Get to market faster with NXP T-Box solutions

S32K148-T-BOX
Telematics Box Reference Design Board Based on the S32K148 MCU

MAIN FEATURES

▸ Supports the S32K148 MCU with LQFP-144 or LQFP-176 pin package (default mounted with LQFP-144 package)

   – S32K is a scalable family of AEC-Q100 qualified, 32-bit Arm® Cortex®-M4F and Cortex-M0+ based MCUs targeted for general purpose automotive and high-reliability industrial applications

   – Scalability – hardware and software compatible families with multiple performance, memory and feature options

   – Integration – ISO CAN FD, CSEc hardware security, ASIL B ISO 26262 functional safety, ultra-low power performance

   – Complimentary, production-grade Software Development Kit (SDK) and S32 Design Studio IDE

   – AUTOSAR and MCAL support, third-party ecosystem support

▸ Integrated SBC UJA1132 with 2 LIN physical layers and 1 CAN physical layer

▸ Integrated communication interfaces

   – 3x CAN with CAN-FD

   – 3x UART(2 reused as LIN via SBC-UJA113x)

   – 1x 100M-base TX1 automotive ethernet via TJA1101

   – 1x I²S audio codec extend with SGTL500 and support AVB evaluation

▸ Integrated 8 MB QSPI NOR Flash memory (MX25L6433F)

▸ Provides T-BOX function module plugin interfaces:

   – 1 UART BLE module

   – 1 UART GPS module

   – 1 UART 4G communication module

▸ 2x user buttons inputs

▸ 2x touch sensor inputs

▸ 1x RGB LED

▸ 1x Potentiometer

▸ 1x 3-axi accelerometer (MMA8452Q) via I²C

▸ 1x stand-alone RTC chip (PCA85063)

▸ A 23-pin ECU connector, routing external I/O signals including:

   – 2x ADC input channels

   – 2x HS PWM output channels

   – 2x PWM input capture channels

   – 3x CAN bus

   – 2x LIN bus

   – 1x 100M-base TX1 automotive Ethernet

- Compatible with S32K148EVB:
  - Arduino™ UNO footprint-compatible with expansion "shield" support
  - Able to run all demo projects of SDK for S32K148 without any modification
- Voltage supply options for 3.3 V or 5 V
- BLE, GPS and 3G/4G select independent module and connects with S32K148 via UART
- Add an external QSPI Nor-Flash, standalone RTC and 3-aix Accelerator for T-Box functions
- Extend a 100M-base TX1 automotive ethernet via TJA1101 for both T-Box connection and AVB evaluation (plus a I²S audio Codec)
- SBC provides 5/3.3 V power supply for S32K148 and other onboard modules as well as expends 1 CAN and 2 LIN bus

- Select TJA1044 with SO-8 and TJA1043 with HVSON14 package to make it compatible with NXP TJA115x secure CAN transceiver
- Use a 23-pin ECU connector to route all CAN/LIN/ENET bus and extend 2x HS output, 2x PWM input capture and 2x analog input, enable it to work as a GP-ECU

S32K148-T-BOX REFERENCE DESIGN BOARD SOFTWARE PACKAGE

- The S32K148-T-BOX reference design board software package is based on the S32K SDK and is developed to accelerate customer's application prototype verification code development
- With the BSP layer, the software package provides a set of easy-to-use API for application layer use

- The software package includes:
  - S32K148-T-BOX SDK processor expert configuration
  - The GPS/BLE/4G communication/audio Codec modules driver API and test codes
  - CAN/LIN/UART/I²C communication driver API and test codes
  - FreeRTOS and LwIP based ENET TCP/IP stack and demo project
  - The BSP test project
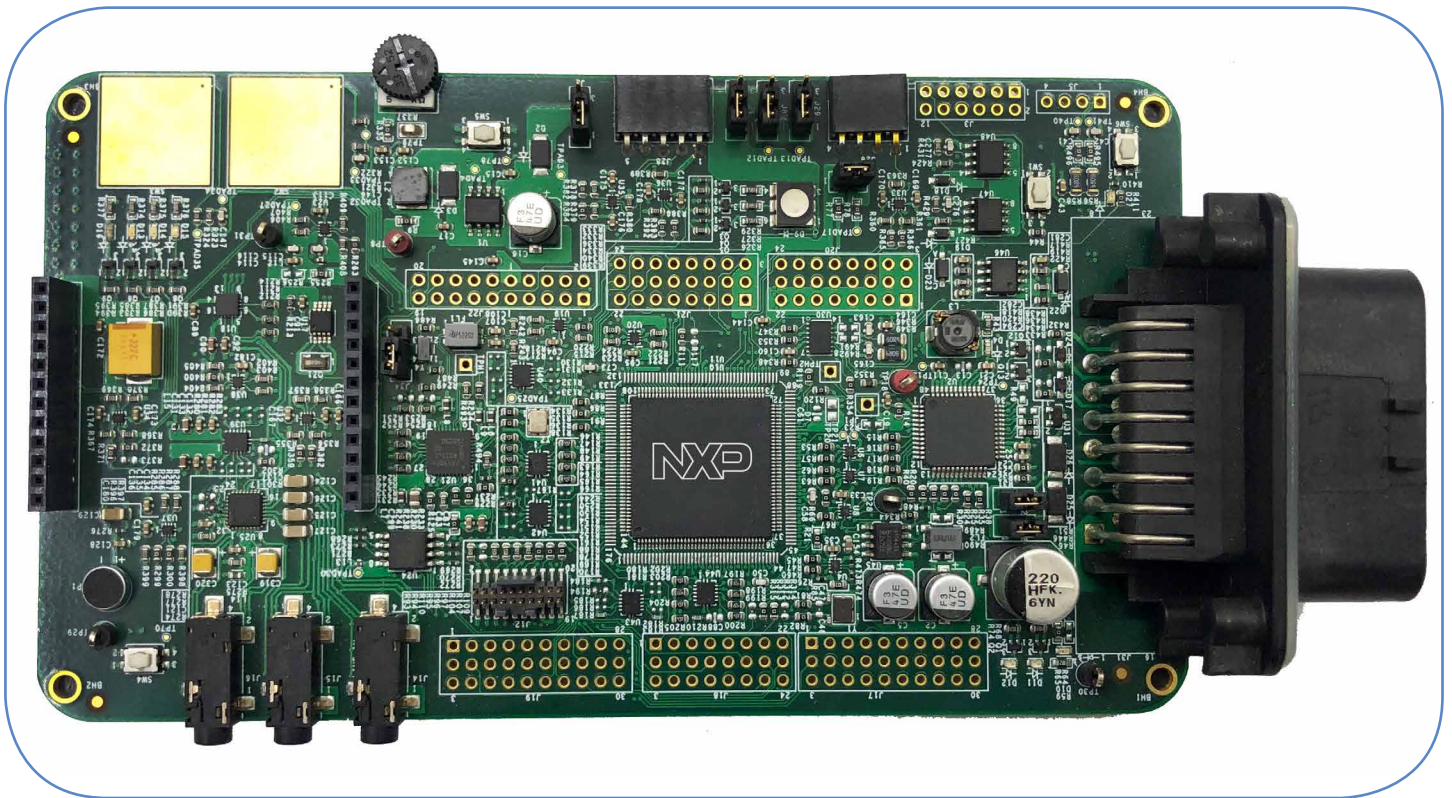 - The T-BOX reference design demo project
  - Detailed user manual

Figure 1. S32K148 T-BOX_GP-ECU RDB

S32K148-T-BOX REFERENCE DESIGN BLOCK DIAGRAM
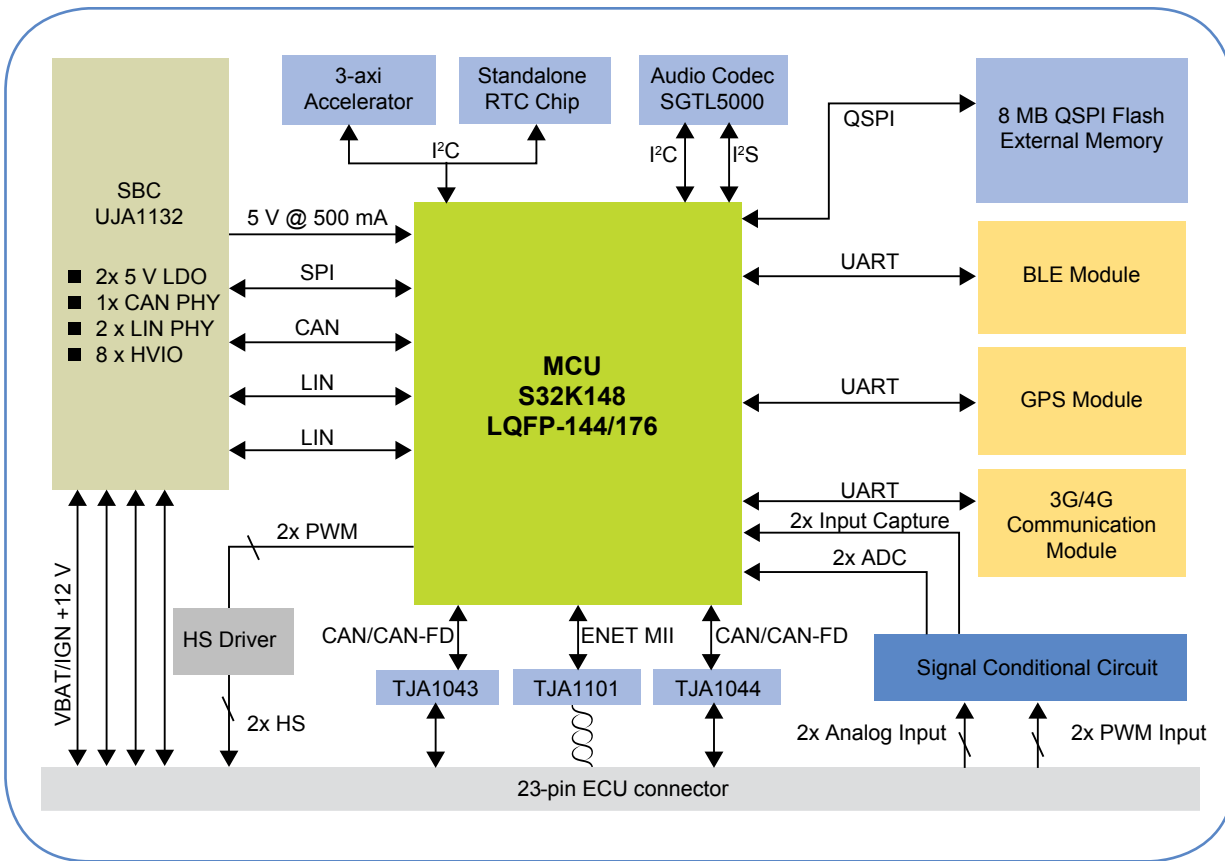

Figure 2. S32K148 T-BOX_GP-ECU RDB System Block Diagram
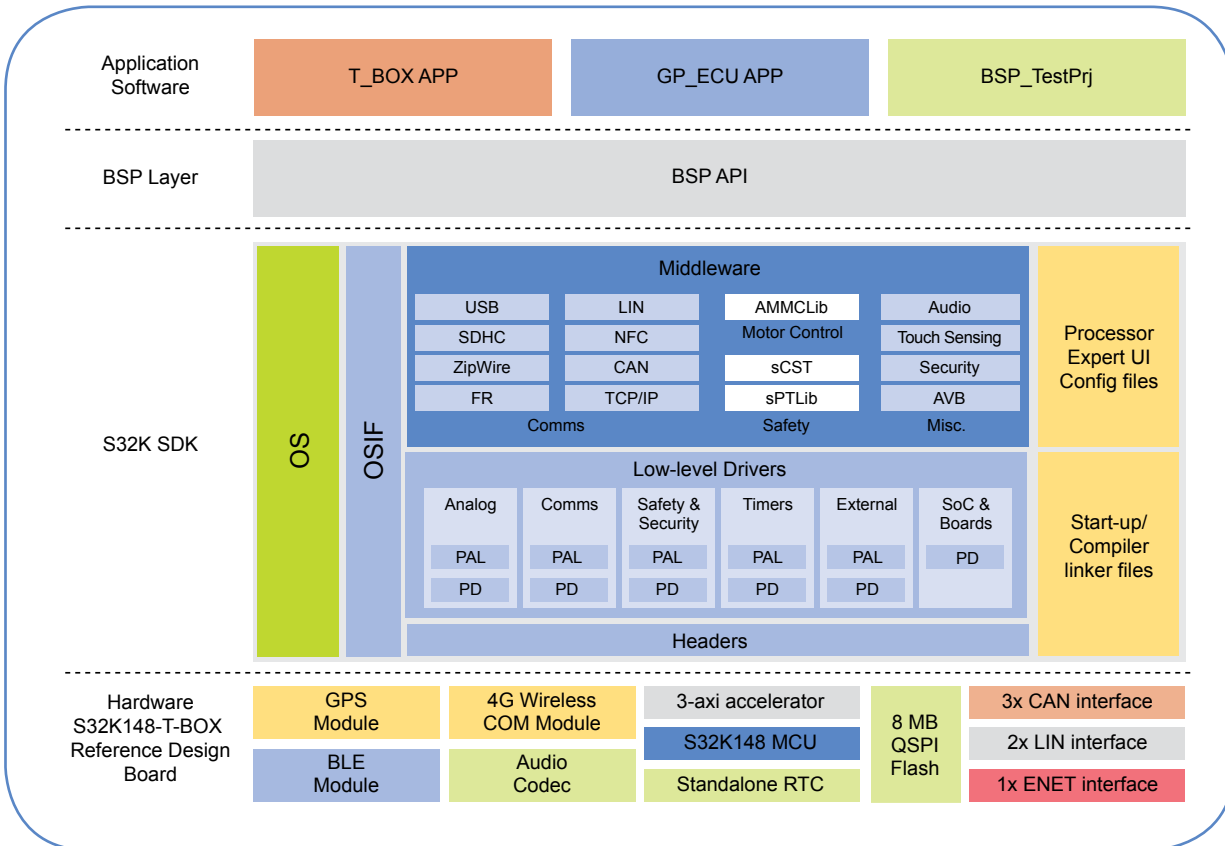
SOFTWARE ARCHITECTURE BLOCK DIAGRAM

Figure 3. S32K148 T-BOX_GP-ECU Reference Design Board Software Architecture

MAIN DOCUMENTATION

Main MCU: S32K148	
S32K1xx MCU Family Data Sheet (REV 9)	nxp.com/S32K
S32K1xx MCU Family Reference Manual (REV 9)	nxp.com/S32K
SBC: UJA1132	
UJA113x_SER, Buck/boost HS-CAN/dual LIN system basis chip (REV 2.2)	nxp.com/UJA113X
100M-base TX1 automotive Ethernet Transceiver: TJA1101	
TJA1101 Full Data Sheet (REV 1.0)	(NDA Required)
CAN Transceiver: TJA1043 and TJA1044	
TJA1043, High-speed CAN transceiver (REV 6.1)	nxp.com/TJA1043
TJA1044, High-speed CAN transceiver with Standby mode - Data sheet (REV 6)	nxp.com/TJA1044
Audio Codec: SGTL5000	
SGTL5000, Low Power Stereo Codec with Headphone Amp - Data Sheet (REV 6.0)	nxp.com/SGTL5000
3-axi Accelerator: MMA8452Q	
MMA8452Q, 3-Axis, 12-bit/8-bit Digital Accelerometer - Data Sheet (REV 10)	nxp.com/MMA8452Q
Standalone RTC Chip: PCA85063	
Automotive tiny Real-Time Clock/calendar with alarm function and I^{2}C-bus (REV 4.0)	nxp.com/PCA85063

www.nxp.com/S32K148-T-BOX