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Global and China Automotive PCB Industry Report, 2021

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Automotive PCB research: vehicle intelligence and electrification bring about demand for PCBs, and local manufacturers come to the fore.

The share of electronics in curb weight of a vehicle is rising, expectedly up to 34.3% in 2020, which is accompanied by more vehicle entertainment and safety functions and the growth of new energy vehicles. This gives a direct boost to demand for automotive printed circuit boards (PCB).

The COVID-19 epidemic in 2020 slashed the global vehicle sales and led to a big shrinkage of the industry scale to USD6,261 million. Yet the gradual epidemic control has driven the sales up a lot. Moreover, the growing penetration of ADAS and new energy vehicles will favor sustained growth in demand for PCBs, which is projected to outstrip USD12 billion in 2026.

As the largest PCB manufacturing base and also the biggest vehicle production base in the world, China demands a great many of PCBs. By one estimate, China's automotive PCB market was worth up to USD3,501 million in 2020.

Vehicle intelligence pushes up demand for PCBs.

As consumers demand safer, more comfortable, more intelligent automobiles, vehicles tend to be electrified, digitalized and intelligent. ADAS needs many PCB-based components such as sensor, controller and safety system. Vehicle intelligence therefore directly spurs demand for PCBs.

In ADAS sensor's case, the average intelligent vehicle carries multiple cameras and radars to enable driving assistance functions. An example is Tesla Model 3 which packs 8 cameras, 1 radar and 12 ultrasonic sensors. On one estimate, the PCB for Tesla Model 3 ADAS sensors is valued at RMB536 to RMB1,364, or 21.4% to 54.6% of total PCB value, which makes it clear that vehicle intelligence boost demand for PCBs.

Number of Sensors Mounted on Typical Intelligent Vehicles

	Number of Cameras	Number of Radars
Tesla Model 3	8 cameras	1 radar, 12 ultrasonic sensors
Xpeng P7	14 cameras	5 radars, 12 ultrasonic sensors
NIO ET7	11 8MP HD cameras	1 ultra-long-range high-precision LIDAR, 5 radars, 12 ultrasonic radars
WEY Mocha	7 cameras	12 ultrasonic radars, 5 radars

Source: ResearchInChina

Vehicle electrification stimulates demand for PCBs.

Differing from conventional vehicles, new energy vehicles need PCB-based power systems like inverter, DC-DC, on-board charger, power management system and motor controller, which directly boosts demand for PCBs. Examples include Tesla Model 3, a model with total PCB value higher than RMB2,500, 6.25 times that of ordinary fuel-powered vehicles.

Application of PCB in New Energy Vehicle Electric Control System

Electric Control System	Function	Application of PCB
VCU	Detect vehicle status and implement vehicle power control decisions	The control circuit uses PCB, about 0.03m ²
MCU	Control the operation of motors according to the decision instructions issued by the VCU	The control circuit uses PCB, about 0.15m ²
BMS	Control the charging and discharging process of the battery for protection and comprehensive management of it	The main control circuit uses PCB, about 0.15m ² ; The single management unit uses PCB, about 3-5m ²

Source: Jiangsu Xiehe Electronic; ResearchInChina

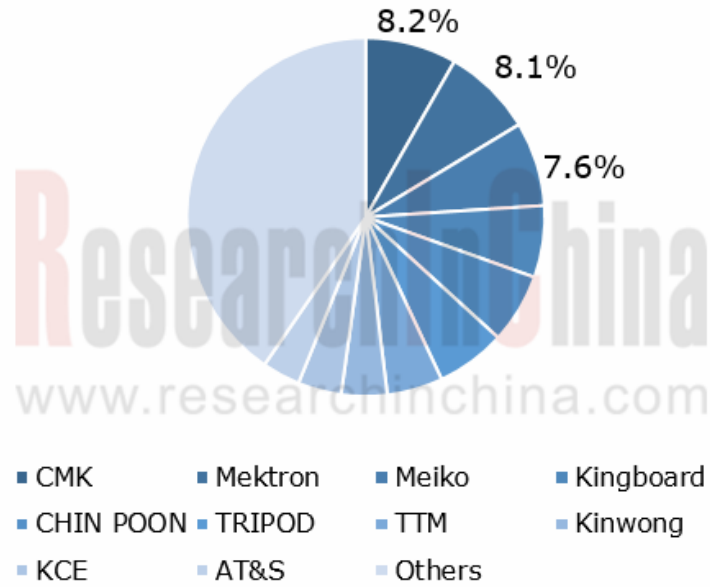
In recent years, the global penetration of new energy vehicles has been on the rise. Major countries have formulated benign new energy vehicle industry policies; mainstream automakers race to launch their development plans for new energy vehicles as well. These moves will be a major contributor to the expansion of new energy vehicles. It is conceivable that the global penetration of new energy vehicles will ramp up in the years to come.

It is predicted that the global new energy vehicle PCB market will be worth RMB38.25 billion in 2026, as new energy vehicles become widespread and the demand from higher levels of vehicle intelligence favors a growth in PCB value per vehicle.

Local vendors cut a figure in the severer market competition.

At present, the global automotive PCB market is dominated by Japanese players such as CMK and Mektron and Taiwan's players like CHIN POON Industrial and TRIPOD Technology. The same is true of the Chinese automotive PCB market. Most of these players have built production bases in Chinese Mainland.

Global Automotive PCB Market Structure by Company, 2020



Source: ResearchInChina

In Chinese Mainland, local companies take a small share in the automotive PCB market. Yet some of them already make deployments in the market, with increasing revenues from automotive PCBs. Some companies have a customer base covering the world's leading auto parts suppliers, which means it is easier for them to secure bigger orders to gain strength. In future they may command more of the market.

World's Large Auto Parts Supplier Customers of Local PCB Companies in China

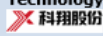





World's Large Auto Parts Supplier Customers	
WUS Printed Circuit 	Continental, Bosch
Guangdong Ellington Electronics Technology 	Valeo, Delphi, Continental, Bosch
Shenzhen Kinwong Electronic 	Denso, Bosch, Valeo, Aptiv, Hella, Toyota
Aoshikang Technology 	Mobis, Bosch, Panasonic, Yazaki, Aptiv
Olympic Country 	Denso, Aptiv, Mando, Amphenol, Toyota, Panasonic, Mobis
Sihui Fuji Electronics Technology 	Panasonic, Hitachi, Koito
Guangdong Goworld 	Continental, Hella, Valeo, Bosch
Jiangsu Xiehe Electronic 	Magna

Source: ResearchInChina

Capital market helps local players.

In recent two years, automotive PCB companies seek capital support to expand capacity for more competitive edges. With the backing of capital market, local players will become more competitive as a matter of course.

Capacity Expansion Plans of Automotive PCB Companies in China, 2020-2021

Company	Time	Fundraising Project	Invested Raised Funds (RMB1,000)	New Annual Capacity
Guangdong Kingshine Electronic Technology 	2020	Jiangxi Kingshine Printed Circuit Board and Semiconductor Construction Project (Phase I)	562,886.0	500,000m ² multilayer boards, 200,000m ² HDI boards, 100,000m ² special boards
	2021	Jiangxi Kingshine Printed Circuit Board and Semiconductor Construction Project (Phase II)	1,100,000.0	1 million m ² /year HDI boards, 600,000 m ² /year new energy vehicle multilayer boards
Jiangsu Xiehe Electronic 	2020	1 million m ² /year high-density multilayer PCB capacity expansion project	426,506.8	1 million m ² high-density multilayer PCBs
Suntak Technology 	2021	Zhuhai Suntak Circuit Technology Co., Ltd.'s new PCB construction project (Phase I)	1,000,000.0	2.7 million m ² multilayer rigid boards
Shenzhen Kinwong Electronic 	2020	Kinwong Electronic Technology (Zhuhai) Co., Ltd.'s 1.2 million m ² /year multilayer PCB project (Phase I)	1,780,000.0	1.2 million m ² multilayer boards
Guangdong Goworld 	2020	New Special Printed Circuit Board Commercialization Construction Project (Phase I)	700,000	240,000 m ² high-frequency, high-speed PCBs and high-performance HDI PCBs
Olympic Country 	2021	Heshan Shimao Electronic Technology Co., Ltd.'s 3 million m ² /year new circuit board construction project (Phase I)	1,000,000.0	3 million m ²

Source: ResearchInChina

Automotive PCB products head in high-end direction, and local companies make deployments.

At present, automotive PCB products are led by double-layer and multi-layer boards, with relatively low demand for HDI boards and high frequency high speed boards, high value-added PCB products which will be more in demand in future as demand for vehicle communication and interiors increases and electrified, intelligent and connected vehicles develop.

The overcapacity of low-end products and fierce price war make companies less profitable. Some local companies tend to deploy high value-added products for becoming more competitive.

Company	Deployments
WUS Printed Circuit 	In 2020, the company developed BSG control board, ADAS main control board, vehicle energy board, ceramic buried lamp board, copper block embedded board, etc.
Victory Giant Technology 	Phase II of the company's HDI project is about to make trial run; ID package substrate is in the phase of research and development and has yet to be production-ready; high-class HDI products have been production-ready.
Shenzhen Kinwong Electronic 	In 2020, the company mass-produced more products for autonomous driving and new energy vehicles.
Aoshikang Technology 	The company is developing high-class HDI boards and high-end automotive boards.
Bomin Electronics 	The company invested RMB3 billion in capacity expansion involving HDI board, high-class multilayer board, rigid-flex board and high-frequency high-speed board.
Olympic Country 	In 2020, the company started production of Class 3/4 high-frequency high-speed HDI PCB and rigid-flex HDI board for vehicles; and trial-produced high heat dissipation copper block buried PCB and high-frequency high-speed long-range radar PCB for vehicles in small.
Sihui Fuji Electronics Technology 	In 2020, the company developed new products for new energy vehicles, including high current high heat dissipation copper block embedded power supply substrate, metal base substrate, ceramic substrate, rigid-flex board, ultra-thick copper ($\geq 60Z$) substrate, and depth-controlled stepped substrate.
Guangdong Goworld 	In 2020, the company raised RMB700 million to construct capacity of 240,000m ² /year high-frequency high-speed PCBs, high-performance HDI PCBs, and other products, which are largely used in smart phones, automotive electronics, intelligent driving, etc.
Jiangsu Xiehe Electronic 	In 2020, the company made an IPO to raise funds for its 1 million m ² /year high-density multilayer PCB capacity expansion project.
Huizhou China Eagle Electronic Technology 	In 2020, the company raised RMB1.2 billion for its high-density PCB construction project, which mainly produces high-class multilayer boards, HDI boards, rigid-flex boards, substrate-like PCBs and so forth, which are largely used in automotive electronics and 5G communications.
Guangdong Ellington Electronics Technology 	The company masters high-safety precision automotive circuit board production technology.

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Beijing Headquarters

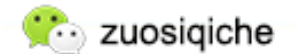
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