

Automotive Electronics and Software Market Assessment, By Components [Electronic Control Units (ECU)/Domain Control Units (DCU), Sensors, Software, Power Electronics, Harness Systems, Other Electronics Components], By With-In Vehicle Application [Advance Driver Assistance Systems (ADAS), Powertrain, Infotainment, Safety Systems, Others], By Sales Channel [OEM, Aftermarket], By Vehicle Type [Internal Combustion Engine (ICE), Hybrid Vehicle, Electric Vehicle (EV)], By Region [Asia Pacific, Europe, North America, South America, Middle East and Africa], Opportunities and Forecast, 2016-2030F

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Abstracts

The last five decades have seen a drastic shift in the automotive industry from being reliant on mechanical parts, to increasing adoption of electronic components and systems. This has revolutionized our interaction and driving experience with vehicles, with increased safety and security, enhanced engine and transmission performance, improved driver comfort and offering internet-integrated multimedia and entertainment.

Global Automotive Electronics and Software Market size was valued at USD 285.92 billion in 2022 which is expected to reach USD 501.64 billion in 2030 with a CAGR of 7.28% for the forecast period between 2023 and 2030. The automotive market just for passenger cars and light commercial vehicles (LCVs) is projected to grow at a



compound annual rate of 1 percent in the same period—from 89 million units in 2019 to just 102 million units in 2030, this increasing demand for automobiles is pulling the automotive electronics market. The adoption of Automotive Electronics has been driven by technological advancements, declining costs of electronic sensors, emission standards and automotive policies, and increasing public demand for better and technologically advanced vehicles.

Engine Control Units (ECU) Increase Automotive Efficiency

The Electronic Control Unit (ECU) not only optimizes fuel injection, ignition timing, and other engine parameters, resulting in better performance and improved fuel economy, but plays a crucial role in the operation of various safety systems, such as anti-lock braking system (ABS), traction control system (TCS), and electronic stability control (ESC). These systems continuously monitor various components and systems of the vehicle, detecting and diagnosing any issues or malfunctions.

Countries around the world are recognizing the pressing need to address automotive emissions and are updating their emission targets to promote a cleaner and more sustainable transportation sector. For example, the EU has set stringent emission reduction targets for all vehicles and updated them to be defined as a percentage reduction from 2021 levels. Hence, most automotive manufacturers are adopting Engine Control Units (ECU) and Transmission Control Units (TCU) to meet the set emission standards.

Customers Seek Increased Safety and Comfort Using ADAS

Advanced Driver Assistance Systems include features like automatic collision warning, emergency braking, lane keep assist, adaptive cruise control, and pedestrian detection, which help prevent accidents and enhance overall safety on the road. Considering its applicability users are looking for ADAS-equipped automobiles and in 2021, approximately one-third of new vehicles sold in major markets such as the U.S., Europe, Japan and China had ADAS features.

Prominent car makers are making substantial investments in self-driving technology and advanced driver assistance systems (ADAS). One standout innovator in this field is Tesla, blazing a trail with its cutting-edge Autopilot system. By harnessing the power of cameras and radar sensors, Tesla's technology enables vehicles to recognize and navigate around obstacles autonomously. Notably, other industry giants like General Motors, Ford, and Toyota are following suit, devoting resources to autonomous vehicle



research and development. Their collective ambition revolves around the creation of fully autonomous cars, a goal that they aim to achieve in the near future. Mercedes-Benz's SAE Level 3 autonomous driver assist system 'DRIVE PILOT' which debuted in Germany in May of 2022, recently became the first automaker to be certified for autonomous driving in the entire state of California and Nevada in the US. Therefore, the adoption of ADAS systems in cars is resulting in the rapid expansion of the market.

Push for Safety and Standardizations in Automotive Electronics

Governments play a crucial role in the automotive electronics market by establishing regulations, policies, and standards that shape the industry. They are responsible for ensuring the safety, efficiency, and sustainability of vehicles, as well as promoting innovation and competitiveness.

Governments following the ISO standards have mandated compliance with regulations such as the IATF 16949, AEC-Q100, AEC-Q200, and ISO 26262 standards are electronics components to be automotive qualified. This ensures the protection of connections between onboard sensors and Electronic Control Units (ECUs) and is crucial to maintain reliable data transmission and prevent potential errors or malfunctions that could impact the driver or vehicle. It is imperative to maintain the integrity of these connections throughout the vehicle's lifespan, safeguarding against faulty or missing data that could lead to adverse consequences.

The automotive industry realizes a need for implementing a standardized approach to sensor and display connectivity, as it simplifies the integration and testing process, reducing costs and saving time, which in turn facilitates the timely introduction of new features. By adopting standard interfaces, interoperability is ensured, enabling a broader range of suppliers to enter the market. An example of such standardization is Automotive SerDes Solutions (MASS) launched by MIPI, an end-to-end framework for reliable, high-performance links with built-in functional safety (and security under development).

Growing trend of Autonomous, Connected, Electric, and Smart-Shared-Mobility (ACES)

The automotive industry is experiencing a significant shift towards the adoption of advanced driver assistance systems, making it a regular feature on upcoming models, however, it still struggles with reliability, extremely high development and unit costs, and legal and regulatory concerns leading to a delay in the development of true self-driving cars. This has not deterred the automotive manufacturers who are advancing by leaps



in bounds to attain new levels of autonomy. Most big players have achieved SAE Level 2 driver support systems such as Tesla's Autopilot with "Full Self-Driving", Audi's Traffic Jam Assist, GM's Super Cruise, BMW's Extended Traffic Jam Assistant, Ford's Blue Cruise, Hyundai's autonomous driving package, and many more. A recent amendment to UN Regulation No. 157 is expected to pave the way for more self-driving cars in 2023. The update introduces automated lane changes and raises the top speed limit for self-driving passenger cars and light-duty vehicles on highways. Under the revised regulations, these vehicles can now autonomously switch lanes and travel at speeds up to 130km/h, a significant increase from the previous limit of 60km/h.

People are preferring electric vehicles with connected car technologies and the Internet of Things (IoT). The integration of connected car technologies and the Internet of Things (IoT) enables drivers to enjoy a multitude of services, such as entertainment options, navigation assistance, and remote diagnostics. This integration not only enhances the overall driving experience but also adds convenience and enjoyment to the journey.

Total number of car connections stood at 279 million in 2022 and is experiencing an increasing trend with improved technology such as vehicle-to-everything (V2X) connectivity, an advancement of cellular variant C-V2X, from the earlier version derived from Wi-Fi known as DSRC or ITS-G5. At the end of 2022, Vodafone Business and Porsche Engineering joined forces to establish the first hybrid mobile private network (MPN) utilizing 5G technology in Europe. This groundbreaking initiative took place at the Nard? Technical Center (NTC).

Impact of COVID-19

The COVID-19 pandemic had a significant impact on the automotive market globally. The measures implemented to control the spread of the virus, such as lockdowns and travel restrictions, led to a sharp decline in demand for automobiles. Manufacturing plants were temporarily shut down, disrupting the supply chain and causing production delays. These delays had affected the growth of the global automotive market directly and its repercussions reaching the Global Automotive Electronics and Software Market. Furthermore, the automotive market was heavily reliant on global supply chains, which were disrupted due to travel restrictions and border closures. This resulted in shortages of certain components, leading to production delays and increased costs.

Impact of Russia-Ukraine War

The conflict between Russia and Ukraine disrupted the supply of oil and gas, shedding



light on the vulnerabilities associated with heavy reliance on fossil fuels for energy. This situation has prompted numerous countries to explore alternative energy sources and technologies. In addition, the war has exacerbated an existing supply chain issue due to the global shortage of semiconductors. Crucial components such as purified neon gas and palladium, essential for semiconductor manufacturing, are sourced from both countries. As a result, original equipment manufacturers (OEMs) like Toyota, Ford, Volvo, Jaguar-Land Rover, General Motors, and BMW have halted exports to Russia and, in some cases, suspended joint ventures with the country. Consequently, OEMs are actively seeking alternative supply chains through short-term and long-term contractual relationships with electronics manufacturers.

Key Players Landscape and Outlook

Key players are heavily investing in R&D and diversifying the features their automobile offers to attract more customers. Moreover, OEM Automotive companies are competing throughout the globe to gain market share in the emerging market of EV vehicles. For instance, Tesla maintains its hold on the US EV market by delivering a record of 422,875 vehicles in the first quarter of 2023, while BYD delivered 264,664 fully electric models in the same quarter in China, overtaking Volkswagen as China's best-selling brand. Furthermore, after the success of Tesla's Autopilot, BYD is looking to replicate the same with roll out its new high-speed navigation-assisted driving function (NOA). BYD's new ADAS is set to feature in its upcoming premium F brand, including an electric pickup and electric Mercedes-Benz G-Wagon SUV competitor.

Additionally, to get an edge over the competitors, automotive manufacturers are collaborating with software and electronics manufacturers to provide Hi-Tech solutions. For instance, BMW has partnered with Intel and Mobileye to develop the BMW iNEXT, and Volvo with its partnership with NVIDIA are looking develop advanced AI-powered ADAS systems.



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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work

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