

Going beyond the call of duty for military and aerospace applications

Altera Enhanced COTS PLD Initiative

From security to rugged operating environments and design productivity, you face unique concerns in developing military and aerospace applications. The Altera® Enhanced COTS PLD Initiative spearheads development of FPGAs, CPLDs, and ASICs that overcome extraordinary military and aerospace challenges beyond baseline DoD requirements and competitive offerings.

Along with enhanced feature sets for military and aerospace applications, our enhanced commercial off-the-shelf (COTS) programmable devices give you the same functionality, density, performance, and low power consumption of our industry-leading commercial solutions, at no additional cost. Our commercial solutions also reduce your risk of obsolescence over custom options.

Altera enhanced COTS features

Anti-tampering design security—Volatile and non-volatile embedded encryption key assures that your designs will be protected in the field. Arria® II GX, Stratix® III and Stratix IV FPGAs offer a 256-bit Advanced Encryption Standard (AES) algorithm (FIPS-197 compliant) and both volatile and non-volatile key storage, which can be used to encrypt military intellectual property (IP) programmed into the FPGA. Cyclone® III LS FPGAs provide a volatile 256-bit AES key and security features for anti-tamper protection. MAX® II CPLDs and HardCopy® series ASICs are non-volatile, inherently providing design security because they do not require external configuration memory.

Design separation—The design separation flow in Quartus® II software enables you to implement high-assurance designs on a single, low-power Cyclone III LS device by ensuring logical and physical separation between design partitions. You can deploy equipment with confidence knowing that your designs are protected against unintentional data leaks.

Extended life cycle—Altera devices support longer product life cycles, reducing your obsolescence risk. JEDEC standard compliance includes JESD48 for sufficient notification of obsolescence: 12-month notification with an additional 6 months for delivery. Automated alerts for product change notifications (PCNs), product discontinuation notices (PDNs), and other documents are available by registering at www.altera.com/literature/updates.

Military temperature support—Altera understands the rigorous environments that military products need to operate in, and offers industrial temperature support on all of our products. Furthermore, we've expanded industrial-grade temperature range devices to include military-grade temperature support (-55°C to 125°C) for select Stratix, Stratix II, Stratix III, and HardCopy II devices. This is done without the typical cost premiums, limited device offerings, and poor end-of-life (EOL) protection associated with competitive military-grade products. Altera will continue to introduce product families that meet military-grade temperature requirements.

Quality and reliability levels for rugged environments—Altera devices stand up to shock and vibration, high temperature operation life (HTOL), highly accelerated stress tests (HASTs), and more. Our silicon and packaging are designed concurrently to ensure reliable compatibility. Extensive package options meet various needs, including tolerance to humidity, shock, and vibration. Flip-chip packaging is reliable even after the PCB cleaning process and conformal coating. Additionally, Altera has been certified to STACK International's Level I and Level II requirements for over 10 years. Altera has a closed-loop quality and reliability system that conforms to the requirements of ISO 9001-Rev2000, MIL-I-45208, and JEDEC standards.

Providing industrial and military temperature support further enhances the long-term reliability of Altera devices to the exposed environment. Many of Altera's new 40-nm devices, including Stratix IV FPGAs and HardCopy III and HardCopy IV ASICs, will support industrial temperature ranges.



The Altera commitment

At Altera, we're committed to serving the military and aerospace industry for the long term, anticipating your challenges and advancing innovation to deliver next-generation technology to you on time and through time.

Altera will ensure you meet your commitments, reduce risk, and provide high reliability.

Bare die support—We support raw-die procurement for military applications that require multi-chip module (MCM) integration, resulting in size, weight, and power (SWaP) savings, and partner with White Electronic Designs Corporation for on-shore packaging needs such as small form factor and ceramic packaging, MCMs, extended temperature products, and more.

Lead packaging—To meet the extreme reliability requirements for military and aerospace applications, we continue to offer lead packages for most devices in addition to RoHS-compliant offerings.

Reliable supply chain—From wafer fabrication, packaging, and test through sales and distribution, Altera stands on its reputation for a robust and reliable supply chain.

AQEC compliance—Altera is part of the Aerospace Qualified Electronics Components (AQEC) working group and was the first semiconductor manufacturer to be certified; our Stratix and Cyclone series FPGAs are GEIA-STD-0002-01 certified.

DO-254 compliance—Our Nios® II embedded soft processor is DO-254 compliant for airborne electronic hardware to ensure FAA airworthiness. Documentation and certification support for other IP is available through our network of IP suppliers.

ITAR compliance—International Traffic in Arms Regulations (ITAR) compliance for export and manufacturing includes the license agreement for HardCopy ASICs manufactured at established overseas plants to control sensitive technical data. This secure design and manufacturing flow ensures customer and design application anonymity.

SEU detection and mitigation—The industry's first automatic CRC device for the configuration of RAM in an FPGA continually and automatically checks for changes in configuration that might occur from a single event upset (SEU). For critical flight systems, HardCopy technology offers very high levels of immunity to soft errors.

Military and aerospace applications

Application	Devices	Top-level design requirements	Application	Devices	Top-level design requirements
Radar	<ul style="list-style-type: none"> Arria series mid-range transceiver FPGAs Stratix series high-performance and transceiver FPGAs HardCopy series ASICs 	<ul style="list-style-type: none"> Digital signal processing (DSP) Floating-point functionality High density High-speed transceivers¹ Programmable Power Technology for power/performance management² 	Missiles and unmanned aerial vehicles	<ul style="list-style-type: none"> MAX II low-power CPLDs Cyclone series low-power FPGAs Stratix series high-performance and transceiver FPGAs 	<ul style="list-style-type: none"> Up to military-grade temperature³ I/O performance Low cost Low power Small form factor SEU detection and mitigation
Wireless software defined radio (SDR)	<ul style="list-style-type: none"> Cyclone series low-power FPGAs 	<ul style="list-style-type: none"> Abundant memory and DSP resources for waveform processing Low power Reprogrammability DSP (expanded capabilities) AES encryption High performance Memory Reprogrammability Waveform processing Information assurance 	Avionics and flight displays	<ul style="list-style-type: none"> MAX II low-cost CPLDs 	<ul style="list-style-type: none"> Instant-on Low cost SEU detection and mitigation Information assurance
				<ul style="list-style-type: none"> Cyclone series low-power FPGAs 	<ul style="list-style-type: none"> Low power SEU detection and mitigation
				<ul style="list-style-type: none"> Stratix series high-performance FPGAs HardCopy series ASICs 	<ul style="list-style-type: none"> Abundant memory and DSP resources for video and image processing SEU detection and mitigation
Inline network	<ul style="list-style-type: none"> Arria series mid-range transceiver FPGAs Stratix series high-performance FPGAs HardCopy series ASICs 	<ul style="list-style-type: none"> Industrial-grade or military-grade temperature³ Low cost/low power SEU detection and mitigation AES encryption 	Electronic warfare	<ul style="list-style-type: none"> Arria series mid-range transceiver FPGAs Stratix series high-performance and transceiver FPGAs HardCopy series ASICs 	<ul style="list-style-type: none"> DSP High performance Military-grade temperature³ High-speed transceivers¹
				<ul style="list-style-type: none"> Cyclone series low-power FPGAs 	<ul style="list-style-type: none"> Low power Small form factor

¹ Transceivers available in Stratix series FPGAs and Arria GX FPGAs.

² Stratix III FPGAs.

³ Military temperature support for select Stratix series and HardCopy series devices.

Want to dig deeper?

For more information about how Altera enhanced COTS solutions can help you meet military and aerospace design requirements, contact your local Altera sales representative or FAE, or visit www.altera.com/military for reference designs, webcasts, white papers, development kits, and more.

Altera Corporation

101 Innovation Drive
San Jose, CA 95134
USA
www.altera.com

Altera European Headquarters

Holmers Farm Way
High Wycombe
Buckinghamshire
HP12 4XF
United Kingdom
Telephone: (44) 1494 602000

