

## Industrial Automation Case Study

### Case Study

**How an Industrial Automation specialist used an ASIC to achieve their challenging power consumption requirements**



### Overview

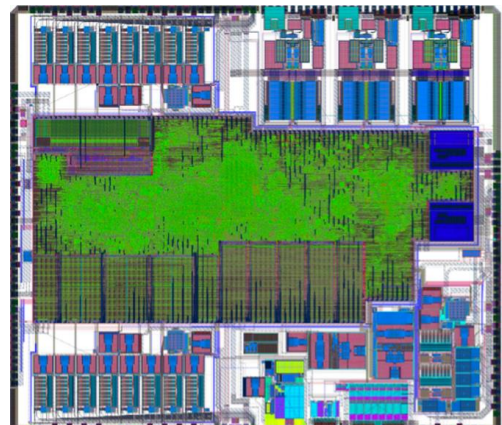
Our customer is a leading Industrial Automation company headquartered in Germany and operating internationally, whose products include pneumatic and electric automation products from actuators to servo motors, to sensors and valves. Precision performance coupled with low power and small size are key requirements of this customer as they source electronic components for the development of their systems.

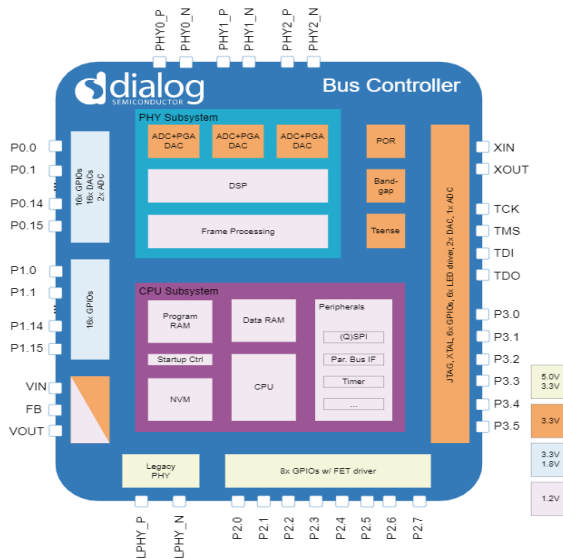
For their latest product, they were developing a flexible, decentralised, compact and light weight automation system. The new system was smaller in size and because there was no local cooling, the need for low power was paramount. Having previously worked with Dialog Semiconductor in the development of an ASIC for their previous modular electrical terminal, they understood the advantages a custom solution offers.

Renesas, formerly Dialog, has a long history of developing ASICs for the Industrial Automation market. With this customer, they had full exposure to the custom chip process through their previous development and knew that for their latest product, they needed many more features and thus the only viable solution to achieve all this was an ASIC.

### Requirements

The design specification targets for the new valve system were more aggressive than previous products. The requirement to reduce the size of the system from previous generations meant there was not enough space to include localised cooling. As a result, there was a challenging requirement on the power consumption for the system. The electronic components needed to be small to meet the overall smaller form factor of the product. Coupled with these requirements, was the need for a supplier that was experienced in PHY design as this was a key necessity for the decentralized system.





## Solution

The ASIC developed was performing the communication via back bus functionality in a centralized multiple valve system. Initially, the customer was considering a different solution when the discovery process began with the Dialog engineering team. It was soon discovered however that this solution would not work in the way that they envisioned. The Dialog engineering team completed the development of a new PHY and DSP architecture that met the communication and power consumption requirements. The final chip included the following additional features:

- 3 x 250MBits/ PHY, full duplex 4 wire interface
- Active noise cancellation
- 16-bit  $\mu$ C core embedded 64kB e-FLASH & SRAM
- 16-channel 10-bit ADC and DAC I/O
- Integrated LDO and DC/DC buck converter

## Results

With the ASIC, our customer was able to achieve the following results:

- 75% decrease in power consumption versus previous solutions (<400mW)
- 2.5X faster speed vs fast ethernet solution
- Single digit nano second synchronisation time stamps
- Flexible Input/output configuration for digital interfaces or analog sensors
- Significant reduction in BOM size which enabled use of the ASIC in multiple sized modules

For more information on how an ASIC can benefit your next Industrial design, visit our [website](#) or contact us at [info-asic@diasemi.com](mailto:info-asic@diasemi.com)