

# Does the FPGA Industry Face Peril? Pt. I

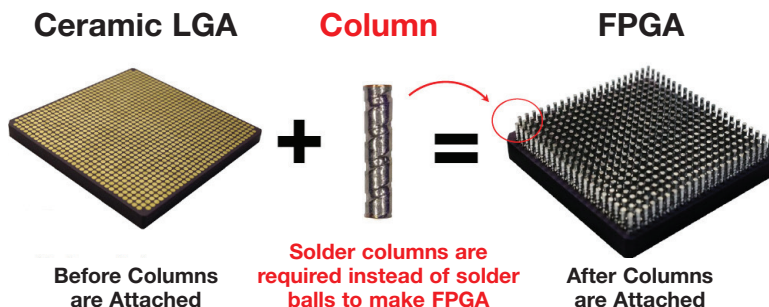
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A SUDDEN SHORTAGE OF MISSION critical Field Programmable Gate Array (FPGA) devices could cause market distortions that are not in the defense industry’s best interest, resulting in warfighters not flying and rockets not launching. Proactive steps taken now to close the gaps by identifying and monitoring the risks can mitigate such a threat.

Documentation published by the Defense Logistics Agency (DLA) shows that makers of FPGA devices depend upon a single subcontractor to provide services to attach copper wrapped solder columns. Columns, rather than solder balls, are a critical subcomponent in the final assembly of FPGA packages. An FPGA is an integrated circuit configurable by customers in the field, making such devices desirable for space and military applications, providing reduced cost and improved design cycle time. Radiation Hardened FPGA devices can withstand attacks from electromagnetic and particle radiation in outer space and high-altitude flight missions.

Past production shortages in the semiconductor industry have been short-lived because multiple vendors have been able to quickly step in to fill voids in the supply chain. Today, only a single subcontractor is designated on the Qualified Manufacturer List (QML-38535) as a provider of copper wrapped solder column attachment services for the entire FPGA industry. The supply-chain is vulnerable if a single supplier of critical components, such as copper wrapped solder columns, were suddenly unable to continue operations.

Business continuation is often an issue for any number of reasons, including natural disasters (fire, flood, earthquake) or the loss of a key manager due to death or retirement. An existential threat could materialize if a hostile foreign actor acquires said single-source supplier and moves production off-shore as a stratagem to lower production costs. A facility reloca-



tion typically results in the loss of QML status, pending requalification.

It could take 24-months for a new candidate to undergo an arduous process prior to attaining QML status for column attachment services. A prolonged production shut down of FPGA devices is relevant to National Security, affecting thousands of downstream customers who would be unable to complete systems and black box builds.

Industry veterans undoubtedly recall the impact in the FPGA supply chain in 2013 when IBM announced their intention to exit the ceramic column grid array (CCGA) FPGA business. IBM’s entire column attachment production line was boxed up and sat in storage for years before being put back into service by a licensee.

Concerns over a diminishing supplier base is an on-going issue in the semiconductor industry. The U.S. Department of Defense (DoD) provides guidelines to assist the industry to identify and mitigate dependency on services from single-source subcontractors. The Defense Standardization Program Office publishes a helpful document SD-22, titled, “Diminishing Manufacturing Sources and Material Shortages (DMSMS), a Guidebook of Best Practices for Implementing a Robust DMSMS Management Program.” It is a useful resource to aid FPGA device makers seeking to broaden their supplier base for components that are critical to the welfare of national security. The DMSMS guidebook presents the concerns and recommended remedies to mitigate the risk of loss, or impending loss, of manufacturers or suppliers of items, software, and raw materials.

The Under Secretary of Defense for

Acquisition and Sustainment delivers an annual report to Congress titled “Industrial Capabilities” stating the mission of the Office of Industrial Policy (INDPOL) is to ensure a robust, secure, resilient, and innovative industrial capabilities upon which the DoD can rely.

Eight public companies making the majority of the world’s FPGA devices may consider issuing forward-looking cautionary statements to shareholders according to guidelines of the Exchange Commission (SEC) citing their reliance on a single QML vendor to attach copper wrapped columns. These statements disclose potential risks from the perspective of management’s reasoning or beliefs.

Fabrication of copper wrapped solder columns is not trivial, and requires the correct know-how, manufacturing equipment and proficient operator skills to properly attach columns to FPGA packages. You can’t buy solder column attachment services from your friendly catalog distributor. Part 2 of Call to Action will describe a path to mitigate risk by encouraging the supply-chain to develop multiple suppliers for attaching copper wrapped solder columns to FPGA devices.

## Conclusion

Risk of a FPGA production shut down is preventable by taking prudent action now. The most direct solution is to qualify multiple vendors for critical processes including column attachment services. This remedy requires a relatively low investment by FPGA device makers. The alternative is to wait for an unexpected disaster to strike, potentially costing the defense industry hundreds of millions of dollars. ♦