

# 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](#).

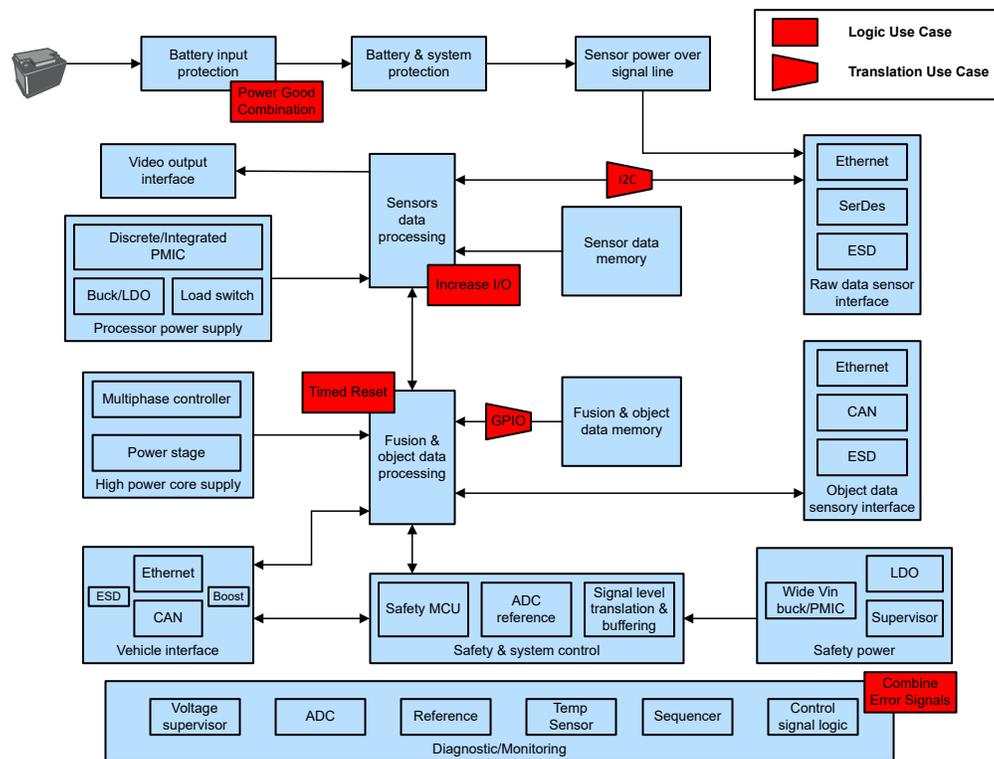


Figure 1. Simplified Block Diagram for ADAS Domain Controller

## 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**

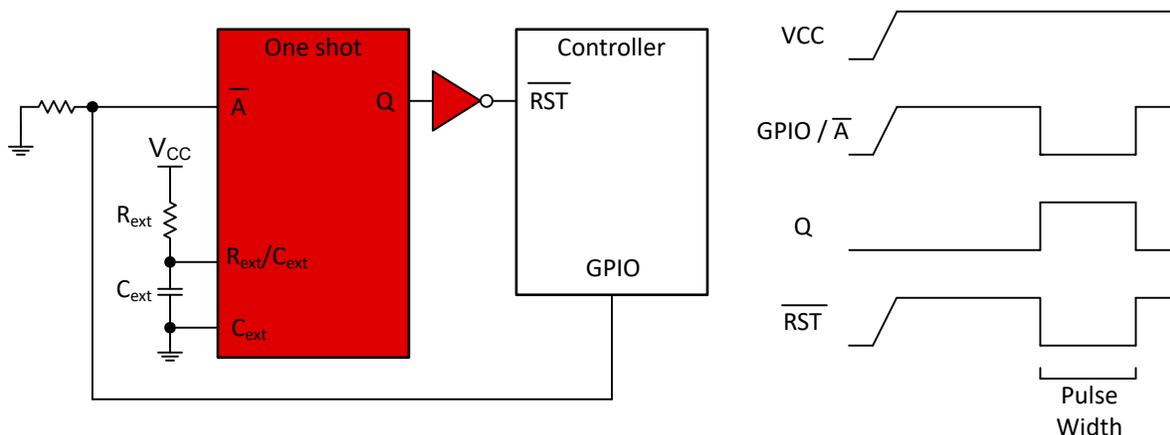
Nearest Block	Use-Case Identifier	Use Case
Battery Input Protection	Power Good Combination	<a href="#">Combine Power Good Signals</a>
Sensors Data Processing	Increase I/O	<a href="#">Increase Inputs on a uC</a>
Fusion and Object Data Processing	Timed Reset	<a href="#">Reset a System for a Short Time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

**Table 2. Translation Use Cases**

Nearest Block	Use-Case Identifier	Use Case
Raw Data Sensor Interface	I2C Translation	<a href="#">Translate Voltages for I2C</a>
Fusion and Object Data Memory	GPIO Translation	<a href="#">Translate Voltages for GPIO Pins</a>

### 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 k $\Omega$ .
- 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 <sub>CC</sub> Range	Type	Features
<a href="#">SN74LVC1G125-Q1</a>	✓	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.
<a href="#">SN74LVC1G07-Q1</a>	✓	1.65 V – 5.5 V	Single buffer with open-drain outputs	Schmitt-trigger inputs Inputs are over-voltage tolerant; signals can exceed V <sub>CC</sub> .
<a href="#">SN74LVC1G08-Q1</a>	✓	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.

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