Application Brief

Optimizing ADAS Domain Controllers Using Logic and Translation

Albert Xu

Interface Logic

Functional Block Diagram

For the purpose of this application brief, a simplified ADAS domain controller block diagram shows the logic and translation use cases. See Simplified Block Diagram for ADAS Domain Controller as an example. Each red block has an associated use-case document. Table 1 and Table 2 list links for more information. To see a complete block diagram, see the interactive online end equipment reference diagram for ADAS Domain Controller.

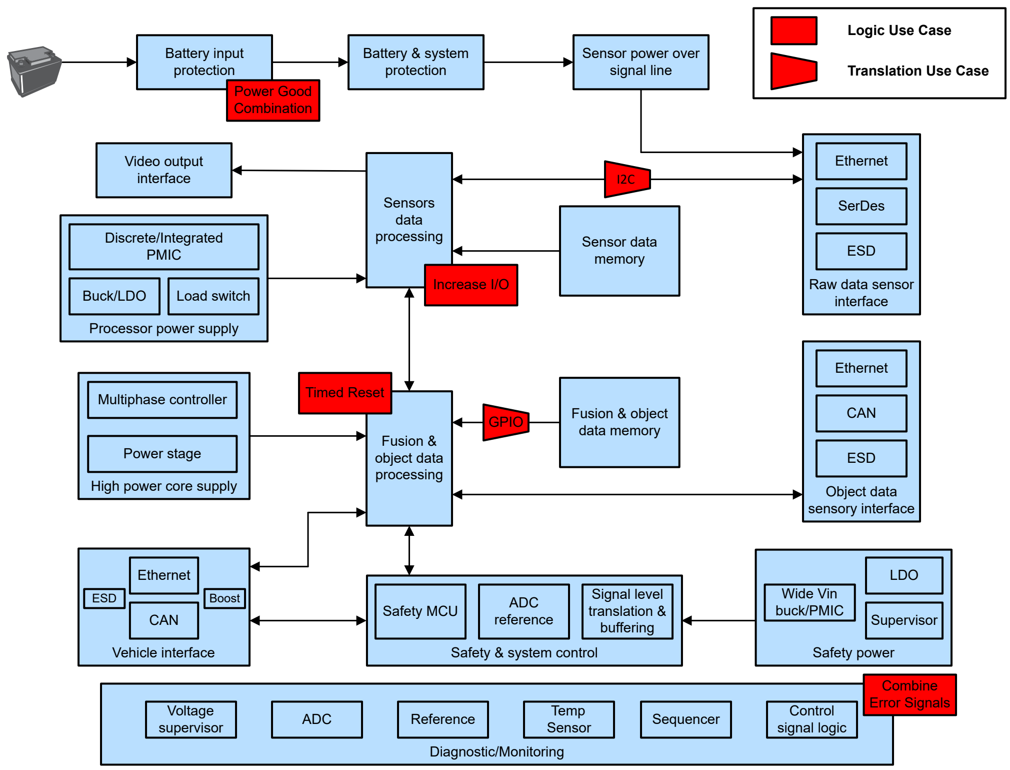


Figure 1. Simplified Block Diagram for ADAS Domain Controller

Logic and Translation Use Cases

Each use case is linked to a separate short document that provides additional details including a block diagram, design tips, and part recommendations. The nearest block and use-case identifiers are listed to match up exactly to the use cases shown in Figure 1.

Table 1. Logic Use Cases

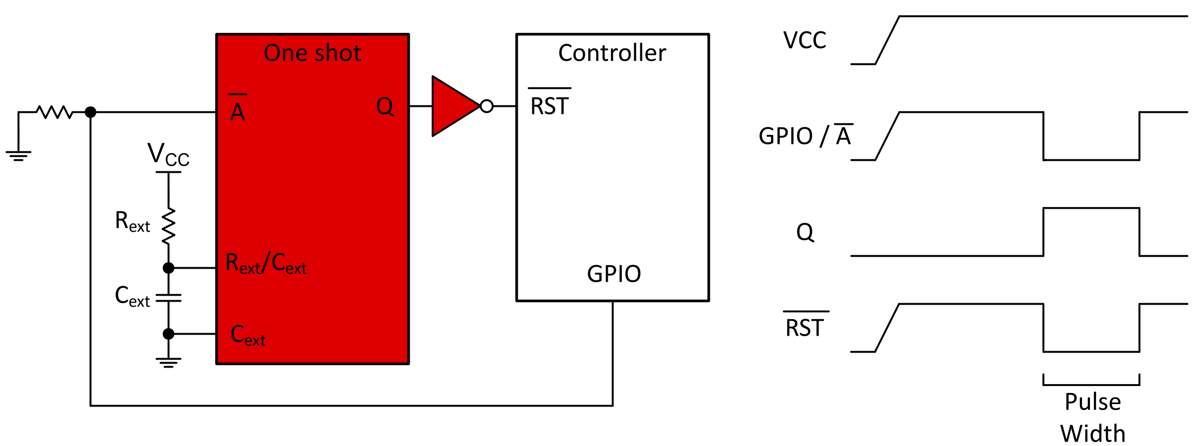
Nearest Block	Use-Case Identifier	Use Case
Battery Input Protection	Power Good Combination	*Combine Power Good Signals*
Sensors Data Processing	Increase I/O	*Increase Inputs on a uC*
Fusion and Object Data Processing	Timed Reset	*Reset a System for a Short Time*
Diagnostics and Monitoring	Combine Error Signals	*Combine Error Signals*

Table 2. Translation Use Cases

Nearest Block	Use-Case Identifier	Use Case
Raw Data Sensor Interface	I2C Translation	*Translate Voltages for I2C*
Fusion and Object Data Memory	GPIO Translation	*Translate Voltages for GPIO Pins*

Reset a System for a Short Time

System controllers can use GPIO pins to reset other components if a fault is detected; however, system controllers generally cannot reset themselves or their entire system. By using a monostable multivibrator, the system controller can reset the entire system.



- Either falling-edge or rising-edge trigger configurations can be used for this application. See the data sheet of the selected multivibrator for details.
- A pullup or pulldown resistor is required to return the input signal to a valid state once the system controller turns off. The recommended value for this resistor is 10 kΩ.
- Retriggerable or non-retriggerable monostable multivibrators can be used for this operation.
- *[FAQ] [H] Monostable Multivibrators - Top Questions Answered*
- *[FAQ] How does a slow or floating input affect a CMOS device?*
- *[FAQ] Where do I find maximum power dissipation for a device?*
- Ask a question on our *E2E™ forum.*

Table 3. Recommended Parts

Part Number	Automotive Qualified	V_{CC} Range	Type	Features
SN74LVC1G125-Q1	✓	1.65 V – 5.5 V	Single buffer with 3-state outputs	Standard CMOS inputs Inverting OE signal; see '1G126 for non-inverting OE signal.
SN74LVC1G07-Q1	✓	1.65 V – 5.5 V	Single buffer with open-drain outputs	Schmitt-trigger inputs Inputs are over-voltage tolerant; signals can exceed V_{CC}.
SN74LVC1G08-Q1	✓	1.65 V – 5.5 V	Single 2-input AND gate	Schmitt-trigger inputs Supports partial-power-down with Ioff circuitry, disabling outputs.

For more devices with Schmitt trigger input architecture, see the *online parametric tool* which can be sorted by the desired voltage, output current, and other features.

IMPORTANT NOTICE AND DISCLAIMER