

# Welcome to O-leading

O-Leading strives to be your one stop solution partner in EMS supply chain, including PCB design , PCB fabrication and PCB assembly ,We provide some of the most advanced PCB technology, including HDI PCBs,multilayer PCBs, Rigid-Flexible PCBs.We can support from quick turn prototype to medium & mass Production.

In general, our global customers are very impressed with our services:Rapid response, competitive price and quality commitment.Providing more valuable technical service and overall solution is the way O-leading forward.

Looking to the future, O-leading will concentrate on the innovation and development of electronics manufacturing technology as always, and make persistent efforts on PCB & PCBA one-stop service to provide first-class services and create more value for our customers.

PLEASE CLICK THESE FOR MORE INFORMATION□[Professional Rigid Flexible PCB Supplier For Raspberry PI 4 ABS Case](#)

The banner is divided into two main sections. The top section has a dark blue background with a glowing blue globe and network lines. It features the O-LEADING logo (To Be Reliable, To Be Valuable) and the text 'WE ALWAYS PROVIDE YOU' in a grey box. Below this is a large, complex green PCB with many components, labeled 'BEST HIGH DENSITY INTERCONNECT PCB'. To the right of this PCB is a row of six smaller, different PCB designs. The bottom section has a similar background but includes images of the Earth's moon and Jupiter. It features the text 'WE ALWAYS PROVIDE YOU' in a grey box and 'BEST RIGID-FLEXIBLE CIRCUIT' in a white box. To the right of this text is a green PCB being held by a hand, with a white arrow pointing to it.

## Product Description

AlphaBot2 Wireless Video Smart Robot Powered By Raspberry Pi 4 With PI4B-4GB

Applicable Industries:Manufacturing Plant, Farms, Food & Beverage Shops, Other

Showroom Location:None

Product name:Smart Robot

Usage:OEM Electronics

Certificate:ROSH. ISO9001

Solder mask:Green. Red. Blue. White. Black.Yellow

Service:One Stop Turkey Service

Features:quad-core processor,dual-band wireless LAN,Bluetooth 4.2/BLE

## Raspberry Pi 4 Video Robot With PI4B

AlphaBot2 Wireless Video Smart Robot

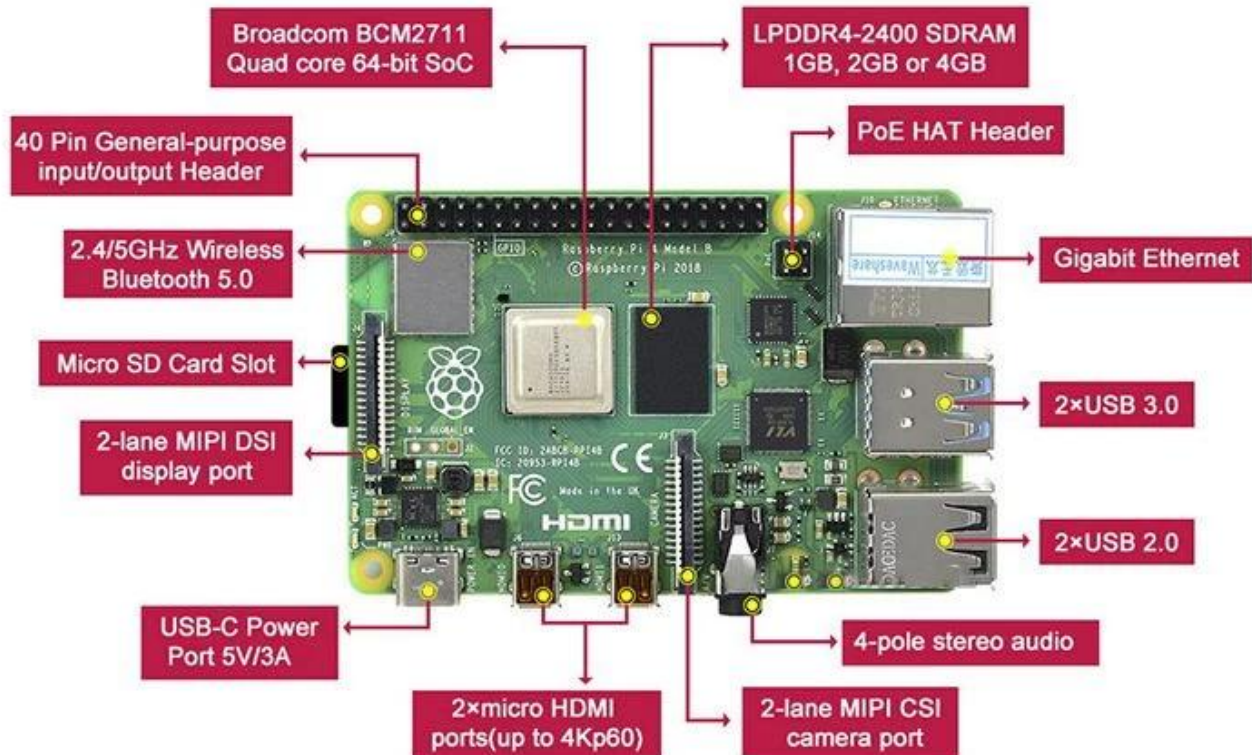
Obstacle Avoidance, Line Tracking, Wireless Remote Control, Video Monitoring...



\* The Raspberry Pi 4 is optional, up to your choice.

# Raspberry Pi 4 Completely Upgraded

More Powerful Processor, Richer Multi-Media Capability, Faster Networking



## BCM2711B0

64-bit 1.5GHz Quad-core Processor

## Choice Of RAM

2GB / 4GB / 8GB

## 4K Dual HDMI

4K High Resolution Dual Displays

## Faster Networking

Gigabit ETH, Bluetooth 5.0, Dual-band WiFi

## New USB3.0

2xUSB3.0 + 2xUSB2.0

## USB-C Power

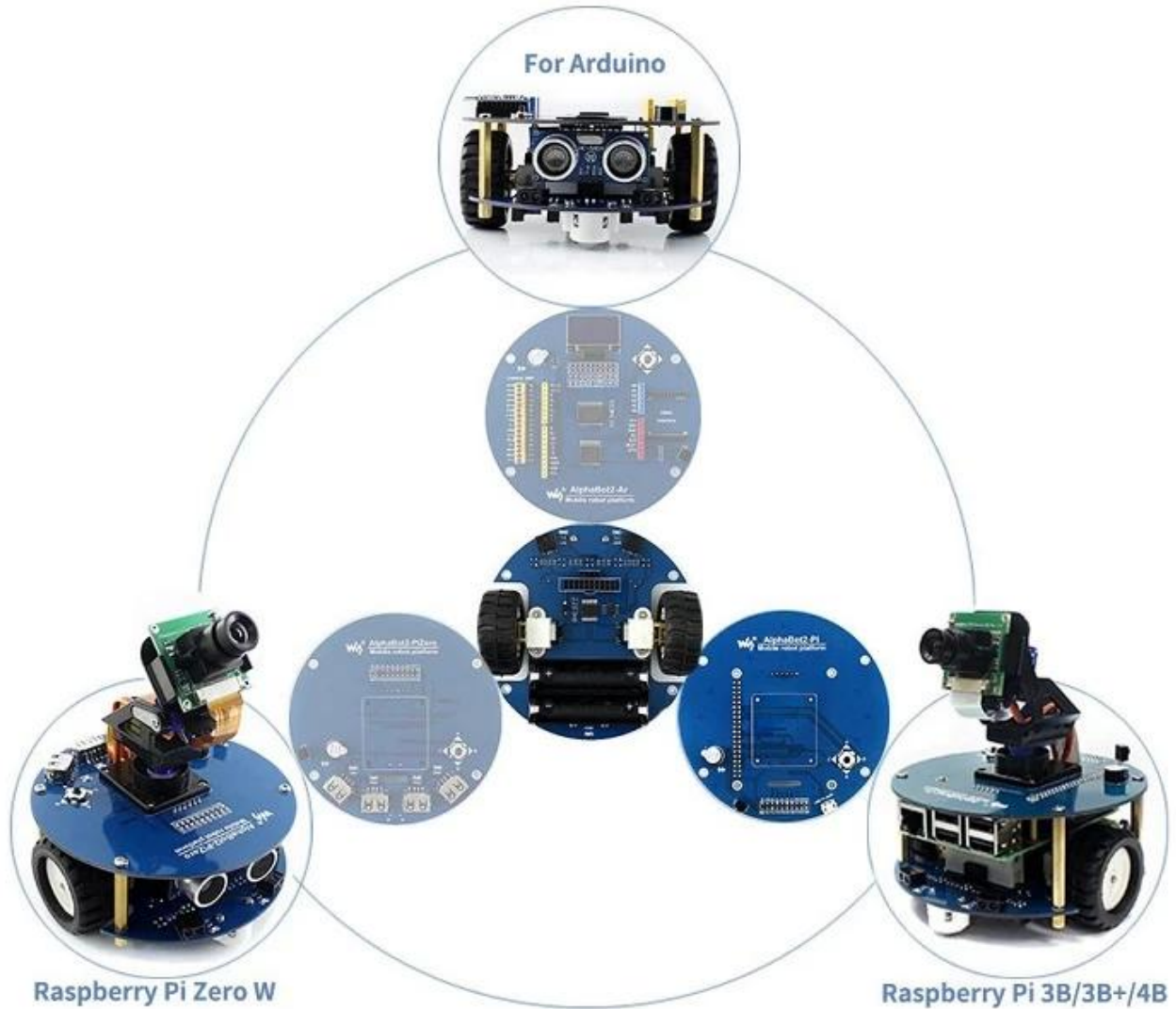
Upgraded Power Supply, More Powerful



# Versatile AlphaBot2 Chassis

Compatible With Multi Controllers Via Related Adapter Boards (Purchased Separately)

Easily Turn It Into A Pi Zero / Arduino Robot



# Modular Design, No More Messy Wiring

## Highly Integrated AlphaBot2-Pi Adapter Board:

IR Obstacle Avoidance, 5-Ch Detector Li Tracking, Battery Charging Circuit, High Quality N20 Motor, Rubber Wheels, And Colorful RGB LED



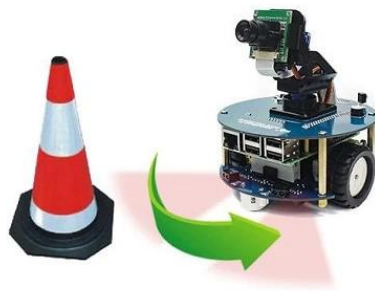
# Raspberry Pi 5MP HD Camera, 1080P

The Leading Role For Vision Applications, Like Mjpg-Streamer Video Monitoring, And OpenCV  
Intelligent Recognition Driving



# Full Functionality, Common Examples

For More Possibilities, Refer To Example Code And Manual

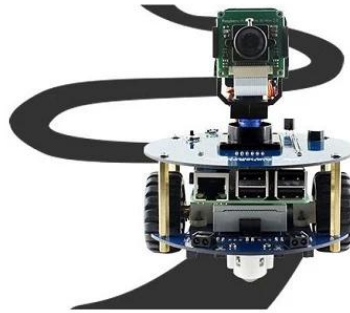


## Obstacle Avoidance

The module sends IR beam and detects objects by receiving the reflected IR beam, to easily avoid obstacles in the way.

## Auto Line Tracking

Features 5-ch IR detector for sensing and analysing the black line, combined with PID algorithm for adjusting robot movement, high sensitivity, stable tracking.



## Bluetooth Control

Provides mobile APP to control the robot movement and peripherals, such as RGB LED color, onboard buzzer, etc.

## Infrared Control

With the IR receiver onboard, it is allowed to control the robot via IR remote controller, make it move forward or change direction...



Web control (Mobile/Tablet/PC)    Qt software control (PC)    APP control (Android phone)



## WiFi Control

Supports WiFi remote control, real time video monitoring via webpage / APP / PC, also features routing function by creating WiFi hotspot.

## 2-DOF Pan-Tilt

2-DOF pan and tilt + hardware PWM controlled servo, smoothly rotates the camera to capture omnibearing images.







AlphaBot2-Pi robot RGB LED control



AlphaBot2-Pi robot video monitoring



AlphaBot2-Pi robot Bluetooth control



multi AlphaBot2 robots line following



AlphaBot2-Pi robot obstacle avoiding



# Kits Selection Guide

Various Raspberry Pi 4 Kits Are Available, Find Your Favorite One

## Starter Kit

The very essential parts to get started, guaranteed compatibility and stability.

- 16GB Class10 high speed micro SD card
- 5V 3A Type-C power supply
- Cool brass heat sink
- Extra free micro SD card reader



## Display Kit

Build your own all-in-one computer powered by Raspberry Pi 4, much more funny.

- 7inch wide viewing angle HD touch screen
- High quality black/white acrylic protective case
- HDMI to micro HDMI cable
- 16GB micro SD card, power supply...

## Sensor Kit

### Pi x Arduino

Sensors are important parts of IoT, while the Arduino is a massive ecosystem, this kit provides a way for the Pi to make use of these powerful things.

1 + 1 > 2

- Pi to Arduino adapter board
- 13x popular sensors
- 16GB micro SD card, power supply...



## Robot Kit

### AlphaBot

Make a Raspberry Pi smart mobile robot, easily use it for obstacle avoidance, line tracking, Bluetooth / IR / WiFi remote control, or video monitoring. Arduino compatible.

- AlphaBot driver board
- AlphaBot chassis
- Modules: Camera / Line tracking / Speed measuring...
- Raspberry Pi 4 is NOT included

## Robot Kit

### AlphaBot2

Make a Raspberry Pi smart mobile robot, easily use it for obstacle avoidance, line tracking, Bluetooth / IR / WiFi remote control, or video monitoring. A smaller and more flexible one.

- AlphaBot2-Pi (adapter board)
- AlphaBot2-Base (base chassis)
- Modules: Camera...



## Robot Arm Kit

Flexible and stable 4-DOF metal robot arm, allows to be controlled by smart phone through Bluetooth or WiFi connection.  
"Just grab it"

- Servo driver board
- Metal mechanical arm structure
- 4x servos, power supply...
- Raspberry Pi 4 is NOT included



# Our Team

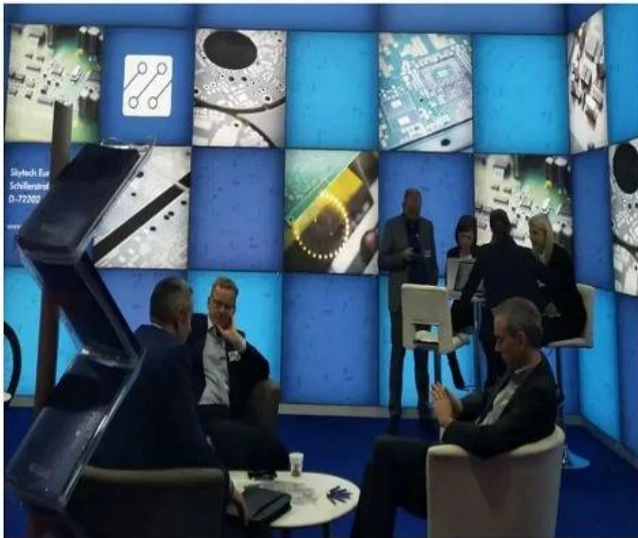
O-LEADING *CUSTOMER*

To be *RELIABLE*

**Q**uality first ,  
**C**ustomer supreme ,  
**S**cientifically management ,  
**S**triving for famous brand



*THE CUSTOMER IS KING*



To be *VALUABLE*

**S**cience and technology keeps head ,  
**P**ut people first ,  
**B**e precise and practical ,  
**C**ontribute sincerely

## Factory PCB



Automatic vacuum press machine



Drilling Machine



Pattern Plating Machine



Scrubbing Machine



Developing Machine



Routing Machine



High-speed flying probe machine



E-test Machine

## Factory SMT





# HOW O-LEADING MAKE A PROJECT FOR YOU

Hardware Dispenser Application Not

## Automatic Dispenser Application Not

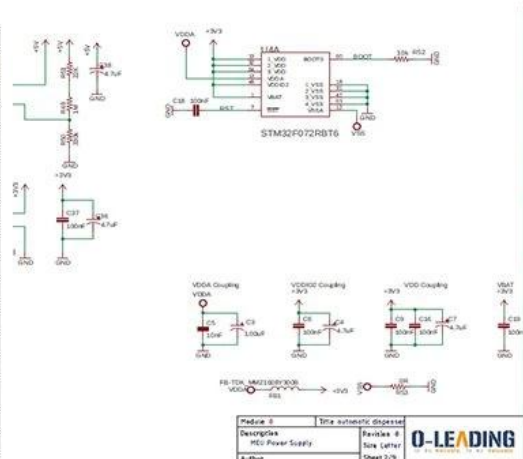
Voltage Table

Volt Pin Number	Description
VDD	Battery Voltage
+3V3	+3.3V
+5V	+5V
USB +5V	USB 5V input
+5V2	Isolated +5V
+12V	12V DC Drive

STM32F072 PinOUT table

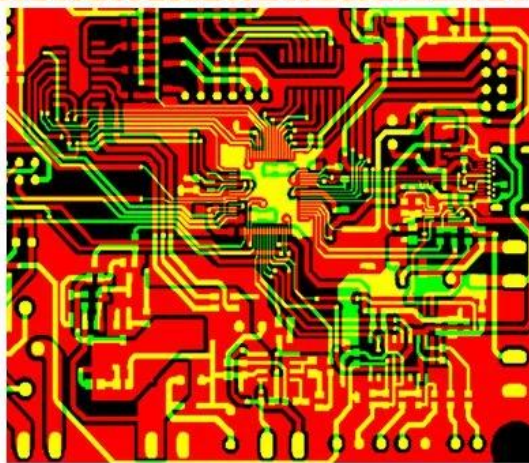
Wire Name	Description	DIO	Mode	Note
SHTN_TOF	Shutdown Time of flight sensor		Output	Logic '0' to shutdown
I2C_SCL_TOF	I2C communication with time of flight sensor		I2C1_SCL	
I2C_SDA_TOF	I2C communication with time of flight sensor		I2C1_SDA	
I2C_SCL_IR	I2C communication with thermopile sensor		I2C2_SCL	
I2C_SDA_IR	I2C communication with thermopile sensor		I2C2_SDA	
RATE_LC	Load cell control pins		Output	
DOUT_LC	Load cell control pins		Output	

**O-LEADING**  
To Be Reliable, To Be Available

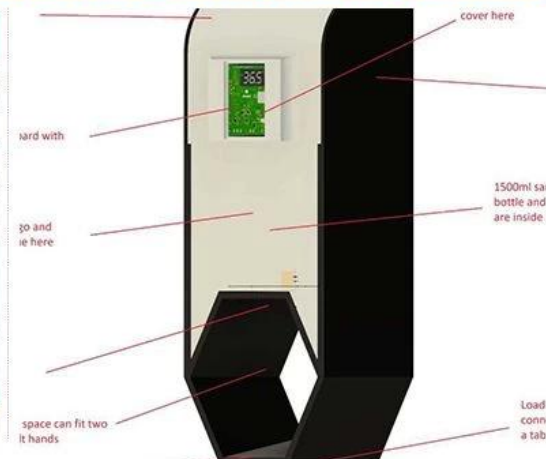
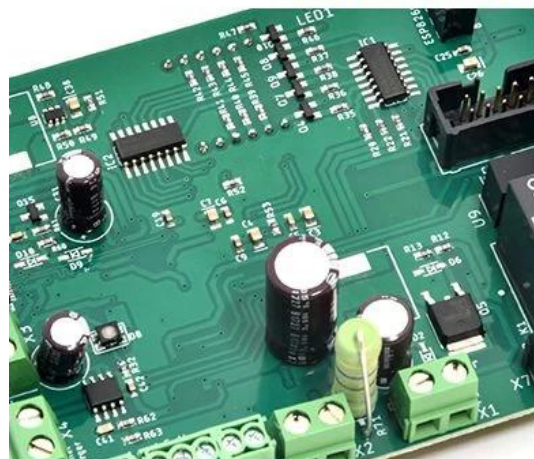


## HARDWARE schematics

## PCB PRODUCTION COMPONENTS SOURCING



Qty	Value	Device	Parts	Description
4	AK500/2	AK500/2	X1, X2	CONNECTOR
1	AK500/3	AK500/3	X7	CONNECTOR
1	124114	MA04-2	SV2	
1	PPPC04	MA04-2	SV1	8 POS , 4*2 FEMALE PIN HEADE
1	ML10	ML10	SV4	HARTING
1	8MHZ	XTALL CSTCE8M	X5	STCE8M00G52-R0 RESONATOR
1	0R	R-0603	R53	Thick Film Resistors - SMD 0603
2	10R	R-0603	R12, R5	Thick Film Resistors - SMD 0603
8	100R	R-0603	R1, R2	Thick Film Resistors - SMD 0603
1	270R	R-0805	R15	Thick Film Resistors - SMD 0605
1	330R	R-0603	R11	Thick Film Resistors - SMD 0603
9	680R	R-0603	R20, R3	Thick Film Resistors - SMD 0603
17	1k	R-0603	R9, R10	Thick Film Resistors - SMD 0603
2	4.7k	R-0603	R17, R6	Thick Film Resistors - SMD 0603
2	5.1k	R-0603	R18, R1	Thick Film Resistors - SMD 0603
9	10k	R-0603	R16, R3	Thick Film Resistors - SMD 0603
1	100k	R-0603	R20, R7	Thick Film Resistors - SMD 0603



## PCB Assembly MECHANICAL DESIGN

Skyworth 创维

HAT 和而泰  
HAT INTELLIGENT CONTROL

dongweikeji  
东威科技

美的 Midea

STAR-NET  
星网锐捷

FORYOU  
ADAYO 华阳集团

EDIFIER®

Cultraview 金锐显

3nod 三诺

T&W

TCL

AcBel 康舒科技  
ACBEL POLYTECH INC.

Honeywell

Schneider  
Electric

ZTE 中兴

EMERSON

BYD

PHILIPS


TE  
connectivity

VIDEOTON


CUSTOMER VOICE IS **EXTREMELY IMPORTANT** TO US

订单编号: 49335463501024670

供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)

 **High quality usb power pcb , pcba manufacturer**  
★★★★★  
Fancy has done an excellent job, whenever we write, she answered us within 1 second, O-leading is very perfect with fast delivery, fast logistics, the most important thing is good quality, good packaging, thank you!


[回复该评论](#)

 **oem customized rohs pcb drawing schematic s...**  
★★★★★  
We received the boards, the quality is very good, the price is very reasonable, Fancy is very nice & smart & experienced, the logistics is super fast, I will come to see more in the future.


[回复该评论](#)

订单编号: 49298271001024670


供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)

 **High TG180 FR-4 Circuit HDI PCB 94V0 Board ...**  
★★★★★  
perfect product, perfect PCB supplier!

[回复该评论](#)

 **oem customized rohs pcb drawing schematic s...**  
★★★★★  
Very good and professional PCB product as usual!


[回复该评论](#)


 **Strip LED Aluminum FR-4 lighting PCB board 9...**  
★★★★★  
High quality, fast delivery, good service, competitive price, lucky and happy to purchase from O-leading!

[回复该评论](#)

订单编号: 49922411001024670


供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)

 **High TG180 FR-4 Circuit HDI PCB 94V0 Board ...**  
★★★★★  
This is a very difficult PCB design, but we are lucky to find O-leading to support the PCB for us very good to a PCB supplier.

 **universal FR4 Multilayer PCB washing machine...**  
★★★★★  
Fancy gives us very excellent service, very professional and experienced, O-leading is the best one of our suppliers, very happy to work with them.

订单编号: 49024962001024670


United States  
供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)

 **High quality Keyboard pcb & pcba Factory SMT...**  
★★★★★  
Top quality, it's the right choice to choose O-leading to make the PCB & PCBA

[回复该评论](#)


订单编号: 4093862301024670

供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)

 **Professional Printed Circuit Board Manufactur...**  
★★★★★  
Very high quality PCB products, O-leading is the best PCB supplier that we have ever worked with.

订单编号: 44068794501024670


供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)


 **High TG180 FR-4 Circuit HDI PCB 94V0 Board ...**  
★★★★★  
We bought two batches, one by DHL, the other one by air, good quality and fast delivery!


LISTEN TO **CUSTOMER VOICE**


订单编号: 4090347501024670


供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)


 **Strip LED Aluminum FR-4 lighting PCB board 9...**  
★★★★★  
Very fast delivery! Fantastic, good job!!

 **Professional Printed Circuit Board Manufactur...**  
★★★★★  
Very happy to great support from O-leading, they are not only professional on the PCB, but also provide good PCB products, very good supplier!

 **hot sale rigid-flexible PCB with 0.2mm BGA an...**  
★★★★★  
very professional supplier


 **High Quality custom FPCB/Flex PCB/FPC/Flexi...**  
★★★★★  
Good product



 **OEM ODM PCBA Bluetooth Wireless Marking G...**  
★★★★★  
high soldering quality


 **Electronic parts haptic pcba Circuit Board asse...**  
★★★★★  
Very Good product

订单编号: 37378603001024670

供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)


 **Raspberry pi 0 Zero Raspberry Pi Zero Pi W ver...**  
★★★★★  
Fantastic products!!


 


 **double layer pcb with red S/M and LF-HASL su...**  
★★★★★  
Good!


订单编号: 36919647001024670


供应商服务: 非常满意 (5 stars) 按时发货: 非常满意 (5 stars)


 **AML-S802 Quad-core Android embedded boar...**  
★★★★★  
Good products


 **Fast delivery low cost pcb fabrication O-leadin...**  
★★★★★  
Good supplier


 **Lidar IR Sensor board pcba(H08R6x)**  
★★★★★  
perfect product

 **Customized PCBA design PCB design**  
★★★★★  
perfect

 **Audio Speaker and Headphone Jack (H07R3x)**  
★★★★★  
High quality, good

 **half hole pcb, half hole pcb module, half hole m...**  
★★★★★  
Top half hole pcb supplier, very perfect goods

 **High Quality custom FPCB/Flex PCB/FPC/Flexi...**  
★★★★★  
this rigid-flexible pcb quality is perfect!

 **Electronic parts haptic pcba Circuit Board asse...**  
★★★★★  
Very satisfied with O-leading products and quality, especially their on-time delivery, fantastic!

**Be kind to your client,  
because he has many choices,  
but he chooses you instead.**



# Certifications

O-LEADING *TRAINING*



Keep *LEARNING*

There's a phrase in Buddhism, 'Beginner's mind.'

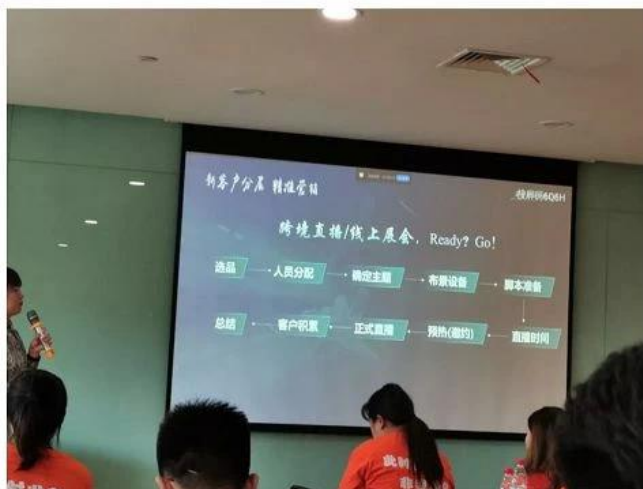
It's wonderful to have a beginner's mind

WE HAVE A *DREAM*

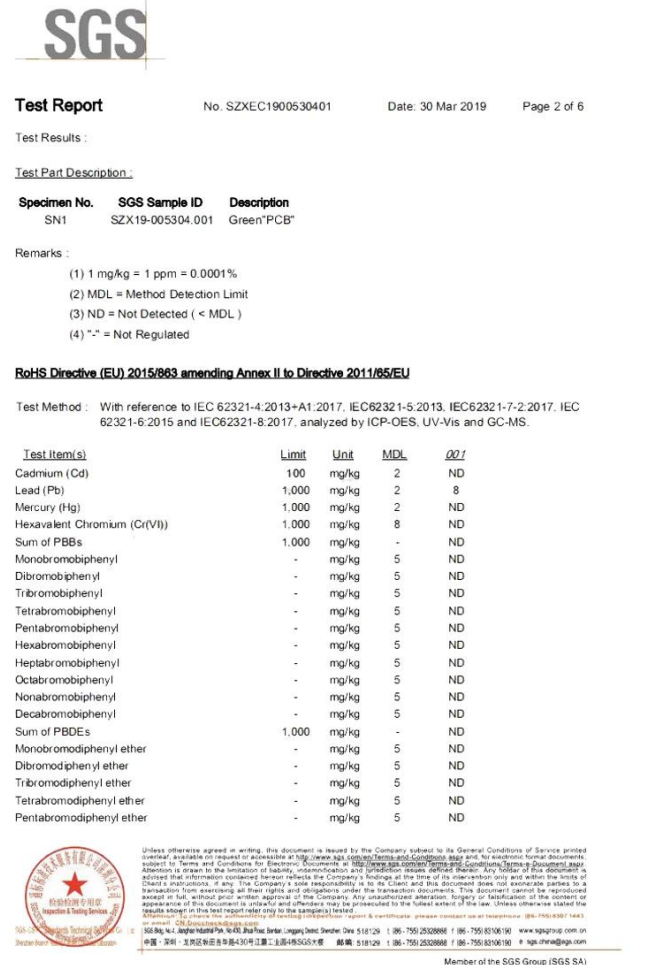
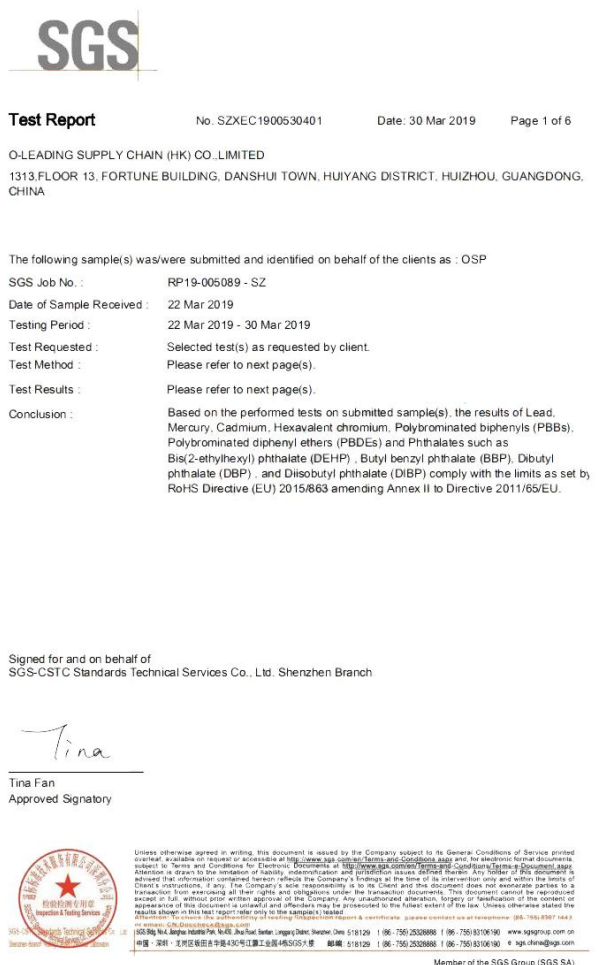
Keep *RUNNING*

I would like to live to study, and not study to live.

----Bacon









## ZPMV2.E490354 - WIRING, PRINTED - COMPONENT

## Wiring, Printed - Component

See General Information for Wiring, Printed - Component

**O-LEADING SUPPLY CHAIN (HK) CO LTD**

E490354

ROOM 1205, 12/F  
TAI SANG BANK BLDG  
130-132 DES VOEUS ROAD  
CENTRAL, HONG KONG

Type	Cond Width		Cond Thk mic(mil)	SS/ DS/ DSO	Max	Max					
	Min	Min			Area	Solder	Oper	Flame	Meets	C	
	mm(in)	Edge mm(in)			Diam	Limits	Temp	Class	UL796	T	
Multilayer (mass laminate) printed wiring boards.											
O-LEADING-401	0.1 (0.004)	0.3 (0.012)	34 (1.34)	DS	12.7 (0.5)	260	10	130	V-0	-	-
O-LEADING-407	0.08 (0.003)	0.2 (0.008)	17 (0.67)	DS	9.7 (0.4)	260	10	130	V-0	All	-
Multilayer printed wiring boards.											
O-LEADING-408	0.125 (0.005)	0.125 (0.005)	12 (0.47) Int:136	DS	50.8 (2.0)	280	20	130	V-0	All	*
Single layer printed wiring boards.											
O-LEADING-002	0.38 (0.015)	1.14 (0.045)	34 (1.34)	SS	19.1 (0.8)	260	10	105	V-0	All	-
O-LEADING-003	0.38 (0.015)	1.14 (0.045)	34 (1.34)	SS	19.1 (0.8)	260	10	130	V-0	▲	-
O-LEADING-033	0.15 (0.006)	0.3 (0.012)	34 (1.34)	SS	25.4 (1.0)	260	10	120	V-0	All	-
O-LEADING-205	0.1 (0.004)	0.3 (0.012)	34 (1.34)	DS	69.6 (2.7)	260	10	130	V-0	All	-
O-LEADING-206	0.15 (0.006)	0.33 (0.013)	17 (0.67)	DS	69.6 (2.7)	260	10	130	V-0	All	-
O-LEADING-D01	0.14 (0.006)	0.15 (0.006)	33 (1.30)	DS	25.4 (1.0)	260	10	130	V-0	All	*
O-LEADING-S01	0.25 (0.010)	0.25 (0.010)	17 (0.67)	SS	25.4 (1.0)	260	4	130	V-0	All	*

## WIRING, PRINTED - COMPONENT | UL Product iQ

<b>O-LEADING-S02</b>	0.2 (0.008)	0.2 (0.008)	17 (0.67)	SS	25.4 (1.0)	260	4	130	HB	▲	*
<b>O-LEADING-S03</b>	0.25 (0.010)	0.25 (0.010)	34 (1.34)	SS	25.4 (1.0)	260	4	130	V-0	All	*

\* - CTI marking is optional and may be marked on the printed wiring board.

Marking: Company name or file number and type designation. May be followed by a suffix to denote factory identification or burning test classification.

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# Process Capability

## PCB Production Capabilities

Layer Count	1Layer-32Layer
Finished copper thickness	1/3oz-12oz
Min Line width/spacing internal	3.0mil/3.0mil
Min Line width/spacing external	4.0mil/4.0mil
Max Aspect Ratio	10:1
Board thickness	0.2mm-5.0mm
Max Panel size(inches)	635*1500mm
Minimum Drilled Hole Size	4mil
Plated Hole Tolerance	+/-3mil
Blind/Buried Vias (All Types)	YES
Via Fill(Conductive,Non-Conductive)	YES
Base Material	FR-4,FR-4high Tg,Halogen free material,Rogers,Aluminium base,Polyimide,Heavy Copper
Surface finishes	HASL,OSP,ENIG,HAL-LF,Immersion silver,Immersion Tin,Gold fingers,Carbon ink

## SMT Production Capabilities

PCB Material	FR-4,CEM-1,CEM-3,Aluminum-based board,FPC
Max PCB size	510x1500mm
Min PCB size	50x50mm
PCB Thickness	0.5mm-4.5mm
Board thickness	0.5-4mm
Min Components size	0201
Standard chip size component	0603 and larger
Component max height	15mm
Min lead pitch	0.3mm
Min BGA ball pitch	0.4mm
Placement precision	+/-0.03mm

## Packaging & Delivery

# Shipping service





Quick Turn Lead Time		
Layer Count:	Lead Tim	Special Requirement
1L/2L	2-3days	24 Hours,48 Hours
4L	3-4days	48 Hours
6L	4-5days	72 Hours
8L	5-6days	NA
10L	6-7days	NA
12L	7-8days	NA
14L	8-9days	NA

Standard Lead Time		
Layer Count:	Sample Lead Time	Volume order lead time
2L	4 days	10 days
4L	5 days	11 days
6L	6 days	12 days
8L	8 days	14 days
10L	10 days	16 days
12L	12 days	18 days
14L	14 days	20 days
16-32L	18 days	24 days

## FAQ

### 1. How do O-Leading ensure quality?Our high quality standard is achieved with the following.

- 1.1 The process is strictly controlled under ISO 9001:2008 standards.
- 1.2 Extensive use of software in managing the production process
- 1.3 State-of-art testing equipments and tools. E.g. Flying Probe, X-ray Inspection, AOI (Automated Optical Inspector) and ICT (in-circuit testing).
- 1.4.Dedicated quality assurance team with failure case analysis process
- 1.5.Continuous staff training and education

### 2. How do O-Leading keep your price competitive?

Over the last decade, prices of many raw materials (e.g. copper, chemicals) had doubled, tripled or quadrupled; Chinese currency RMB had appreciated 31% over US dollar; And our labor cost also increased significantly.

However, O-Leading have kept our pricing steady. This owns entirely to our innovations in reducing cost, avoiding wastes and improving efficiency. Our prices are very competitive in the industry at the same quality level.

We believe in a win-win partnership with our customers. Our partnership will be mutually beneficial if we can provide you an edgeon cost and quality.

### **3. What kinds of boards can O-Leading process?**

Common FR4, high-TG and halogen-free boards, Rogers, Arlon, Telfon, aluminum/copper-based boards, PI, etc.

### **4. What data are needed for PCB & PCBA production?**

4.1 BOM (Bill of Materials) with reference designators: component description, manufacturer's name and part number.

4.2 PCB Gerber files.

4.3 PCB fabrication drawing and PCBA assembly drawing.

4.4 Test procedures.

4.5 Any mechanical restrictions such as assembly height requirements.

### **5. What's the typical process flow for multi-layer PCB?**

Material cutting → Inner dry film → inner etching → Inner AOI → Multi-bond → Layer stack up Pressing → Drilling → PTH → Panel Plating → Outer Dry Film → Pattern Plating → Outer etching → Outer AOI → Solder Mask → Component Mark → Surface finish → Routing → E/T → Visual Inspection.

### **6. What's the key equipments for HDI manufacturing?**

Key equipment list is as following: Laser drilling machine, Pressing machine, VCP line, Automatic Exposing machine, LDI and etc.

The equipments we have are the best in the industry, laser drilling machines are from Mitsubishi and Hitachi, LDI machines are from Screen(Japan), Automatic Exposing machines are also from Hitachi, all of them make we can meet customer's technical requirements.

### **7. How many types of surface finish O-lead can do?**

O-the leader has the full series of surface finish, such as: ENIG, OSP, LF-HASL, gold plating (soft/hard), immersion silver, Tin, silver plating, immersion tin plating, carbon ink and etc. .. OSP, ENIG, OSP + ENIG commonly used on the HDI, we usually recommend that you use a client or OSP OSP + ENIG if BGA PAD size less than 0.3 mm.

### **8. What's your capability for FPC? Can O-Leading provide SMT service also?**

O-Leading can fabricate FPC from single layer to 8layer, the working panel size can be as large as 2000mm\*240mm, please find the details in the page "Flex Capability"

We also provide SMT one stop service to customer.

### **9. What are the main factors which will affect the price of PCB?**

Material;

Surface finish;

Technology difficulty;

Different quality criteria;

PCB characteristics;

Payment terms;

Different manufacturing countries.

### **10. What's the definition of PCB, PWB and FPC and what's the difference?**

PCB is short for Printed Circuit Board;

PWB is short for Printed Wire Board, same meaning as Printed Circuit Board;

FPC is short for Flexible Printed Board.

### **11. What factors should be considered when choosing the material for a PCB board?**

Below factors should be considered when we choose the material for PCB:

The material's Tg value should be greater than the operation temperature;

Low CTE material has good performance of thermal stability;

Good thermal resistance performance: Normally PCBs are required to resist 250°C for at least 50s.  
Good flatness; In consideration of the electrical properties, low loss/high permittivity material is used on high frequency PCB; Polyimide glass fiber substrate used for flexible PCB; Metal core is used when the product has strict requirement of heat dissipation.

## **12. What's the merits of O-leading's rigid-flex PCB?**

O-leading's rigid-flex PCB has the characters of both FPC and PCB, so it can be used in some special products. Some part is flexible while the other part rigid, it can help save product's interior space, reduce product volume and improve performance.

## **13. How to you make the impedance calculation?**

The impedance control system is done using some test coupons, the SI6000 soft and the CITS 500s equipment from POLAR INSTRUMENTS.

The equipment measures the impedance on a representative track configuration coupon of which the client has given us a determinate value and tolerance.