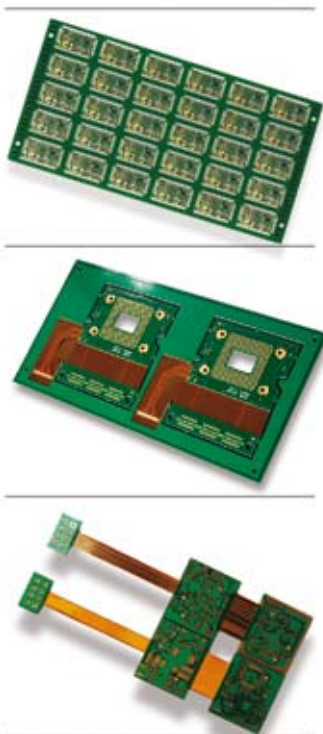


PCBs



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PCBs

Supplier capability in China

EXECUTIVE SUMMARY

China continues to strengthen its position as the world's largest supplier of PCBs. Production and exports this year are estimated to climb 11 percent YoY to reach \$19.7 billion and \$11.8 billion, according to the China Printed Circuits Association.

Makers are banking on the robust electronics industry to recover from the recent export sales slump and sustain growth in coming years. With overseas orders starting to rebound in 2H09, many expect revenue to remain in an upturn. The rising penetration rate in the computer, telecom, automotive, industrial and even aviation segments likewise bodes well for the sector.

Multilayer boards are forecast to lead, with output projected to climb at least 15 percent this year to hit 99 million square meters. HDI and flexible PCBs are also gaining traction. The upswing in the former type is spurred by the bullish mobile phone segment as nearly 90 percent of the world's handsets integrate HDI boards.

Many suppliers, especially small and midsize operations, expect the government's stimulus programs to spur electronic product manufacture and push up demand for PCBs.

The following are some of the key trends in China's PCB industry:

- Squeezed margins resulting from the recent sales slump compelled makers to increase export quotes in the past several months. The tight price competition, however, will force many to implement reductions to grab more orders.

- To boost export capability, suppliers are improving operating efficiency and lowering manufacturing costs through production line optimization and process streamlining. Several are adopting stricter resource planning to manage raw material inventory better.

- Product development initiatives center on increasing the number

of PCB layers and adopting new materials. Some makers are decreasing the line width and spacing.

- "Green" initiatives revolve around waste management, energy efficiency and recycling. About 50 suppliers now comply with the Cleaner Production Standard-Printed Circuit Board Manufacturing specifications released by the Ministry of Environmental Protection of China early this year.

- Companies are keen to expand their markets in the EU. North America is another key export destination.

- The high cost of imported materials and manufacturing equipment remains a challenge for many suppliers, especially small enterprises. Most inputs for multilayer PCBs, for example, are from DuPont, Arlon and Taiflex.

This report covers the major types of PCBs manufactured in China. Each product category is discussed in a separate module that details common features and functions found in mainstream models. R&D trends, components and materials, and prices are also covered.

The Industry Overview positions China in the worldwide market and discusses growth opportunities in coming months. It identifies the factors shaping the segment, including challenges faced by makers and steps taken to overcome these hurdles and boost competitiveness further.

The majority of China's more than 1,000 manufacturers are based in the Pearl River Delta and Yangtze River Delta regions. Companies leverage the areas' material and service supply chains and target their strong consumer electronics, computer and telecom equipment industries. The provinces of Fujian and Liaoning are emerging as key sourcing centers as well, especially for flexible and multilayer boards.

In this report

- 16 in-depth company profiles
- 17 additional suppliers
- 65 top-selling export products
- Supplier demographics
- Supplier survey
- Industry statistics & charts

METHODOLOGY

To produce this report, Global Sources surveyed a wide range of suppliers. Rather than focus simply on high-profile makers, we compiled a representative sample of large, midsize and emerging manufacturers. All profiled companies are export-oriented professional suppliers that may or may not be clients of Global Sources.

The selection of suppliers is designed to reflect the composition of the industry in China in terms of geographic spread, business type and company ownership.

For in-depth company profiles, our research teams interviewed senior executives and export managers who discussed their recent performance and provided, R&D, production and export forecasts for the next 12 months. The interviews were done in person, by phone or e-mail.

In each case, companies were required to answer specific questions designed to verify their manufacturing and export credentials, including their production and export statistics, and a breakdown of exports by product type and market. Our production checklist details the product-specific manufacturing capability of each supplier.

All profiled suppliers participated in a survey designed to provide insight into product and price trends, and challenges facing the industry. All survey questions are single choice. Results were calculated based on the actual number of valid responses to each question.

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INDUSTRY OVERVIEW

China remains the largest production base for PCBs worldwide, accounting for one-third of global supply. Aggregate yield by end-2009 is estimated to reach 175 million square meters, representing a 13 percent increase YoY, according to the China Printed Circuits Association. CPCA expects overseas shipments to climb to 105 million units from 93 million in 2008. The upswing will translate to \$19.7 billion and \$11.8 billion in output and export value by year-end, both expanding 11 percent from 2008.

The country's huge consumer electronics, computer and telecom industries partly sustain the local PCB segment, providing makers in the latter with a ready market for their products. Overseas business, nevertheless, remains a priority for the majority of companies. Despite the recent setback in international sales due to the economic downturn, most will concentrate on foreign trade. Many are banking on the anticipated recovery in the global electronics segment, and are therefore increasing capacity and export ratio in preparation for a rebound in orders.

The step up to high-grade boards under efforts to expand selections and reach a wider buyer base will also contribute to the momentum. In addition to fast-tracking product development, it will raise overall yield.

Across the different PCB categories, the multilayer variant is forecast to post the strongest growth. Output is expected to climb at least 15 percent to hit 99 million square meters by year-end. Besides the consumer electronics industry, makers are riding on the communication, automotive, medical, industrial and aviation sectors to sustain this line.

For HDI and flexible varieties, it is the portable electronics segment that is providing an impetus. The former takes up only a quarter of China's total PCB supply but the ubiquity of mobile phones will likely increase

this share. Nearly 90 percent of the world's handsets use HDI. With the country producing the bulk of global mobile phone yield, output of this board configuration will rise steadily in coming years.

HDI PCBs are also now widely adopted in computers, and consumer and automotive electronics. The penetration rate is likewise going up in the medical, industrial and military sectors.

Flexible variants, meanwhile, are increasingly integrated into mobile phones, laptops and digital handheld devices. Makers of this type are expanding capacity to prepare for more orders from computer and telecom equipment manufacturers.

Industry challenges

The shift to multiple-layer and higher-density PCBs is constricting traditional models such as single- and double-sided versions. Production of the former in particular has been in a downward trend in recent years. The line accounted for 25 percent of China's total yield in 2008, a significant drop from its 58 percent share in 2000. Companies expect this will fall an additional 5 percent this year as players switch to the more

Supplier summary

Suppliers surveyed	16
Export sales	\$307.6mn
Export ratio	56%
OEM business	80%
Capacity utilized	76%
Annual R&D spending	\$13.7mn
Full-time employees	13,967

Data: All surveyed suppliers

popular multilayer and HDI boards.

Reflecting the shift in product type is the shrinking supplier pool for single- and double-sided PCBs. While all manufacturers in the country can turn out such models, only one-third actually make them. Most prefer to concentrate on units with healthier margins.

Exacerbating the situation is the severe price competition in these segments. Many companies have reduced quotes in recent months to grab more orders. Contract cancelations forced a number to shelve expansion plans, with some operating at only 50 percent of total capacity. Between 4Q08 and 1Q09, 30 percent of the maker population or 300 to 400 had shut down operations.

In the other product categories, the biggest challenge for suppliers is the lack of locally made equipment and

Major customers

Company	
ABP	Cairn Sarl (France)
Glorysky	Maxim, Emerson (US); Bosch (Germany); Invt (China)
Shanghai Fast-PCB	Philips (the Netherlands); GE (US)
Shenzhen Fastprint	ZTE, Huawei (China)
Shenzhen King	Philips (Australia); GE, IBM, ZTE, Mindray (China)
Shenzhen Sunshine	Flextronics (Singapore); Elcoteq (Hungary); Seidel (Austria); Jabil Circuit (US)
Shenzhen Suntak	Emerson, GE, Tyco (US)
Zhejiang Zhanbang	Alcatel, Haier (China)

Data: All surveyed suppliers

ABP (Shenzhen) Electronics Ltd

ABP's PCB selection consists of aluminum-base, flexible/rigid-flex, multilayer and single/double-sided types. The average monthly production is 8,500sqm out of a 10,000 capacity. Nearly 90 percent ships overseas.

The line generated \$12.5 million in sales in 2008, with \$11 million from exports. This accounted for 81 percent of the company's total sales.

In the next 12 months, the supplier expects overseas sales to stay the same but is undertaking steps to boost exports by broadening its product range. It will continue to sustain R&D

with a 5 percent allocation from sales. ABP also plans to increase annual capital expenditure by up to 50 percent.

ODM orders form the bulk of outbound shipments and OEM 15 percent. The major destinations are North America and the EU. Products are also sent to non-EU countries, South America and the Asia-Pacific region.

Manufacture is carried out in three factories with a total area of 15,000sqm. The workforce complement totals 150, including 50 QC and 10 R&D personnel.

Company facts

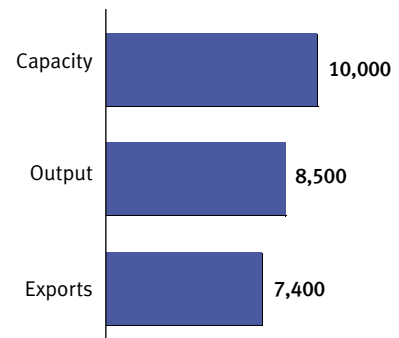
Year established	2004
Business type	Manufacturer
Company ownership	Mainland China-owned
Head office location	Shenzhen (Guangdong)
Number of factories	3
Factory location(s)	Meizhou, Huizhou (Guangdong)
Total factory area	15,000sqm
No. of full-time employees	150
No. of R&D/design staff	10
No. of QC staff	50
Annual sales (all products)	\$15.4mn
Annual R&D spending	\$770,000
ISO certification	Yes

Sales & output: PCBs

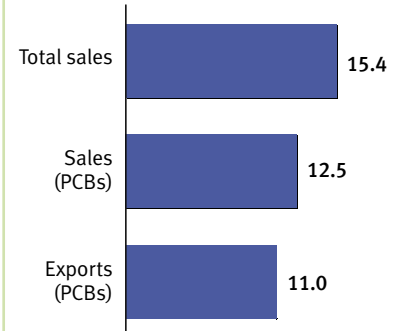
Annual sales	\$12.5mn
Share of total sales	81%
Annual export sales	\$11.0mn
Total monthly capacity	10,000sqm
Average monthly output	8,500sqm
Capacity utilized	85%
Average monthly exports	7,400sqm
Export ratio	87%
OEM % of exports	15%
ODM % of exports	85%
OEM % of exports	—
Major customer	Cairn Sarl (France)
Other products made	PCB assemblies, stencils, membrane switches

Profile

Production sqm/mth



Sales \$mn/yr



Contact details

Business contact

HU Winnie

Phone

(86-755) 2605-4178

Fax

(86-755) 2643-5488

E-mail

sales@abp.net.cn

abp@globalsources.com

URL

www.abp.net.cn

www.globalsources.com/abp.co

Address

311 10th Building, Zhongxing Industrial Zone, Chuangye Road, Nanshan, Shenzhen, Guangdong, China

Capability

In-house processes

Silk-screen printing	Yes
Photoengraving	Yes
PCB milling	Yes
Patterning	Yes
Laminating	Yes
Drilling	Yes
Solder plating	Yes
Solder mask making	Yes
Etching	Yes

Exports by product

Aluminum-base PCBs	10%
Flexible/rigid-flex PCBs	2%
Multilayer PCBs	65%
Single/double-sided PCBs	23%

Exports by market

North America	40%
European Union	40%
Europe (non-EU)	8%
Asia-Pacific	5%
Middle East	—
Other	7%

Survey

- **Export prices**
Increased
- **Export price increase**
5-10%
- **Export sales**
Stay the same
- **Target market**
European Union
- **Capital expenditure**
Increase up to 50%
- **Major challenge**
Price competition
- **Export capability**
Widen product range
- **R&D focus**
Increase number of layers

Popular export models



Single/double-sided PCB

Model	LPF
MOQ	1sqm
Packaging	Vacuum
Delivery	Negotiable
Price	Negotiable

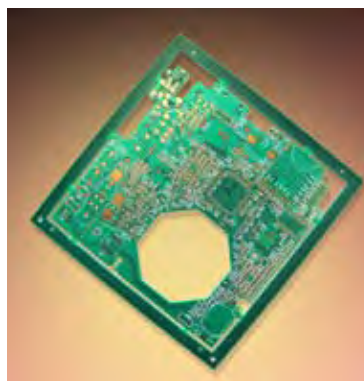
Description: Rigid double-sided; two layers; Arlon Diclad 880 base; 5µm hard gold surface finish; no solder mask; 21.65mil line width; 21.65mil line spacing; 1mm hole diameter; 165x73mm board dimensions; 0.8mm board thickness; 230 to 260 C soldering temperature; UL, RoHS



Multilayer PCB

Model	8 layer PCB_301
MOQ	1sqm
Packaging	Vacuum
Delivery	Negotiable
Price	Negotiable

Description: Eight layers; FR-4 base; 2 to 3µm immersion gold surface finish; green solder mask; 3.94mil line width; 3.94mil line spacing; 0.2mm hole diameter; 167x107mm board dimensions; 1.6mm board thickness; 230 to 260 C soldering temperature; for telecom products



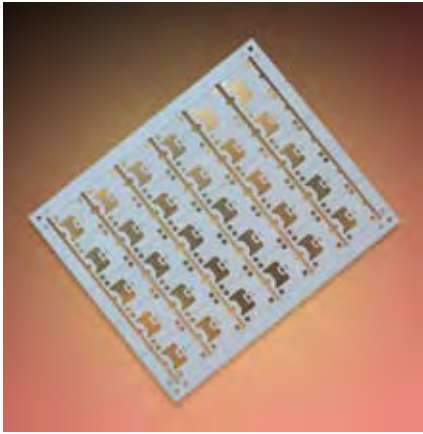
Multilayer PCB

Model	311
MOQ	1sqm
Packaging	Vacuum
Delivery	Negotiable
Price	Negotiable

Description: Rigid; four layers; FR-4 Tg170 base; immersion gold surface finish; green solder mask; 5.91mil line width; 5.91mil line spacing; 0.4mm hole diameter; 150x152mm board dimensions; 1.6mm board thickness; 230 to 260 C soldering temperature; for medical apparatuses

PRODUCT GALLERY

Aluminum-base PCBs


Global Circuit

(profile page 30)

Model: GC-003

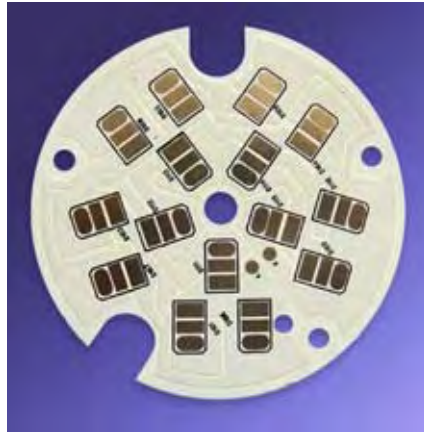
MOQ: 1sqm

Packaging: Vacuum

Delivery: 10 days

Price: Negotiable

Description: One layer; FR-4 base; immersion gold surface finish; white solder mask; 11.8mil line width; 11.8mil line spacing; 200x170mm board dimensions; 1.5mm board thickness; UL, RoHS


Glorysky

(profile page 32)

Model: Aluminum 03

MOQ: 1sqm

Packaging: Vacuum

Delivery: Negotiable

Price: Negotiable

Description: One layer; ENIG surface finish; black solder mask; 10mil minimum line width; 10mil minimum line spacing; 0.8mm minimum hole diameter; 50x50mm maximum board dimensions; 2mm board thickness


Shenzhen Fastprint

(profile page 38)

Model: 8T00101CA0

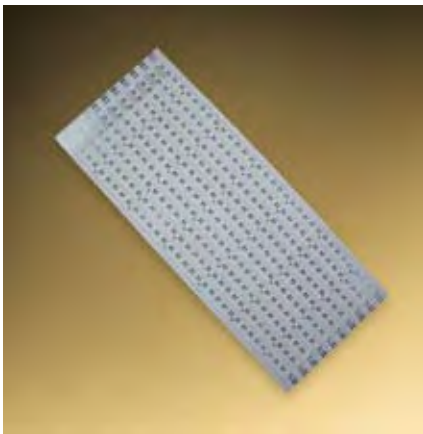
MOQ: 2 units

Packaging: Vacuum

Delivery: 15 days

Price: Negotiable

Description: Eight layers; FR-4 S1000-2 and aluminum base; HASL surface finish; green solder mask; 5.2mil line width; 5.7mil line spacing; 0.2mm hole diameter; 140x98mm board dimensions; 3mm board thickness; ≤235 C soldering temperature


Shenzhen Sunshine

(profile page 42)

Model: SS906S001

MOQ: 0.1sqm

Packaging: Vacuum

Delivery: 3 days

Price: Negotiable

Description: One layer; HASL surface finish; white solder mask; 21.26mil line width; 0.9mm hole diameter; 190.42x470mm dimensions; 1.7±0.17mm board thickness; 3oz copper thickness; 1.5mm aluminum core thickness; 80µm dielectric material; for LEDs


Shenzhen Suntaink

(profile page 44)

Model: 003658H1A1

MOQ: 1sqm

Packaging: Vacuum

Delivery: 7 days

Price: Negotiable

Description: One layer; HAL surface finish; green solder mask; UL, RoHS


Shenzhen Zhiboxin

(profile page 46)

Model: zbx002

MOQ: 1sqm

Packaging: Vacuum

Delivery: 10 days

Price: Negotiable

Description: One layer; lead-free HASL surface finish; white solder mask; 19.7mil line width; 19.7mil line spacing; 1.5mm minimum hole diameter; 30x200mm board dimensions; 1.6mm board thickness; for LED lights; UL, RoHS, SGS

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