

## Implementing Simple Automation on Legacy Equipment without OEM Support

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### Abstract:

The Plasma Material Technology (PMT) P8000 Etcher is a legacy tool set used by TriQuint that could not communicate with factory automation [1]. The lack of automation left TriQuint exposed to equipment and software failures that were undetectable to operators. In addition the lack of data from the PMT tools left engineering without the correct information to diagnose and correct equipment failure efficiently. PMT tools do not have Ethernet, SECS GEM communication, and OEM support. Our research into the basic operating system and hardware associated with the PMT revealed that it is possible to implement simple automation. Enabling automation on a legacy tool set reduces TriQuint's costs and extends the lifetime of the legacy platform.

TriQuint engineers developed a robust capability to execute QNX 2 command line statements and copy text files from QNX 2 to an intermediate computer. The primary challenge was to gain access to the closed internal network used by the PMT called ARCNET. PMT tools are highly constrained without the ability to add new hardware or directly integrate with the existing equipment software. We will describe how we overcame the challenges and risks of connecting PMT tools to TriQuint factory automation. The testing protocol and risk assessment will be useful to others implementing automation on legacy equipment.

The building blocks of QNX2 command line access and file transfer enabled greatly improved control over the PMT etcher. We have been able to implement recipe gold check, enable PMT data logging, and tight control over the PMT computer memory resources. This automation has significantly reduced TriQuint's risk to recipe corruption, equipment downtime and hardware variability. We will present higher level design for integration with existing automation. Last we will discuss the benefits obtained from having some automation.

**KEYWORDS:** Plasma Materials Technology, Automation, QNX, ARCNET, Equipment

### REFERENCES:

[1] D. Brindza, T. Abshere, "Challenges of Equipment Support in a Factory With a Diverse Multi-generational Toolset" *CS Mantech* 2013.