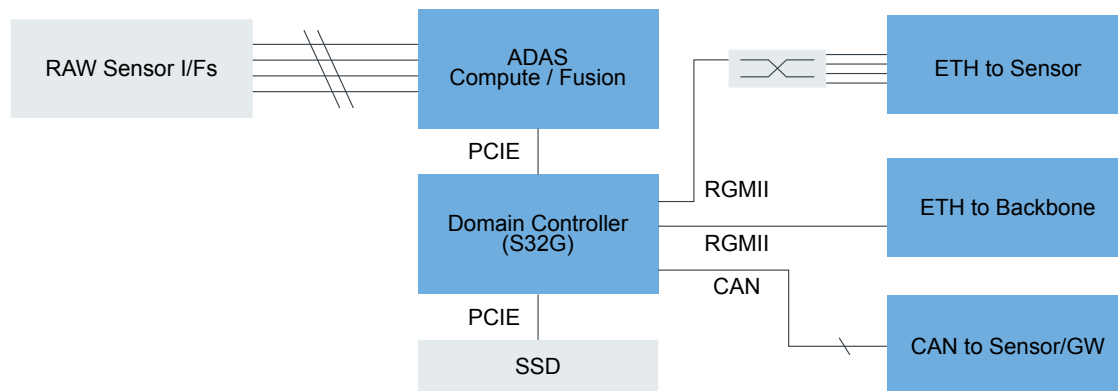# Domain Controller

Last Updated: Nov 16, 2023

Domain control is the centralization of control of similar functions and functionality. Domain architectures aid in the reduction of vehicle engine control units (ECUs) and in the simplification of software development and distribution, as system complexity within the vehicle grows. The NXP S32 automotive platform captures the opportunity to move towards the transformation of vehicle electronic architectures (VEA) and the transition to the software-defined vehicle (SDV).

OEMs are approaching the transformation of the VEA by following two different vectors. The logical path is about coordination and consolidation of functional domains, including body domain, powertrain domain and ADAS domain. This is where domain controllers are required and where NXP provides optimized products and insights.

The other vector is the physical path, which looks to reduce the complexity of the wiring harness and thereby reduces vehicle weight and reduces costs. Zone controllers, which control physical zones of the vehicle, improve the efficiency of energy consumption as well.

Both of these vectors can relate to each other, and OEMs are following architecture strategies that combine each of these vectors in varying ways. NXP provides optimized hardware and software to meet the needs of both vectors.
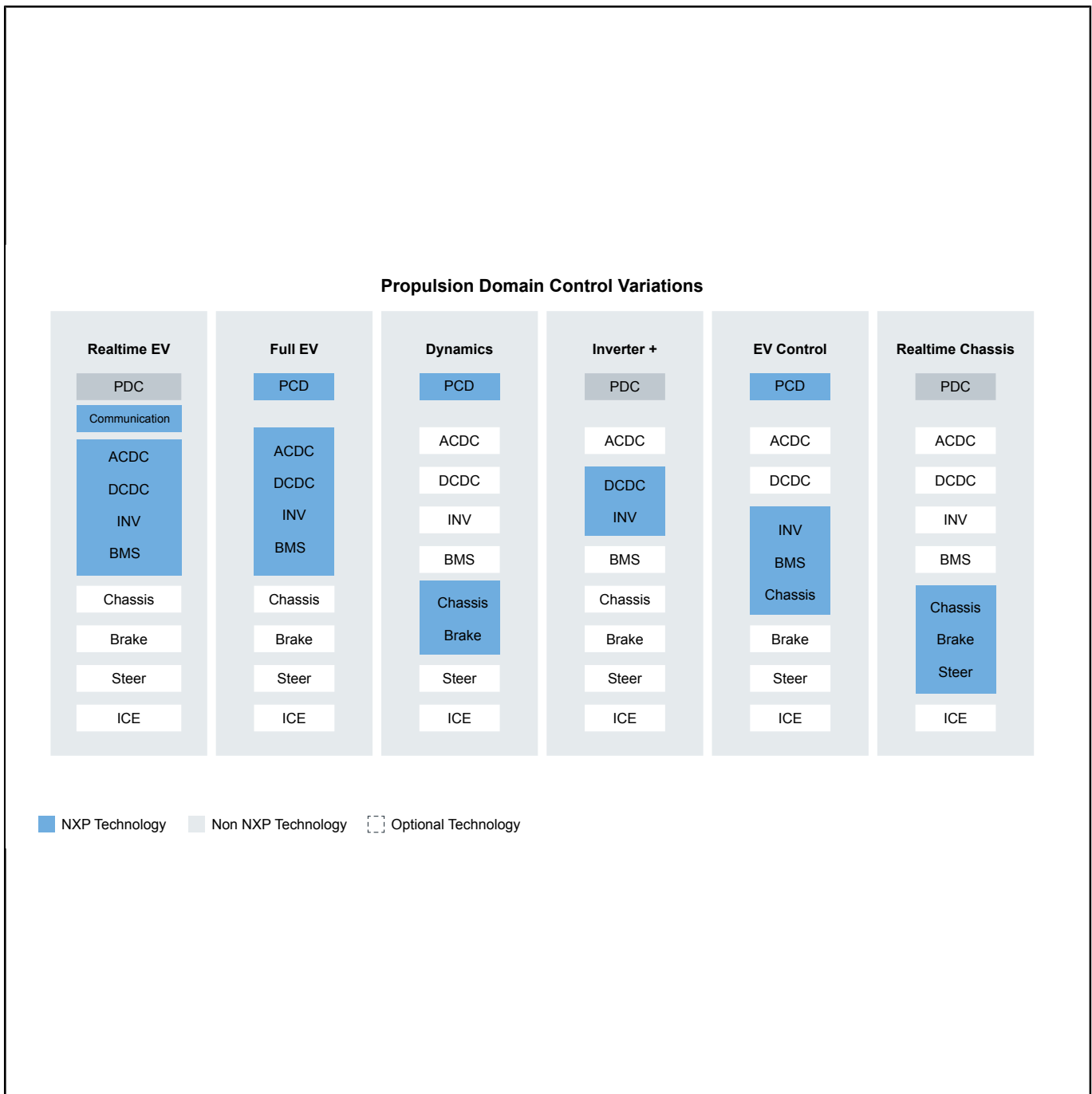
ADAS Example Block Diagram

Diagram:

- RAW Sensor I/Fs → ADAS Compute / Fusion
- ADAS Compute / Fusion — PCIE — Domain Controller (S32G)
- ADAS Compute / Fusion → ETH to Sensor
- Domain Controller (S32G) — RGMII — ETH to Backbone
- Domain Controller (S32G) — RGMII
- Domain Controller (S32G) — CAN — CAN to Sensor/GW
- Domain Controller (S32G) — PCIE — SSD

Legend: ■ NXP Technology　□ Non NXP Technology　⬚ Optional Technology

Recommended Products for ADAS Example	
ADAS Compute / Fusion	• LX2162A: Layerscape® LX2162A, LX2122A, LX2082A Processors • FS5600: Automotive Dual Buck Regulator and Controller with Voltage Monitors and Watchdog Timer • FS86: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D • LX2160A: Layerscape® LX2160A, LX2120A, LX2080A Processors
Domain Controller	• S32G2: S32G2 Processors for Vehicle Networking • S32G3: S32G3 Processors for Vehicle Networking • PF53: 12 A / 8 A / 15 A Core Supply Regulator with AVP and Watchdog • VR5510: Multi-Channel (9) PMIC for S32G Processor – 8 High Power, 1 Low Power, Fit for ASIL D Safety Level
Ethernet	• TJA1103: TJA1103, ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • TJA1104: TJA1104, MACsec Enabled ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • TJA1120: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver

Ethernet	• TJA1103: TJA1103, ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • TJA1104: TJA1104, MACsec Enabled ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • TJA1120: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver
CAN	• TJA1463: CAN Signal Improvement Capability Transceiver with Sleep Mode • TJA1462: CAN Signal Improvement Capability Transceiver with Standby Mode

Propulsion Block Diagram

Propulsion Domain Control Variations

Realtime EV	Full EV	Dynamics	Inverter +	EV Control	Realtime Chassis
PDC	PCD	PCD	PDC	PCD	PDC
Communication		ACDC	ACDC	ACDC	ACDC
ACDC	ACDC	DCDC	DCDC	DCDC	DCDC
DCDC	DCDC	INV	INV	INV	INV
INV	INV	BMS	BMS	BMS	BMS
BMS	BMS	Chassis	Chassis	Chassis	Chassis
Chassis	Chassis	Brake	Brake	Brake	Brake
Brake	Brake	Steer	Steer	Steer	Steer
Steer	Steer	ICE	ICE	ICE	ICE
ICE	ICE				

Legend: ■ NXP Technology   □ Non NXP Technology   ⬚ Optional Technology

Recommended Products for Propulsion

Realtime EV	• S32Z2: S32Z2 Safe and Secure High-Performance Real-Time Processors

	• **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **FS86**: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D • **PF5030**: Multi-Channel PMIC for Automotive Applications
Full EV	• **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors • **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **FS86**: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D • **PF5030**: Multi-Channel PMIC for Automotive Applications
Full EV	• **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors • **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support
Dynamics	• **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors • **FS86**: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D • **PF5030**: Multi-Channel PMIC for Automotive Applications
Dynamics	• **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors
Inverter +	• **S32K39-37**: S32K39/37/36 Microcontrollers for Electrification Applications • **FS26**: Safety System Basis Chip with Low Power, for ASIL D Systems
EV Control	• **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors • **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **PF5030**: Multi-Channel PMIC for Automotive Applications • **FS86**: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D
EV Control	• **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors
Realtime Chassis	• **S32E2**: S32E2 Safe and Secure High-Performance Real-Time Processors with Actuation Support • **S32Z2**: S32Z2 Safe and Secure High-Performance Real-Time Processors • **PF5030**: Multi-Channel PMIC for Automotive Applications • **FS86**: Safety System Basis Chip For Domain Controller, Fit For ASIL B and D
Communication	• **TJA1463**: CAN Signal Improvement Capability Transceiver with Sleep Mode • **TJA1462**: CAN Signal Improvement Capability Transceiver with Standby Mode • **TJA1103**: TJA1103, ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • **TJA1104**: TJA1104, MACsec Enabled ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver • **TJA1120**: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver

View our complete solution for Domain Controller.

Note: The information on this document is subject to change without notice.