MICROCHIP

Aerospace and Defense Newsletter

Welcome to our third edition of Microchip's Aviation and Defense newsletter. Microchip products have been used in all major aviation platforms for many decades. As a result of our acquisition of Microsemi, Microchip has evolved to become a leading-edge systems solution provider for the most demanding aerospace applications. We offer a broad portfolio of products and capabilities that come with a proven track record of innovation, quality and reliability on aerospace platforms over the past 20 years. As a key partner for your existing and future aerospace platforms, Microchip will continue to leverage our technology and extensive capabilities in this segment to support the ever-increasing electronic content in today's aircraft.

In this newsletter we will provide important updates about new product releases, qualification and neutron testing results, hardware/kits, engineering samples, events, documentation, and software. Please forward this newsletter to your colleagues and friends who are interested in receiving important updates about our solutions.

Thank you for reading. Do not hesitate to forward the Aviation and Defense Newsletter to your colleagues. They can subscribe to receive future editions here.

New Products

PolarFire® SoC FPGA Early Access Program Is Open

The PolarFire SoC FPGA Early Access Program (EAP) has begun. Contact your local salesperson for qualification requirements. If you qualify, you will receive an EAP Libero® SoC Design Suite license that enables you to use the new MSS configurator in Libero SoC Design Suite v12.3.

For software development of bare-metal systems, you can use our SoftConsole software development environment and use Antmicro's Renode™ platform for PolarFire SoC.

Renode contains a functional model of the PolarFire SoC FPGA device that allows you to debug your application and get sizing information. We've been offering 30-minute training webinars about using SoftConsole with the Renode platform since May, and we will continue to offer them well into 2020. Watch previous training sessions and register for new sessions here. Learn more about PolarFire SoC FPGAs here. Engineering samples of the PolarFire SoC FPGA will be available in mid-2020.

Please contact Tim Morin, Director of Product Line Management, Defense, FPGA Group. Tim.Morin@microchip.com for questions.

Libero SoC Design Suite v12.3 Release Update

We're delivering production timing data for PolarFire 300TS FPGA military devices and preliminary timing data for PolarFire® 200TS/500TS FPGA military devices for 1.0V STD speed grade with Libero SoC Design Suite v12.3. The new release also introduces new RTG4™ RT4G150 1657-FCG (STD and –1) and RT4G150L 1657-FCG (STD) devices.

Additionally, this release delivers an MSS configurator to support the new PolarFire SoC 250T FPGA devices (for FCG484 and FCG1152 packages). Libero v12.3 reduces runtime by 10% for place and route and 7% for bit stream generation for PolarFire FPGAs. We also introduce SPI slave programming support for PolarFire devices on Windows® and Linux® operating systems. This release also features Turbo mode, which reduces the runtime significantly for SmartDebug tools.

For more information, please contact Divipala Basava Rajesh, Principle. Engineer-Product Marketing, Channel Marketing at DivipalaBasava.Rajesh@microchip.com

LX4580 24-Channel Data Acquisition System with Motor Control

In our last newsletter we introduced our new LX4580 IC targeting aviation and defense applications for actuation control and sensor monitoring. We are happy to report that it is now in wafer fabrication and sampling will begin in Q1 2020.

The LX4580 data acquisition system offers robust sensor interfaces that are designed to operate in a DO-160 aircraft environment. It interfaces with a microprocessor or an FPGA to execute digital control system algorithms in real time. This interface is based on an Error Control Code (ECC) over a redundant slave SPI or UART interface. Additional features are:

- Five temperature sensor interfaces
- Three pressure sensor interfaces
- Two LVDT drivers and driver monitors
- Four LVDT monitor differential pairs with instantaneous and RMS outputs
- Five current sense interfaces
- One voltage measurement interface
- Three Hall effect proximity sensor inputs

- Eight PWM outputs
- Powered from +15V and generates its own intermediate power rails
- On-chip power regulators
- Register-programmable GPIOs
- JTAG scan and test IF
- Small 144-pin LQFP package

For product information and to order samples, contact Dorian Johnson, Product Marketing Manager for Mixed Signal Aerospace Products at Dorian.Johnson@microchip.com.

Application Highlights

FPGAs in Drone Design

Microchip FPGAs have over 20 years of heritage in commercial aviation and defense aircraft. Their low power consumption eliminates the need for heat sinks, making them ideal for reducing total solution size, cost, and weight. Our FPGAs also have a variety of security anti-tamper features designed and implemented to prevent malicious attacks.

The configuration memory in Flash and SONOS-based FPGAs is immune to Single Event Upsets (SEUs) which helps reduce design time by eliminating the need for redundancy in the configuration.

Our history supporting customers with DO-254 certification and flight services questions will help ease you through the certification process.
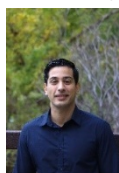
To read more about how our FPGAs are being used in UAVs please read our article published in October on the Aerospace Manufacturing and Design website.

Julian Di Matteo, Sr. Product Marketing Engineer, Space and Aviation, FPGA Group.   Julian.DiMatteo@microchip.com

High-Performance, Multi-Axis Motor Control for Aviation Applications

Our nonvolatile, radiation-tolerant FPGAs serve as an ideal platform for the integrated motor control requirements of aviation applications. They offer high-performance solutions for high-speed, low-latency algorithm processing, strong design security, Differential Power Analysis (DPA) resistance and integration of complementary functions while offering steadfast performance in harsh temperatures, pressure and altitude conditions.

Our FPGA-based motor control solution includes modular algorithmic blocks for Field-Oriented Control (FOC) transformations, PI controller, space vector modulation, core 3-phase PWM, rate limiter, position and speed estimator, encoder interface and stepper angle generator blocks.

Reference designs are available that demonstrate multi-axis motor control solutions on the SmartFusion®2 SoC FPGA and the RTG4 FPGA and LX7720 rad-tolerant spacecraft motor controller. We offer demonstrations for two- and six-axis motor control and a quadcopter drone. For more information, visit Microchip's FPGA-Based Multi-Axis Motor Control Solution page.

For questions please contact Apurva Peri, Sr. Product Marketing Engineer, FPGA Group. Apurva.Peri@microchip.com

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Test Results

PolarFire FPGA Neutron Test Results Updated on Website

We have completed several rounds of testing on our PolarFire FPGAs to determine the effects of atmospheric neutrons, which increase to a higher flux at typical commercial and defense aviation applications.

Neutrons can strike silicon atoms, which may result in momentary current pulses causing data to flip in memory cells or flip flops. Our Flash and SONOS-based FPGAs are immune to configuration upsets, which can help reduce design effort and cost by eliminating the need of redundancy or external memories when loading the configuration in the case of SRAM-based FPGAs.

To review our latest report on PolarFire FPGAs please click here.

Julian Di Matteo, Sr. Product Marketing Engineer, Space and Aviation, FPGA Group. Julian.DiMatteo@microchip.com

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Webinars

Shields Up! December 18th

In the world of quantum computers new methods for signature verification are required that are resistant to all known quantum computer attacks. Veridify's security methods can be implemented in software only allowing developers to easily implement critical security functions such as secure boot and secure firmware update on platforms like PolarFire® SoC. This webinar will also describe the power and scalability of DOME, a device onboarding, management and enrollment platform for securing PolarFire SoC throughout its lifecycle. Register here: https://mchp.us/2qkIuxE

Watch the Smart Embedded Vision Webcast

To help accelerate designs, Microchip launched its Smart Embedded Vision initiative to provide you with solutions for designing intelligent machine vision systems with our low-power PolarFire FPGAs. A great way to get started with Smart Embedded Vision is to watch our "Enabling Intelligence at the Edge with Low-Power FPGAs" webinar produced by OpenSystems Media. This webinar will give you an overview of how low-power FPGAs can enable high computing and data throughput for machine vision applications thermally constrained by small form factors. We detail requirements for these applications and how our PolarFire FPGA solutions offer the imaging and AI IP needed to implement your designs. Click here to watch the webcast on demand.