

CASE STUDY

PCAN-USB Pro FD in Agricultural Test Benches

Customer: Control Technologies
Solution: PCAN-USB Pro FD
Country: United Kingdom
Industry: Agricultural machinery



Test Bench Validation and Simulation: CAN FD Communication in Agricultural Planting Systems

Modern agricultural planting systems rely on distributed electronic control units and high-performance communication networks to ensure precise, reliable, and efficient operation. During development, validating these networks before field deployment is critical to reduce integration risks and commissioning time. Therefore, a large agricultural machinery manufacturer integrated the PCAN-USB Pro FD interface together with the PCAN-Explorer 6 software into its development and test environment. This solution was specified and implemented by the UK-based engineering and distribution partner from PEAK, Control Technologies. This article highlights the customer's requirements, insights into the technical system setup and gives you the big picture of CAN communication hardware and software as a strong combination.

THE CHALLENGE: RELIABLE TEST BENCH VALIDATION OF CAN FD NETWORKS

The agricultural machinery manufacturer was developing a new generation of planter systems with a modular and distributed electronic control architecture. Multiple control units, sensors, and actuators communicate via CAN and CAN FD and must interact deterministically to ensure accurate planting operations. Before building and commissioning physical machines, the engineering team required a reliable method to simulate the full machine network in a laboratory environment. The main challenge was to validate CAN communication, especially the message timing, bus load, and interaction between distributed modules and complex I/O functions at an early development stage. In addition, simulated sensor

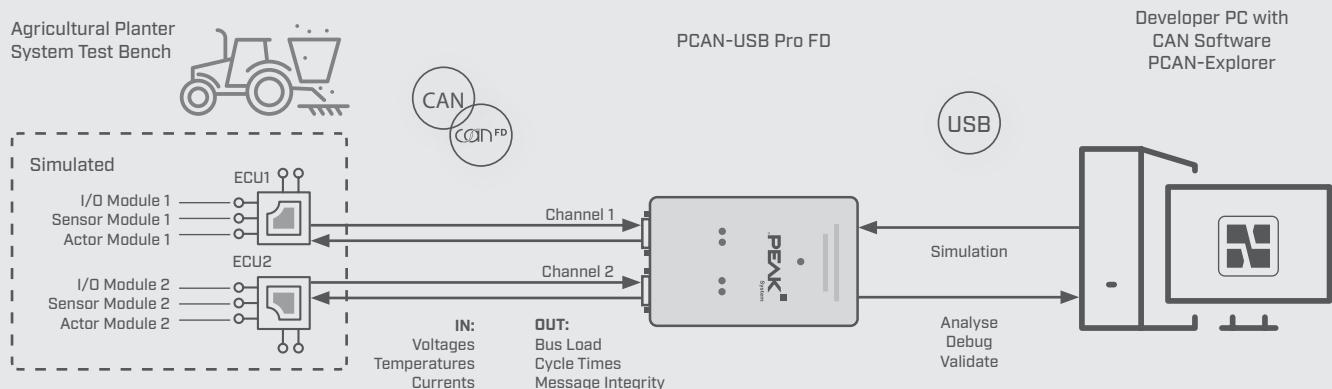
signals such as voltages, temperatures, and currents had to be injected into the network to test control logic, diagnostics, and error handling. Without an appropriate test setup, faults would only become visible during late integration phases or field testing, leading to increased development effort, higher costs, and delayed commissioning.

THE SOLUTION: CAN INTERFACE AND SOFTWARE FOR REALTIME SIMULATION AND MONITORING

Control Technologies designed a comprehensive communication and simulation environment based on PEAK's CAN interfaces and analysis software. The PCAN-USB Pro FD serves as the central communication interface between the development PC and

CUSTOMER BENEFITS

- ✓ Early validation of complete CAN and CAN FD machine networks before physical system integration.
- ✓ Precise simulation and analysis of message timing, bus load, and control unit interaction.
- ✓ Faster debugging through real-time visualization, logging, and signal injection.
- ✓ Reduced development risk, shorter commissioning time, and improved overall system reliability.



the simulated planter control network. The PCAN-Explorer 6 software is used to configure the network, inject simulated signals, and monitor CAN and CAN FD traffic in real time. This setup enables engineers to simulate the complete machine network before any physical system is assembled. Communication flows between control modules can be analyzed, timing constraints verified, and software behavior debugged under repeatable and controlled conditions. The solution significantly reduces the risk associated with system integration and accelerated the overall development process.

THE COMMUNICATION SETUP IN DETAIL

The system setup consisted of a development PC running the PCAN-Explorer 6 software, connected via USB to a PCAN-USB Pro FD interface. The interface provided two independent CAN FD channels connected to the internal control network of the planter system on the test bench. Distributed electronic control units, I/O modules, and simulated sensors were connected to the CAN buses. The PCAN-Explorer 6 software was used both as a monitoring and simulation tool. Incoming CAN and CAN FD messages were logged and visualized, while bus load, cycle times, and message integrity were continuously analyzed. At the same time, the software transmitted simulated messages and signal values to emulate sensors and operating conditions. This closed-loop setup allowed engineers to observe the system, validate module interaction and identify communication issues in real time.

The PCAN-USB Pro FD was selected due to its dual-channel CAN FD capability and reliable high-speed communication performance. Support for both CAN FD and Classical CAN was essential to ensure compatibility with different modules within the planter system. In combination with PCAN-Explorer 6, advanced functions for logging, graphing, and message anal-

ysis were available without additional hardware. Engineers could visualize signal values, analyze bus load, and validate communication efficiently. The tight integration between hardware and software allowed rapid configuration of test scenarios and flexible adaptation to evolving system requirements. “PEAK’s tools are essential in our test bench work - they give us reliable CAN communication and make it easy to analyze and debug complex machine networks”, explains Rob Carlaw, Digital Sales & Marketing manager at Control Technologies. “Hence, these products have become our entire engineering team’s day-to-day tools.”

CONCLUSION

By using the PCAN-USB Pro FD in combination with PCAN-Explorer 6, ControlTech enabled the agricultural machinery manufacturer to establish a robust and repeatable CAN communication test environment. The solution allowed comprehensive validation of the planter system’s distributed control network at an early stage of development. Integration risks were reduced, faults were detected earlier, and commissioning time was significantly shortened.

ABOUT CONTROL TECHNOLOGIES

Control Technologies is a UK-based distributor and engineering solutions partner specializing in CAN hardware, embedded control systems, data logging, and system integration for on- and off-highway applications. The company supports OEMs and machine builders with system specification, hardware supply, and application engineering. It is the exclusive UK reseller for PEAK products providing technical expertise throughout development and integration. For more information, please visit <https://controltech.uk.com>.

FURTHER INFORMATION IS AVAILABLE AT www.peak-system.com