

LUCINTEL INSIGHT  
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# FIVE TRENDS SHAPING THE FUTURE OF THE FLEXIBLE PRINTED CIRCUIT BOARD MARKET

The flexible PCB market is rapidly growing due to rising demand for electronic products such as smartphones, tablet PCs, LCDs, and many others. The technologies in the flexible PCB market have undergone significant changes in recent years, from technologies of traditional single-sided flexible circuit boards to those of advanced multi-layer and rigid-flex flexible circuit

boards. The rising wave of rigid-flex circuit technology is creating significant potential in various telecommunication and medical applications. The major growth drivers for this market are an increasing demand for FPC in the telecommunication industry, the growth in connected devices, and advancement in automotive electronics.

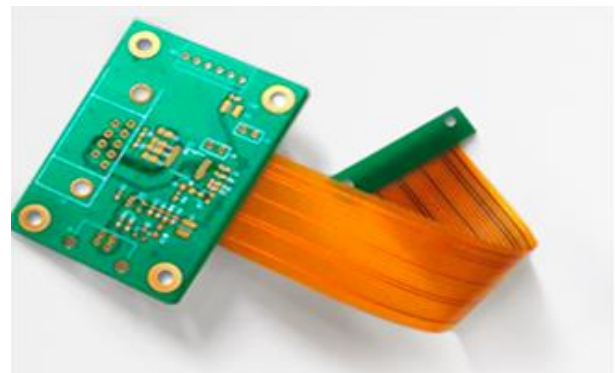


The flexible printed circuit board market is divided into several segments, such as single layer, double layer, multi-layer and rigid-flex. Key players in the flexible printed circuit board market include NOK Corporation, Zhen Ding Technology, Sumitomo, Flexium Interconnect, Fujikura, Nitto Denko, Compeq Manufacturing, Samsung Electro-Mechanics, Unimicron, and Young Poong Electronics. These have been working on different strategies to drive sales using highly influential marketing approaches; however, as we examine the challenges and opportunities ahead in this market, companies can benefit from a strategy of developing rigid-flex PCBs and HDI flexible PCBs, along with the key target market trends we have identified. Lucintel predicts that the global flexible printed circuit board market will be valued at \$23.4 billion by 2025, with an expected CAGR of approx. 6% between 2020 and 2025.

Lucintel identifies five trends set to influence the global flexible printed circuit board market. Most of the industry players and experts agree that these five trends will accelerate developments in the flexible printed circuit board industry in the near future. In terms of the widespread knowledge about the flexible printed circuit board market already on the horizon, there is still a lack of unified perspective on the direction the industry is moving to proactively address developments. To help bring more clarity to this gap, our study aims to provide insights concerning the direction that changes are taking and how these changes will impact the flexible printed circuit board market.

## 1. Development of Rigid-Flex PCBs

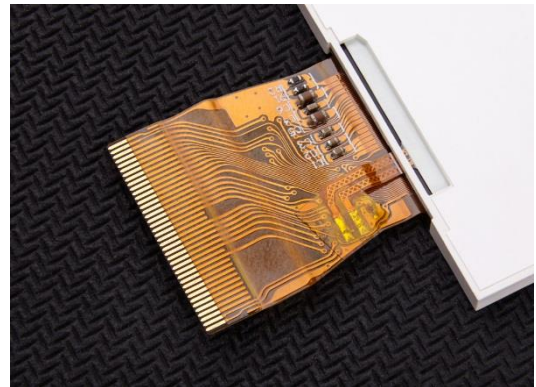
The rigid-flex PCB is a combination of both rigid and flexible circuit boards that offers higher component density compared to other circuit boards. These boards provide high precision, substantial reduction of interconnects, and freedom of packaging geometry, and are



designed to fit in hard-to-reach places. The reliability and strength of rigid-flex design remove the intense heat and contact problems associated with connectors and harnesses. The rigid-flex board offers exceptional mechanical support and electrical performance, and it can be bent to any shape due to the flexible material. The flexible substrate material shows remarkable dielectric stability that makes the board a perfect match for impedance control and high-frequency signal transmission. From digital cameras to cell phones to smart devices, rigid-flex PCBs are used in each and every one. Rigid-flex PCBs has been widely applied in electronic products.

## 2. HDI Flexible PCBs

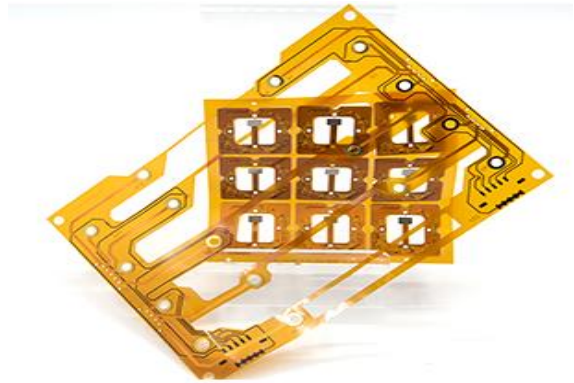
High density interconnect flexible printed circuit boards' circuit designs are efficient and reliable, and feature better design and layout than other boards. HDI flexible circuits offer construction options by incorporating desirable features such as microvias. HDI flexible boards provide better electrical performance and reduced package size due to the thinner substrate material used in the manufacturing of



these boards. HDI flexible boards are used in medical, aerospace, and defense industries. The most significant applications driving the growth of HDI flexible printed circuit boards are for mobile communications and computer devices.

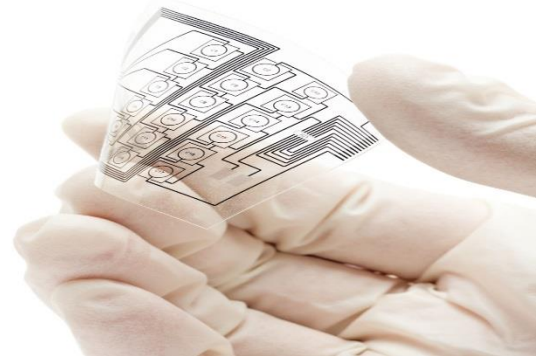
## 3. Development of Embedded Component Flex PCB

Electronic hardware development driving toward high density and miniaturization pushes the surface area of PCBs to shrink drastically while the number of electronic components required for assembly on the board continually rises. In order to explore a better solution, some designers consider embedding components such as inductors, resistors, and capacitors into the internal part of PCBs so as to achieve high density and miniaturization of electronic products. Embedded technology plays an active role in shrinking the interconnect path between components and reducing transmission loss. It buries Active Devices (ADs) and Passive Devices (PDs) inside boards or embeds them into a cavity. The embedded technology contributes to reductions of connection points, external pads, number of thru-holes, and lead length so that circuit board integrity can be improved and parasitic inductance of printed circuits can be decreased. Commercial, aeronautic, military, and medical products apply embedded components in PC boards.



## 4. Miniaturization of Flexible Printed Circuits (FPCs)

In 3C applications (computers/peripherals, consumer electronics, and communication), the demand for more compact and convenient, high-speed, low-cost, and efficient products is growing. In order to meet requirements, manufacturers are designing sophisticated FPCs in smaller sizes with higher component densities that can perform at a higher speed.



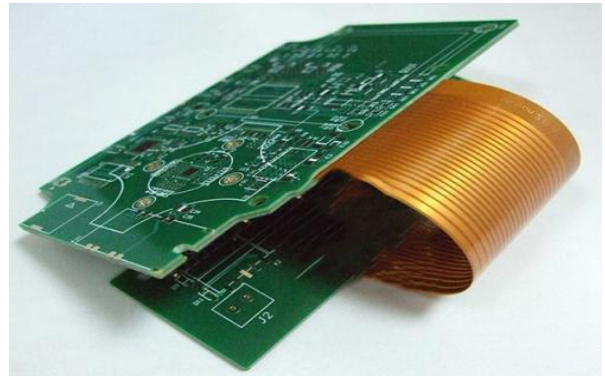
With continuous technological advancement in the 3C industry, the pressure is on FPC manufacturers to come up with solutions to meet demand. In the present scenario, the demand



for smaller products with more features is at a peak, pushing the market for advanced flexible circuits and rigid-flex circuits. Miniaturization of FPCs to meet the demand for compact devices with more features is expected to drive the market. Increasing demand for lightweight and portable devices is expected to increase demand for more compact and highly efficient FPCs.

## 5. Multi-Layer Flexible PCB

Multi-layer flexible PCBs come with three or more conductive layers separated by a dielectric material. The irregular lamination ensures high board flexibility, and the lamination thickness is normally less in the bonding area. Multi-layer flexible PCBs contain both bendability of flexible board and supporting components assembly capability.

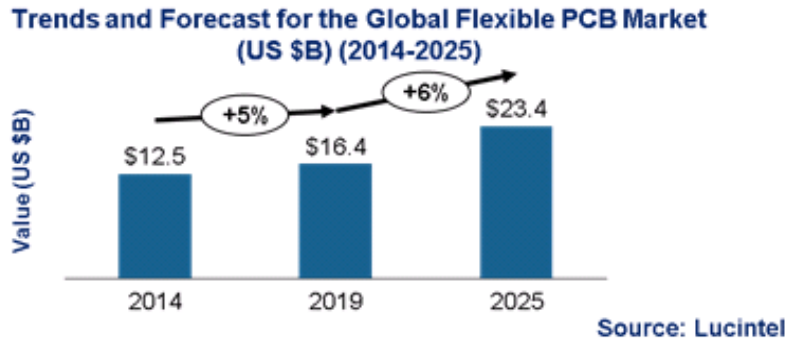


As the digital wave swells, multi-layer flexible PCBs are widely applied in LCDs (liquid crystal displays), DVD optical heads, digital cameras, digital video cameras and many more. For instance, the connection part of LCDs is comprised of an 8-layer flexible board, while digital cameras utilize a 6-layer flexible board. Thus, multi-layer flexible PCBs are becoming increasingly accepted for new electronic products.

## Strategic Considerations for Key Players in the FPC Market

The flexible printed circuit board industry is dynamic and ever-changing. Successful industry players are masters of innovation, change, and adaptation. To retain this status, they need to be attentive to current trends. We believe there will be promising opportunities for flexible printed circuit boards in the computer/peripheral, telecommunication, consumer electronic, medical, automotive, and aerospace and defense industries. As per Lucintel's latest market research report (Source: <https://www.lucintel.com/flexible-printed-circuit-board-market.aspx>),

the [flexible printed circuit board market](#) is expected to grow with a CAGR of approx. 6.0% between 2020 and 2025, and reach \$23.4 billion by 2025. This market is primarily driven by the increasing demand for FPCs in the telecommunication industry, growth in connected devices, and advancement in automotive electronics.



Whether you are new to the flexible printed circuit board market or an experienced player, it is important to understand the trends that impact the development process, as these trends as listed above will lead players to create long-term strategy formulation that will allow them to remain competitive and successful in the long run. For example, to capture growth, some of the strategic considerations for players in the flexible printed circuit board market are as follows:

- The FPC market players can increase their capabilities in designing and developing thinner and lighter flexible PCB structure, along with higher data processing speed.
- Development of flex PCBs for high working-temperature and high-density applications, as these are rapidly gaining market share in the PCB market
- Players can focus on developing sophisticated flexible PCBs in smaller sizes to align with the requirements of miniature electronic devices, a move which is expected to lead future trends.
- Investments to increase competencies in developing embedded component flex PCBs
- Research and development activities to develop high performance and multiple-function

flexible PCBs.

**Note:** In order to gain better understanding, and learn more about the scope, benefits, and companies researched, as well as other details in the flexible printed circuit board market report from Lucintel, click on <https://www.lucintel.com/flexible-printed-circuit-board-market.aspx>. This comprehensive report provides you in-depth analysis on market trends and forecast, segment analysis, regional analysis, competitive benchmarking and company profiling of key players. In addition, we also offer **strategic growth consulting** to meet your customized needs. We have worked with many PE firms and corporate customers in the process of their market entry and M & A initiatives.



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