

PCs, PLCs Unite to Improve Efficiency

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Multifunctional Platform brings best of both worlds



Programmable controllers and personal computers are both powerful tools in industrial environments, each providing different benefits that help companies speed production and improve efficiency. Plant floor managers that link them together efficiently will see significant performance benefits.

When PCs and PLCs work together more closely, higher level processing and control can be smoothly integrated. That's important in industrial environments where multiple applications run in parallel. Advances in microprocessors and software now make it possible to combine PCs and PLCs in a single module that helps plant managers continue to improve operational efficiency while saving panel space.

“Smart factories benefit from more performance, and companies gain efficiencies by closing the gap between functions done by PCs and PLCs,” said Tim Parmer, Product Manager, Advanced Controllers, Siemens Industry, Inc. “The Industrial Internet of Things (IIoT) and digitalization are also factors driving this transition.”

Today's manufacturing requirements require new levels of processing power to facilitate advanced testing with digital twins to achieve better designs and shorter commissioning times. These digital twins are the virtual duplications of the production lines and machines that simulate entire process lines, allowing complete set up and diagnostics of function and operational requirements before the first machine is built.

To address this requirement level more efficiently, Siemens has introduced the S7-1518 Multifunctional Platform (MFP), among the first systems to combine a proven rugged modular PLC and a ruggedized PC in one hardware platform. The MFP is designed to provide

the computing power needed to handle a wide range of modern industrial tasks, and plant wide configurations meet flexible manufacturing requirements of the digital factory. Here we consider how integrating these two computer technologies will advance the manufacturing efficiency while increasing the usability of big data on the plant floor.

PCs can be more efficient at handling high level tasks such as access to shared functions, programming using open APIs, including a high range of complex algorithms that bring flexibility to the plant floor with less programming. The MFP's big data communications capabilities along with open APIs bring real time flexibility to digital manufacturing. The adoption of powerful multicore processors enables the combining of a PLC and a PC in one hardware platform with independent runtime processes. Separate cores are dedicated to the PLC, while other cores run optimized PC tasks in a separate but connected environment. Running functions of PCs and PLCs on dedicated cores in the same system brings additional benefits and performance to improve production.

In addition, tasks in C++ that need real time synchronization with the machine operation can be launched and coordinated by the PLC while externally focused processes continue running in parallel in the Linux Operating System. This creates a perfect task-based combining aligning of the functions to the appropriate system best suited to the process. In addition to the operational benefits, the combined package will take much less space than a separate PC residing on the machine.

PCs can also run high level languages, giving programmers access to a wealth of open source APIs already developed and designed to share. For example, there are many C++ programs available for sharing in the IIoT space that reduces programming time. They can be deployed as is, or be reconfigured to meet specific requirements. It can be easier to find programmers who are well-versed in the languages and programming nuances of these mainstream commercial technologies, and they will be much more efficient than when creating with ladder logic programs.

Another benefit of the MFP hybrid is that it is fully designed as a rugged plant floor PLC device bringing the PC portion up to the standard of the modular PLC. As is normal for the S7-1518 in the MFP there is system level diagnostics with no special programming required that will enunciate problems on human machine interface (HMI) displays, making it easier for maintenance to rapidly restore the machine operation even when the PC is causing the fault. As a result, this MFP "hybrid controller" with improved diagnostics will be more reliable than using two separate hardware types to achieve the desired machine operation.

These benefits come with increases in overall performance and increased efficiency. When complex, high-level functions and complex operational controls can be closely linked together, tasks can be integrated to help managers continue to enhance performance and increase effectiveness. The [MFP hybrid](#) controller conserves space, improves performance and paves the way for future improvements in efficiency.