to Ethernet (TCP/UDP) Gateway
- Ethernet (TCP/UDP) to CAN/CAN-FD/LIN Gateway
- Authentication of messages. These messages may come from CAN-FD/Ethernet
- Diagnostic messages can be routing between Ethernet (DoIP) (CAN TP) (LIN TP)

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