GREENBOX 3 DEVELOPMENT PLATFORM FOR S32Z AND S32E REAL-TIME PROCESSORS

Supports integration of diverse, real-time applications for new vehicle architectures and software defined vehicles

The NXP GreenBox 3 is a versatile development platform for the S32Z and S32E real-time processors which integrates high-performance processing, peripherals, networking and connectivity interfaces in a rugged enclosure. The GreenBox 3 is ideal for development and demonstrations of integrated and isolated real-time applications, for domain and zonal control, safety processing and vehicle electrification.

TECHNICAL FEATURES

- NXP S32E288 real-time processor

- NXP S32K148 microcontroller

- Memory support:

  – 32 MB embedded flash memory

  – 2 GB LPDDR4 DRAM

  – 32 GB eMMC 5.1 flash memory

  – 1 kb (128 B) serial EEPROM

  – MicroSD slot

- SJA1110A 10-port automotive TSN Ethernet switch

- NXP transceivers: TJA1448 dual high-speed CAN, TJA1081 FlexRay, TJA1124 LIN

- Dedicated dual motor control and battery management circuitry and connectors

  – MC33664 isolated network high-speed transceiver for BMS

- Ethernet Interfaces: 10BASE-T1S, 6x Gigabit Ethernet, 6x 100BASE-T1 Ethernet

- Communications Interfaces: CAN FD, CAN XL, FlexRay, LIN, SENT

- Other Interfaces: DSPI, I3C, DSPI, PSI5, SPI, UART, Zipwire

- JTAG and OpenSDA debug and Aurora trace interfaces

- ISO 26262 ASIL D functional safety

- +12 VDC input with fully regulated switching power supply

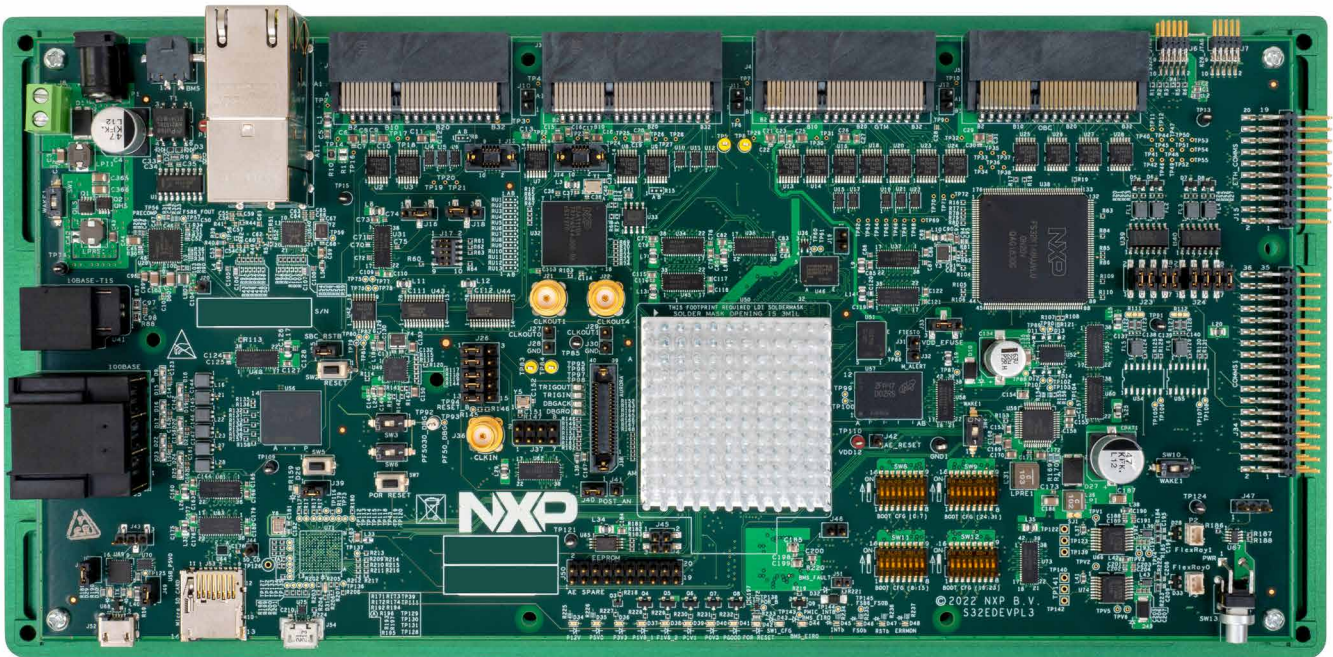 – Power management (FS26/FS86/PF5030)

ENABLEMENT TOOLS

- NXP GreenVIP Vehicle Integration Platform
- NXP S32 Design Studio Integrated Development Environment (IDE)
  - GCC compiler, trace and debugger components
- S32 Configuration Tools Suite
  - Pins, clocks, peripherals, IVT, DCD, QSPI parameters and DDR tools
- Real-Time Drivers (RTD) including AUTOSAR MCAL support
- FreeRTOS™ real-time operating system
- Zephyr real-time operating system
- FreeMASTER real-time debug monitor and data virtualization tool including FreeMASTER Lite
- Hypervisor support
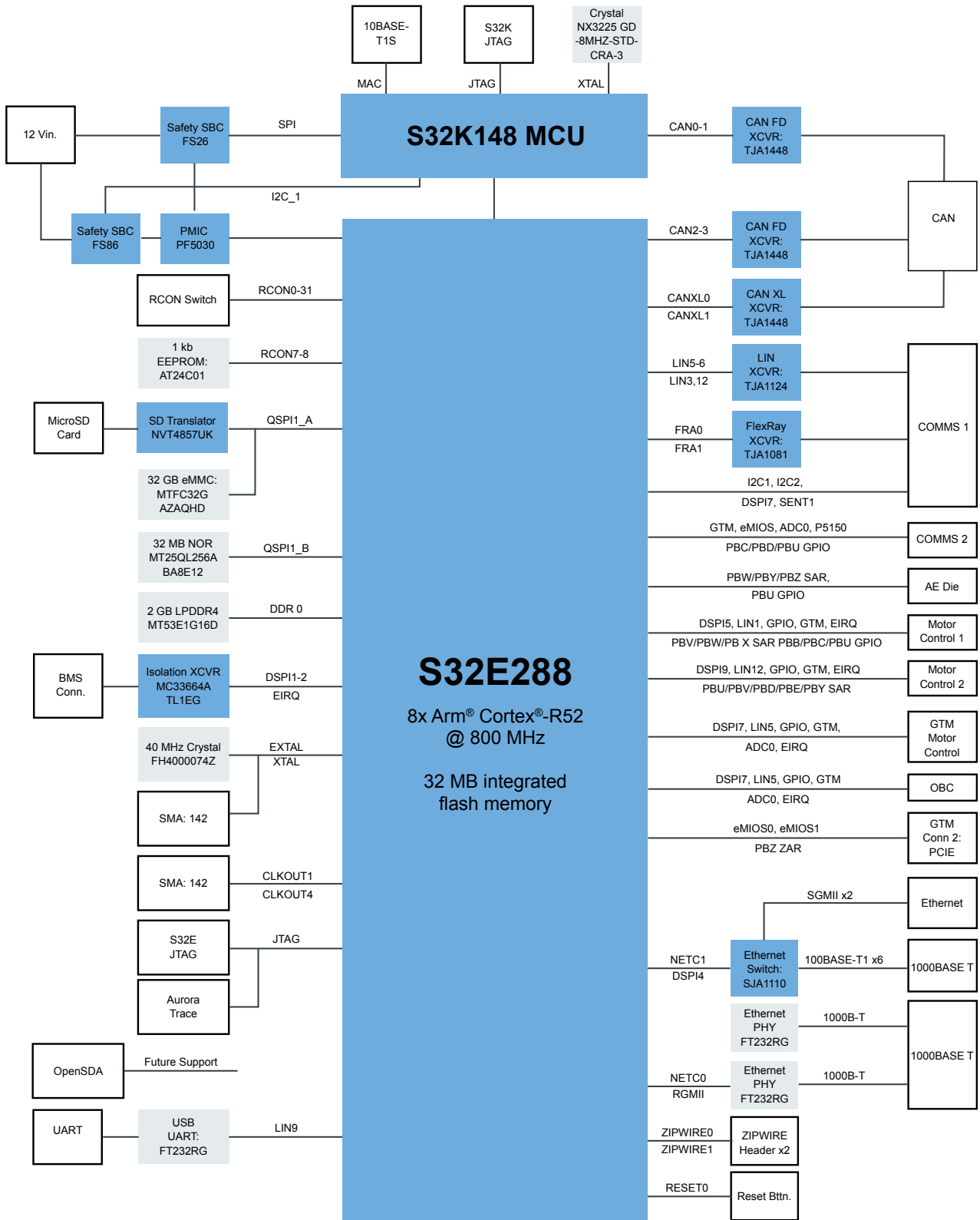- NXP AI/ML Enablement (NXP eIQ® Auto)

S32E288 PROCESSOR SPECIFICATIONS

Processor Cores	8x Arm® Cortex®-R52 split-lock cores (4x lockstep) operating at up to 1 GHz
	Arm Cortex-M33 lockstep pair for System Manager @ 400 MHz
	FP vector DSP/ML processor (25 GFLOPS)
On-chip Memory	19 MB total SRAM
Ext. Memory I/Fs	LPDDR4 (DRAM/flash), uSDHC (SD/eMMC), QuadSPI (NOR flash/HyperRAM)
CAN	CAN offload engine (FlexLLCE), CAN FD, CAN XL
Other Interfaces	DSPI, I3C, MSC, PSI5, SENT, SPI, UART, Zipwire
Ethernet	Integrated Ethernet Switch (NETC3)
Security	Hardware Security Engine (HSE)
A/D Converters	3.3/5 V 12-bit SAR ADC (68 channels), 1.8 V 12-bit SAR ADC (8 channels)
Timers	CTU, eMIOS, GTM 4.1, PITs, STMs, SWTs

GREENBOX 3 INSIDE PCB

GREENBOX 3 BLOCK DIAGRAM

10BASE-T1S — MAC

S32K JTAG — JTAG

Crystal NX3225 GD -8MHZ-STD-CRA-3 — XTAL

S32K148 MCU

12 Vin.

Safety SBC FS26 — SPI

Safety SBC FS86

PMIC PF5030 — I2C_1

RCON Switch — RCON0-31

1 kb EEPROM: AT24C01 — RCON7-8

MicroSD Card

SD Translator NVT4857UK — QSPI1_A

32 GB eMMC: MTFC32G AZAQHD

32 MB NOR MT25QL256A BA8E12 — QSPI1_B

2 GB LPDDR4 MT53E1G16D — DDR 0

BMS Conn.

Isolation XCVR MC33664A TL1EG — DSPI1-2 / EIRQ

40 MHz Crystal FH4000074Z — EXTAL / XTAL

SMA: 142

SMA: 142 — CLKOUT1 / CLKOUT4

S32E JTAG — JTAG

Aurora Trace

OpenSDA — Future Support

UART

USB UART: FT232RG — LIN9

S32E288

8x Arm® Cortex®-R52 @ 800 MHz

32 MB integrated flash memory

CAN0-1 — CAN FD XCVR: TJA1448

CAN2-3 — CAN FD XCVR: TJA1448 — CAN

CANXL0 CANXL1 — CAN XL XCVR: TJA1448

LIN5-6 LIN3,12 — LIN XCVR: TJA1124

FRA0 FRA1 — FlexRay XCVR: TJA1081 — COMMS 1

I2C1, I2C2, DSPI7, SENT1

GTM, eMIOS, ADC0, P5150 PBC/PBD/PBU GPIO — COMMS 2

PBW/PBY/PBZ SAR, PBU GPIO — AE Die

DSPI5, LIN1, GPIO, GTM, EIRQ PBV/PBW/PB X SAR PBB/PBC/PBU GPIO — Motor Control 1

DSPI9, LIN12, GPIO, GTM, EIRQ PBU/PBV/PBD/PBE/PBY SAR — Motor Control 2

DSPI7, LIN5, GPIO, GTM, ADC0, EIRQ — GTM Motor Control

DSPI7, LIN5, GPIO, GTM ADC0, EIRQ — OBC

eMIOS0, eMIOS1 PBZ ZAR — GTM Conn 2: PCIE

SGMII x2 — Ethernet

NETC1 DSPI4 — Ethernet Switch: SJA1110 — 100BASE-T1 x6 — 1000BASE T

Ethernet PHY FT232RG — 1000B-T — 1000BASE T

NETC0 RGMII — Ethernet PHY FT232RG — 1000B-T

ZIPWIRE0 ZIPWIRE1 — ZIPWIRE Header x2

RESET0 — Reset Bttn.

NXP Technology