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Field Programmable Gate Array Market Assessment, By Configuration [High-end FPGA, Mid-end FPGA, Low-end FPGA], By Technology [EEPROM, Antifuse, Flash, SRAM, Others], By Application [5G, Wired Communication, Wireless Communication, Radar & Sensors, Avionics, Wearable Devices, Imaging Diagnostic Systems, Others], By End-use Industry [IT & Telecommunications, Military & Aerospace, Healthcare, Automotive, Others], By Region, Opportunities and Forecast, 2016-2030F

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Abstracts

Global field programmable gate array market size was valued at USD 8.83 billion in 2022, which is expected to reach USD 22.98 billion in 2030 with a CAGR of 12.7% for the forecasted period between 2023 and 2030.

FPGAs offer versatile, reconfigurable hardware for various applications, enabling rapid prototyping, reduced development costs, and flexibility in digital circuit design. The FPGA market is experiencing growth due to the demand for high-performance computing, 5G technology, artificial intelligence, and increased applications in the automotive, aerospace, and healthcare industries. Additionally, the need for energy-efficient solutions and the emergence of edge computing contribute to the expanding adoption of FPGAs in various sectors.

The rollout of 5G technology is significantly impacting the FPGA market. With its high data speeds and low latency, 5G requires advanced, flexible hardware for base

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stations, edge computing, and network optimization. FPGAs are well-suited for these applications, providing adaptability and performance, which are crucial in the rapidly evolving 5G ecosystem, leading to increased demand in the FPGA market.

For example, in September 2023, Napatech, a prominent supplier of customizable Smart Network Interface Cards (SmartNICs) and Infrastructure Processing Units (IPU) utilized in cloud, corporate, and telecommunications datacenter networks, unveiled its offload solution for 5G User Plane Function (UPF) on the recently launched NT400 400Gbps SmartNIC. This SmartNIC harnesses the innovative Intel Agilex FPGA technology.

The Utilization of FPGA in Technologically Advanced Vehicles is Fueling Market Growth

The integration of FPGAs in technologically advanced vehicles is a driving force behind the growth of the FPGA market. FPGAs play a vital role in these vehicles by powering their sophisticated systems like autonomous driving, infotainment, and connectivity. Moreover, they provide adaptable, high-performance hardware solutions catering to the evolving demands of modern vehicles. With the automotive industry's focus on innovation, FPGAs are in increasing demand, boosting their market presence as they facilitate the development of advanced vehicle features and functionalities.

For example, in Feb 2022, Xilinx unveiled a duo of 16-nanometer FinFET+ FPGAs specifically designed for advanced driver assistance systems (ADAS) and autonomous vehicles. These FPGAs, known as the Xilinx Automotive (XA) Zynq UltraScale+ MPSoC 7EV and 11EG, integrate 64-bit hard-core Arm processors, accompanied by approximately 3,000 DSP slices and over 650,000 programmable logic cells, making them well-suited for demanding automotive applications, thereby driving the market growth.

The Prevalence of Internet of Things (IoT) is Propelling the Market Growth

The widespread adoption of the Internet of Things (IoT) is a significant driver of growth in the field-programmable gate array market. FPGAs play a vital role in IoT by providing customizable hardware acceleration for various IoT applications, enhancing performance and energy efficiency. With the ever-increasing number of IoT devices and the need for rapid, flexible hardware solutions, the demand for FPGAs continues to rise, making them a pivotal component in advancing IoT technology and consequently fueling market expansion.

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For example, Intel's FPGA solutions offer genuine adaptability and scalability to meet the diverse needs of IoT applications through built-in hardware and software programmability. This dynamic synergy empowers autonomous functionality, the ability to customize solutions according to customers' unique requirements, and the capacity to expand to meet the ever-changing and varied market demands. From applications like smart buildings, connected vehicles, to efficient power grids and urban infrastructure, Intel's FPGAs democratize innovation within the IoT realm.

Reduction in Price for FPGAs in Military & Aerospace Sector is Catering to Extensive Opportunities

The reduction in FPGA prices within the Military & Aerospace sector is significantly strengthening the growth of the FPGA market in these domains. This price decrease is primarily attributed to advancements in manufacturing techniques and economies of scale. As FPGA technology becomes more affordable, it is increasingly adopted in critical systems like radar, communication, and electronic warfare.

For example, in May 2023, Actel Corporation declared a substantial price reduction of up to 50% for its ProASIC Plus field-programmable gate arrays (FPGAs) enclosed in military-temperature plastic (MTP) packages. This price reduction made feasible through enhancements in Actel's manufacturing process, is particularly advantageous for avionics designers.

Asia-Pacific Dominated the FPGA Market in All Aspects

Asia-Pacific has established dominance in the FPGA market due to several key factors. Firstly, it is a manufacturing hub, hosting major FPGA manufacturers like Xilinx and Intel. Additionally, a booming electronics industry in countries like China, South Korea, and Taiwan has driven the FPGA demand in the region. Furthermore, the proliferation of 5G technology and increased adoption of IoT and AI applications further contribute to FPGA growth.

For example, in October 2022, a Japanese startup, NanoBridge Semiconductor (NBS), implemented NanoBridge technology to manufacture FPGAs suitable for both space and automotive applications. NBS participated in the Taiwan Innotech Expo 2022 and earned an honorable mention in the TIE Award 2022.

Government Initiatives on The Field Programmable Gate Array (FPGA) Market

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Government initiatives foster innovation, growth, and security in the FPGA market. These initiatives focus on R&D funding, educational programs, and industry partnerships to advance FPGA technology. Additionally, regulations and standards are essential to ensure product reliability and cybersecurity, especially in aerospace, defense, and critical infrastructure sectors. Moreover, government support can promote FPGA adoption in emerging technologies, such as 5G, autonomous vehicles, and AI, thereby driving economic development and ensuring national competitiveness in the digital age.

For example, in October 2021, DARPA, the U.S. Defense Advanced Research Projects Agency, launched the DARPA Toolbox initiative to procure low-power devices from Microchip Technology. Through the Toolbox program, DARPA researchers can access open-licensing opportunities offered by commercial suppliers like Microchip, enabling them to incorporate commercial electronic products into defense and aerospace development projects where they are most applicable. As part of this collaboration, DARPA researchers are granted free access to the Microsoft Libero design software suite and related intellectual property, centered around low-power FPGAs.

Impact of COVID-19

The field programmable gate array market underwent a massive transformation due to the COVID-19 pandemic. Pre-COVID, it was on a steady growth trajectory, with its applications spanning in the telecommunications, automotive, and aerospace sectors. However, the pandemic disrupted supply chains, causing manufacturing delays and distribution challenges, affecting the industry's momentum. Post-COVID, the demand for FPGA technology is surging rapidly as companies accelerate their digital transformation efforts, particularly in the telecom sector, which requires FPGA solutions for 5G network expansion.

Moreover, the increasing reliance on remote work and the rise of e-commerce drive the FPGA adoption, influencing data centers and network infrastructure. Furthermore, FPGA technology plays a critical role in medical devices and research, contributing to efforts to combat the virus. Today, the FPGA market showcases resilience and adaptability, aligning with the surging trends in artificial intelligence, edge computing, and automation, making it an essential player in addressing evolving technological needs.

Key Players Landscape and Outlook

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The FPGA market is advancing considerably as leading companies boost their investments in sectors such as 5G infrastructure and electric vehicles to expand their market reach and income. Simultaneously, businesses are actively engaging in collaborations, acquisitions, and partnerships, which are reshaping the industry's dynamics and propelling overall market growth with increased momentum.

In September 2023, Intel diversified its FPGA product range by introducing cost-effective alternatives, openly sharing its official software stack and introducing a no-cost RISC-V processor design, among various enhancements. The chip manufacturer, headquartered in Santa Clara, announced the expansion of the Agilex FPGA portfolio to meet the growing need for bespoke workloads, particularly in the field of AI processing, and to provide customers with an even more extensive selection of products.

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