Promira Serial Platform / Treetown Tech

Company:
Treetown Tech

CHALLENGE

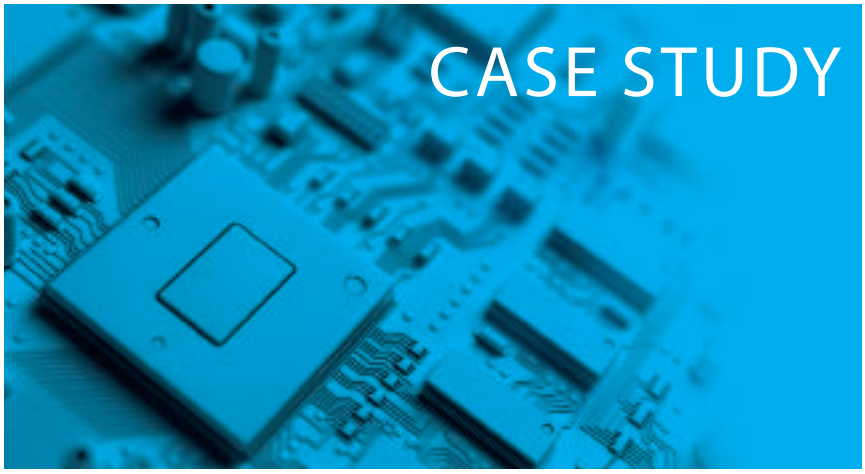
Treetown Tech created a custom manufacturing system for a client in the semiconductor industry that included a PCA to interface with their client's parts. They needed a solution to establish a communication bridge between a PC and the PCA, capable of managing data exchange across 8 individual SPI devices while handling large volumes of data at high speeds. Because the system was inherently built to communicate over Ethernet, this solution also needed to support Ethernet connectivity.

SOLUTION

By using the Promira Serial Platform with the Promira Software API, Treetown Tech was able to integrate the Promira platform within their custom system, successfully facilitating SPI/PGIO communication between the PC and PCA over Ethernet with the desired speed and data throughput necessary for this project.

BENEFIT

The Promira Serial Platform's increased SPI speeds, GPIO pins, 8 chip select lines, and Ethernet connectivity allowed Treetown Tech to leverage an off-the-self solution that perfectly met their SPI communication needs. By avoiding the need for a custom solution, they greatly streamlined their operations and saved on costs.



TREETOWN TECH

Treetown Tech is a multidisciplinary product development consulting firm that utilizes innovative problem-solving strategies to provide practical but creative solutions to a wide variety of clients, from small start-ups to large publicly-traded companies. With approximately 40 engineers, their diverse team has expertise in mechanical, software, and electrical engineering, industrial design, and battery systems. Because of this, they are not focused on any one specific industry, but cater to a wide range of sectors. Treetown Tech brings cross-functional insight to projects surrounding semiconductors, work trucks, food and beverage, factory automation, medical devices, fuel cells, utilities, and more. They work closely and collaboratively with their clients to find robust solutions for wherever they're at in a project's journey; whether it be developing initial concepts, design reviews, early and late-stage prototyping, or small-scale production.

Background/Challenge

One of their clients in the semiconductor industry approached their team to help enhance an existing process that was falling short of evolving requirements. To support the development of this client's next-generation products, the system needed to deliver higher speeds and offer expanded capabilities beyond what was currently implemented.

With these requirements in mind, Treetown Tech collaborated with their client to develop a custom machine that interfaced seamlessly with client devices, becoming an integral part of their internal process flow for product manufacturing.

As an integral part of the system, they developed a custom PCA, but required an intermediate communication solution to help them bridge a connection between the PCA and a PC used to control and manage the SPI and GPIO communications. This solution needed to support significantly higher SPI speeds, Ethernet connectivity, and GPIO selection across 8 SPI channels from a single device.

Technical Approach

Feature Requirements for the Project

During their initial search for the right solution for the setup, their team reviewed various options on the market, including Total Phase's own Aardvark I2C/SPI Host Adapter, a tool they've used for many years across different projects. While this solution works well for their benchtop testing, they sought a more robust solution with higher speeds, higher data throughput, and more capabilities than what other devices supported.

Through research, they determined that the Promira Serial Platform was the only product on the market that was capable of meeting all of their project requirements. It provided the ability communicate with all 8 SPI devices over Ethernet at the required speeds while using GPIO functionality to select and manage each SPI device individually.

Based on these requirements, they acquired the Promira Serial Platform configured with SPI Active – Level 3 Application.

The Promira Serial Platform offers various applications for both I2C and SPI protocols that can be installed on the platform per the customer's requirements, with each I2C or SPI level providing master or slave configurations at varying speeds with other advanced features.

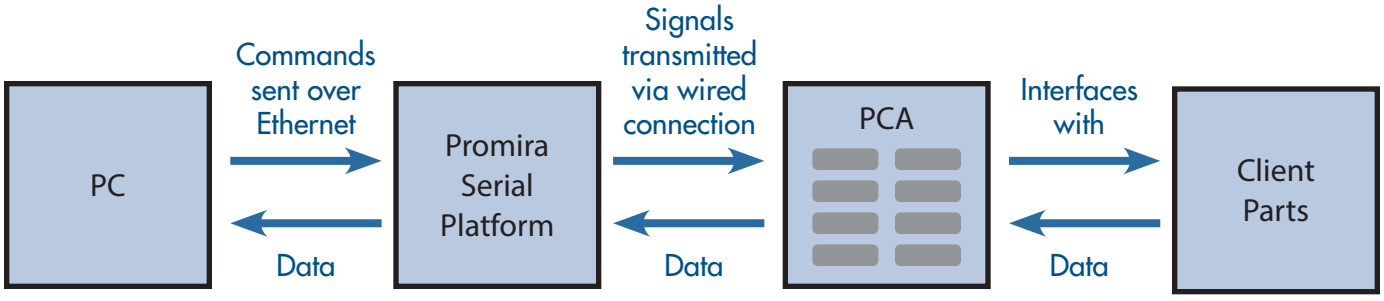
Specifically, SPI Active – Level 3 Application, the highest active SPI level, supports SPI master speeds up to 80 MHz and SPI slave speeds up to 20 MHz, and also offers up to 8 SPI slave select signals and up to 16 GPIO signals.

Custom Software Integration

To integrate the Promira Serial Platform as an intermediate communication device as part of a larger system, their team utilized the Promira Software API I2C/SPI Active to be able to interface with the Promira platform through a custom software application developed by Treetown Tech. This custom software would incorporate a GUI to control the full system and perform all of the data processing.

To aid in development, their team found referencing the Python examples provided with the Promira Software API integral for creating and troubleshooting their own API commands.

Using this software, their team could easily facilitate communication between the PC and the PCA by translating PC commands into signals that are transmitted over Ethernet to the 8 individual SPI devices. GPIO signals on the Promira platform allow them to switch between these SPI devices that they are communicating with individually.



Cost Savings

The Promira Serial Platform helped Treetown Tech save both time and money to build this machine for their client. Without this tool, their team would have needed to develop their own custom solution for intermediary communication. While their team had the capability to do so, they estimated that the Promira Serial Platform saved them between $50,000 and $75,000 they would have spent on engineering effort. As a result of this project, Treetown Tech has now used the Promira Serial Platform in several other endeavors.

Conclusion

Treetown Tech developed a fully-customized machine for their client in the semiconductor industry to improve an existing internal process flow for their product line up. With the Promira Serial Platform, Treetown Tech was able to bridge communication between a custom PCA and PC through 8 individual SPI devices to operate as part of a larger system. The Promira Software API provided examples that allowed them to easily integrate the platform within their custom software application. With increased SPI speeds, GPIO pins, 8 dedicated chip select lines, and Ethernet connectivity, the Promira Serial Platform was the only solution that could handle the high data throughput between SPI devices at the required speeds, meeting all of the project requirements.

"The Promira Serial Platform is an excellent tool. It has provided us with a single robust platform to address our needs for different communication protocols as we develop custom sensing and interface solutions for our end clients."

— James Coller, Director of Program Management

"The Promira Serial Platform is like a high-quality Swiss army knife for interfacing; while we don't use every capability every time, each one we use works very well for its intended purpose."

— Matthew Reed, Project Technical Lead

Product Brief

The Promira Serial Platform is a high-performance interface for I2C and SPI development and protocol analysis. As an active master/slave device, it supports I2C up to 3.4 MHz and SPI up to 80 MHz/20 MHz (master/slave), with integrated level shifting, advanced command queuing, Single/Dual/Quad SPI programming, up to 8 SPI slave-select lines, and 16 GPIO signals. For analysis, it supports I2C up to 5 MHz, SPI up to 40 MHz, and eSPI up to 66 MHz. The platform offers flexible connectivity through USB and Ethernet.



ABOUT TOTAL PHASE

Total Phase is a leading provider of embedded systems solutions for engineers all over the world. Our mission is to provide intelligent visibility into embedded systems by creating affordable, high quality, and powerful solutions for anyone working in the embedded systems industry.

©2025 Total Phase, Inc.