Buyer's Guide

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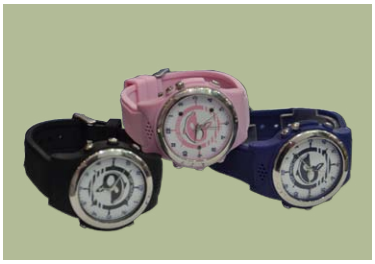

Smart watches

- √ Key parts and components
- √ Comparison of chipsets and other parts
- √ Top brands in China
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Buyer's Guide to sourcing smart watches

An exclusive report comparing chipsets, sensors and other parts, table of 21 suppliers and 10 trendy products.

What's inside a smart watch?

In this report we delve into the various parts and components that go into making a smart watch.

Guangdong Appscomm Co. Ltd's new smart watch called A1.

Hansheng Winpower Technology Co. Ltd's smart phone mate bw001.

Shenzhen PGD Digital Technology Co. Ltd's S88, a GPS tracker with a few useful functions.

Since wearables became a viable market in 2012, a growing number of leading consumer electronics companies have joined the business. The imminent release of the Apple Watch has brought the industry a much bigger profile in the consumer market.

China plays an important role in this industry, as it is both the biggest market and the largest manufacturer of the devices. Over 80 percent of wearable electronics products are manufactured in Shenzhen. Moreover, many upstream suppliers, such as Qualcomm, MTK, CSR, Texas Instruments and InvenSense have put a lot of resources in the hands of their wearable device component design and manufacturing teams.

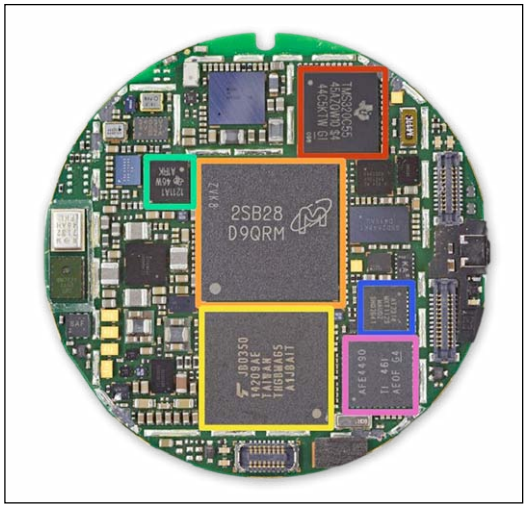
Smart watches are the most popular type of wearable product on the market today; according to research firm IDC, over 60 percent of wearable products are smart watches.

Smart watches can be divided into the following four categories:

1. **Sports:** Functions include pedometer, calorie consumption, weather forecast, compass and GPS
2. **Health:** Feature heart rate monitoring, body temperature monitoring and sleep monitoring
3. **Security:** Include GPS, SOS, emergency communications and user fall detection
4. **Alerts:** Mainly offer smart phone synchronization (for example, SMS, call or e-mail alerts) and reminders

All the functions have to be coordinated by the MCU (micro control unit), which controls the various sensors and processing units. The CPU, sensors, Bluetooth chipset, graphics processor, vibrator, GPS, gyroscope and other functions are all managed by the MCU.

The following image shows the different components of a typical smart watch, in this case, the MOTO360:



	PCB board		MEMS from Wolfson
	Micro-phone from Wolfson		USB controller from Texas Instruments
	Power management unit from Texas Instruments		Radio receiver from Texas Instruments
	CPU from TI		512MB RAM from Micron
	4GB ROM from Toshiba		Digital Signal Processor from Texas Instruments
	6-axis gyroscope from InvenSense		Graphics processor from Solomon
	Capacitive touch screen controller from Atmel		Pulse Oximeter from Texas Instruments

Image courtesy: MyDrivers.com

Development platform

For smart watches, the development platform is the basic central unit. The development of smart watches requires a dedicated SoC (system on chip). With wearables getting more and more attention, leading chipset manufacturers have all tried to get in on the ground floor.

The table below illustrates key features of some of the currently available platforms.

Company name	Platform	Features
Broadcom	WICED	Wireless connectivity (WiFi, Bluetooth, NFC, GPS)
Intel	Edison	Small size (SD card size) and low power consumption
Freescale	WaRP	Open platform, flexible and easy to expand
Texas Instruments	Meta Watch	Quickly develop apps that link to watches and can connect with smart phones and tablets
CSR	1012	Long working time
MediaTek	LinkIt	Streamlined development process
Ingenic	Newton	Low power consumption and high performance

Sensors

Sensors are at the core of smart watches, and are the primary means by which watches input data. Mei Weixin of Mifree Technology said that smart watches *are* sensors. Sensors for smart watches differ from those for other mobile electronics products as they offer unique features such as pedometer, heart rate monitoring, humidity test, UV test and temperature test.

Typically, sensors can be divided into three categories:

1. **Motion sensors:** Examples include acceleration, gyroscope, geomagnetic, and atmospheric pressure sensors

2. **Biosensors:** These include glucose, blood pressure, ECG, EMG, temperature and brain wave sensors

3. **Environmental sensors:** For example, temperature and humidity, gas, PH, ultraviolet, ambient light, dust particles, and pressure sensors, as well as microphones

Sensors collect data and transfer them to the CPU or display processor. As technology continues to develop, sensors will become smaller, smarter, more accurate, and their power consumption will decrease.

Application processor

Most smart watches use licensed ARM (Advanced RISC Machines) processors, though Intel and others offer competing processors. Compared with CPUs found in laptops or desktop computers, smart watch application processors (APs) have much lower power consumption and take up less space on a board.

MediaTek is the most widely used smart watch chipset brand in China; according to a research report accounting for over 100 products in Shenzhen, over 60 percent of manufacturers use MediaTek chipsets.

Many brand manufacturers also use APs designed by domestic Chinese companies. For instance, Beijing Ingenic recently launched the JZ4775, especially for wearable products and it is already used in Shanda's Geak Watch, SmartQ's Z Watch, among others.

Although MediaTek chipsets are widely used in smart watches, they are not designed specifically for smart watches but are actually smartphone chipsets. Smart watches equipped with such chipsets can be viewed as watch-shaped Bluetooth smartphones or watch phones combined with different kinds of sensors.

On the other hand, chipsets designed specifically for wearables, such as the JZ4775, have advantages in power consumption, user interface, compatibility, size and radiation compared with smartphone chipsets.

Wireless chipset

Wireless chipsets are another important part of smart watches. Most data transmission to and from smart watches is done via wireless functions like Bluetooth, WiFi, NFC and GPS. Since the small size of smart watches requires components to fit into a limited space, most Chinese manufacturers prefer chipsets that integrate Bluetooth, WiFi and GPS functions.

The table lists 10 leading sensor manufacturers and their main products:

Company	Main sensors
Freescale	Acceleration sensors (MMA8653FCR1, MMA7660FCR1, MMA8452QR1, MMA7455LR1)
BOSCH	Low-power acceleration sensors (BMA250E, BMA250, BMA222E, BMA222, BMA223)
Sitronix	Ambient light sensor and proximity sensor
MEMSIC	Dimensional acceleration sensor (MXC6225XU); geomagnetic IC (MMC3280MA, MMC3230MS)
Silicon Labs	UV sensor contains pulse and oxygen saturation sensor functions
MCUBE	3D G-Sensor, E-Compass, Gyroscope
DMT	MEMS motion sensor, 3-axis accelerometer, 3-axis gyroscope, 6-axis motion sensor
Texas Instruments	Non-contact temperature sensor
InvenSense	9-axis inertial sensor (MPU-9150)
STMicroelectronics	3-axis acceleration sensor (LIS3DH, LIS3DE)

Broadcom, Qualcomm, CSR and MediaTek are the leading suppliers in this field.

Other than the size of the chipset, power consumption is another significant consideration. Many smart watches have a synchronization function that requires that the chipset is activated at all times; the power management of this unit should be an important consideration.

Screen

The screen is the primary input and output component of smart watches. Smart watch screens can be divided into two parts: the display and the capacitive touch panel.

There are four types of screens used in smart watches: Traditional LCD, Sharp memory LCD, E-ink and OLED. In addition, Qualcomm has introduced a screen with MEMS technology (Mirasol) and Samsung has introduced its "soft screen". The most commonly used screens for smart watches currently are E-ink and LED screens because of their low power consumption.

Battery

The two main types of batteries used in smart watches are Li-ion and Lithium polymer. Polymer batteries have higher power capacity, making them a better choice for smart watches.

Currently, power consumption is still one of the biggest challenges to wider adoption of smart watches. Even if manufacturers upgrade the battery

The table shows the basic features of different screen types:

Type of screens	Features
Traditional LCD screen	Mature product, many suppliers, low price
Sharp memory LCD screen	Low power consumption, high price, higher refresh rate compared with E-ink screen
E-ink screen	Mature technology, very low power consumption, high price, cannot be used in the dark without an external light source
OLED screen	No backlight needed, lower power consumption compared with LCD, high image quality, high price
MEMS technology screen	No backlight needed, auto adjustment according to environment, low power consumption, high price
Soft screen	Immature technology, small number of users, high price, attractive appearance

material or improve its construction, its capacity will not improve significantly. This is because the way a battery functions – converting chemical energy to power – is what limits battery capacity.

Traditional wristwatches may last 1 to 2 years or even do not need power, while smart watches often require daily charging; it is hard for some to accept a watch that may not last a day of heavy use.

New charging technologies are being used in smart watches, such as wireless charging and solar power, but for now battery capacities are a significant limiting factor.

Design

A watch is jewelry and that is how users see it; it is a status symbol as well as a fashion accessory. While smart watches are electronic devices, manufacturers and buyers still have to consider this point. Smart it may be, but smart style is even better.

Motorola and Geak use traditional round-shaped designs to make their products more stylish (the MOTO 360 and Geak Watch II are good examples of this). Such designs are inspired by traditional watch designs and have a broader appeal.

Moreover, the design constraints of smart watches are dictated mainly by their functions, whether the need to pack in sensors or to provide a screen user-friendly enough to be easily used.

Safety needs are another concern. The general manager of Shenzhen Top Watch Communication Technology Co. Ltd, Zhou Qiong said the primary issue of safety-focused wearables is the safety of the material itself.

Most of these functions – and most smart watches - are built and marketed by the consumer electronics industry. As a result, consumer electronics manufacturers entered the market first, and only relatively recently have traditional jewelry manufacturers joined in. In China, jewelry suppliers have taken notice of wearable electronics and have begun to enter the market.

Rising Chinese brands

In addition to the large number of OEM manufacturers of smart watches in China, there are also many brands that are trying to make their mark.

inWatch is one of the leading smart watch manufacturers in China. The company considers fashion as an important factor of wearables and applies it in its products. The brand inWatch is sold in overseas markets as well.

Appscomm is a wearables products-focused OEM manufacturer. It has already developed more than 30 wearables and over 80 percent of its products are smart watches.

Top Watch is a smart watch brand name manufacturer. It focuses on fashion smart watches and children's trackers. The company focuses on overseas markets.

360 is leading antivirus software company in China, which has now joined the smart watch industry. It considers children's safety products as a niche in the smart watch industry and focuses on the domestic market.

Geak was funded by Shanda – one of the biggest online game operators in China. Its products combine fashion and technology. The company has designed an app store for its smart watches. It focuses mainly on the domestic market.

TOMOON is a brand name smart watch manufacturer in China. It views power consumption and practicability as the primary concerns, and focuses on the domestic market.

Looking ahead

A number of market research firms have published reports about the wearables industry, and most of them predict that it will grow rapidly in coming years.

Many leading consumer electronics companies, notably Samsung, Motorola and Sony, have also designed and released a number of products; Apple's Watch alone has driven enormous speculation about how much the market can grow in 2015.

However, even if the wearables industry has a bright future, at the moment it represents a small market compared to smartphones or tablets. Analysts at BI Intelligence tend to believe that the future of the wearable market is full of hype and suspect that projections of many firms are far more optimistic than reality will prove to be.

Consumer awareness and adoption of smart watches are still low. Many manufacturers in China agree. One of the consumer electronics product manufacturers in Huaqiang North (the biggest electronics products hub in Shenzhen), Mao Yun, said, "Manufacturers are confused by data. Even for some big manufacturers, the sales of wearable products are a small part of their business."

Some manufacturers are concerned that the barriers to entry into the smart watch business are low for existing smartphone manufacturers because many of the core competencies are the same.

Most smart watch manufacturers have taken an early position in the industry and are adopting a wait-and-watch approach.

The table shows some of the top smart watch brands in China:

Brand name	Logo	Latest product
InWatch	inWatch We are here to make some noise.	 (Inwatch π)
Appscomm	APPScomm	 (A 1)
Top Watch	TOP WATCH	 (TW320)
360	360 安全卫士	 (Children's Guardian)
Geak	GEAK	 (Geak Watch II)
TOMOON	土曼	 (T-FIRE)

Supplier comparison table

Name	Total annual revenue (US$ million)	Wearables exports (% of total exports)	Smart watches exports (% of wearable exports)	Number of employees	Year started manufacturing wearables
Appscomm	12	83.0%	Smart watches (25%), smart bracelets (75%)	300	2011
E-Ran	8	38.0%	Smart watches (35%), smart bracelets (65%)	50-198	2014
E-Tells	20	15.0%	Pedometer sports watches (50%), Bluetooth speaker watches (50%)	100	2012
Foronda	1	10.0%	Smart watches (45%)	150-199	2010
Groo	1.5	40.0%	Smart watches (70%), smart bracelets (30%)	120	2013
Hexiang	10	5.0%	Smart watches (70%), smart bracelets (30%)	Over 1,000	2014
rfwinpower	15	25.0%	Smart watches (35%), smart bracelets (30%)	388	–
Hopismart	12	66.0%	Smart watches (70%), smart bracelets (30%)	120	2007
King Flash	4.8	6.6%	–	150	2013
Lianxintai	8	23.0%	Smart watches (25%), GPS watches (30%)	100-200	2012
Linktop	50	2.0%	Smart watches (40%), smart tracking devices (30%)	1,000	2013
Neusoft	32.5	83.0%	Smart watches (60%), smart bracelets (20%)	700	2011
Neway	5	10.0%	Smart watches (60%), smart bracelets (40%)	200-300	2011
Oriver	3.25	10.0%	Smart watches (100%)	150-200	2013
PGD	2	90.0%	Smart watches (100%)	150	2009
Phiyang Hongye	5	1.0%	Smart watches (65%), smart bracelets (35%)	350	2013
Qiaoya	3.25	12.0%	Smart watches (90%)	800	2012
Salon	1.4	12.7%	Smart watches (35%), smart bracelet (40%)	100-150	2013
Sunriseway	3.2	45.0%	Watch phones (100%)	25	2008
Top Watch	8	60.0%	Smart watches (90%), smart bracelets (10%)	600	2009
Winait	2.4	20.0%	Smart watches (50%), smart bracelets (50%)	–	2012

Number of smart watch models offered	Main markets	Accepts small orders (US$)	OEM	ODM	OBM	
21	US (20%), Western Europe (60%)	<10,000	40%	60%	0%	CONTACT SUPPLIER
2	Western Europe (30%), Australia (30%)	<1,000	65%	25%	10%	CONTACT SUPPLIER
2	–	<1,000	100%	0%	0%	CONTACT SUPPLIER
5	US (35%), Australia (30%)	<5,000	60%	10%	30%	CONTACT SUPPLIER
2	US (40%), Western Europe (40%)	<5,000	40%	60%	0%	CONTACT SUPPLIER
4	Eastern Europe (15%), US (5%)	<5,000	80%	20%	0%	CONTACT SUPPLIER
20	US (20%), Europe (20%)	<1,000	40%	30%	30%	CONTACT SUPPLIER
20	Europe (35%), Asia (25%)	<1,000	30%	40%	30%	–
6	US (40%), Western Europe (20%)	<1,000	50%	30%	20%	–
6	Western Europe (30%), Australia (30%)	<1,000	60%	20%	20%	CONTACT SUPPLIER
1	North America (30%), Europe (30%)	<10,000	10%	50%	40%	CONTACT SUPPLIER
6	US (20%), Western Europe (80%)	<10,000	100%	0%	0%	–
80	US (40%), Western Europe (30%)	<1,000	30%	20%	50%	CONTACT SUPPLIER
2	Western Europe (50%), Middle East (30%)	No small orders	90%	10%	0%	CONTACT SUPPLIER
23	US (20%), Europe (60%)	<1,000	10%	30%	60%	CONTACT SUPPLIER
8	US (35%), Western Europe (40%)	<1,000	40%	60%	0%	CONTACT SUPPLIER
10	US (30%), Australia (30%)	<1,000	50%	20%	30%	CONTACT SUPPLIER
3	Western Europe (35%), North America (15%)	<1,000	50%	20%	30%	CONTACT SUPPLIER
3	–	<1,000	40%	60%	0%	–
20	North America (30%), Western Europe (50%)	<1,000	40%	20%	40%	CONTACT SUPPLIER
9	US (30%), Western Europe (50%)	<1,000	95%	5%	0%	CONTACT SUPPLIER

10 smart watches representing current trends

Fitness and fashion are considered the primary needs for smart watch buyers

With the maturation of the wearables market, some new trends can be identified among the assorted products. These trends primarily fall into three categories: athletics, safety and fashion. Wearables catering to fitness-oriented users are still the most popular.

Devices with longer battery life and more accurate sensors are in high demand. Safety needs are another concern and are addressed by devices for the elderly and children.

Fashion is an important requirement for anything wearable, especially for women, but some devices are designed with fashion specifically in mind. The point of wearable devices is that they should be products people are willing to wear.

Here are 10 smart watches representing current trends:

GPS watch for children is safe and inconspicuous

The TD01 GPS watch from Shenzhen Top Watch Communication Technology Co. Ltd is a GPS tracker made for children. The chipset and PCB panel use non-lead materials to ensure it is safe for children. Further, the strap is made of the same material used to make pacifiers. The watch also appears like a normal child watch to reduce the possibility that a criminal might recognize it.

CONTACT SUPPLIER

Smart watch has built-in Bluetooth headset

Guangdong Appscomm Co. Ltd offers a new smart watch called A1. The bottom of the watch contains a plug-in foldable Bluetooth headset that can work for 1 hour of playback after being charged by the watch. It uses a Qualcomm Mirasol screen that offers good performance under strong sunlight.

CONTACT SUPPLIER

Multi-function GPS tracker for children and the elderly

Shenzhen PGD Digital Technology Co. Ltd has launched the S88, a GPS tracker with a few useful functions. It is shaped like a normal watch with a round dial plate. Its functions include dialing, alarm, music playing and recording. Further, a user's family can use SMS or a website to locate this watch and playback history.

CONTACT SUPPLIER

Smart watch with 1.54-inch iPod Nano touch screen

Foronda Technology Co. Ltd's smart watch FR037 is equipped with a 1.54-inch iPod Nano touch screen. It contains a 450mAh battery that can support 3 days standby time or 3 hours talk time. The functions include GPRS, Bluetooth Sync (phonebook, calls, SMS), anti-lost and water resistance.

CONTACT SUPPLIER

Multi-sensor outdoor smart watch

The watch phone EW-801 from Shenzhen Hexiang Electronics Co. Ltd is a square-shaped watch. It has built-in sensors including a G-sensor, light sensor, proximity sensor, temperature sensor and humidity sensor. These sensors can provide functions such as compass, navigation and weather forecast. Further, EW-801 frees the user's hands via voice input function.

CONTACT SUPPLIER

Anti-lost sync smart watch

Hansheng Winpower Technology Co. Ltd offers a smart phone mate bw001. The watch offers basic functions such as vibration reminder, anti-lost, clock and dialing. The main body is made of light metal and it weighs only 80g. There are three colors available: gold, silver and black. The price is US$35.

CONTACT SUPPLIER

Low-cost sports smart watch

Shenzhen King Flash Electronic Co. Ltd claims it offers the cheapest smart watch for outdoor activities with a price of US$65. The SV-W2 can only work with Android phones via Bluetooth. There are some functions designed for outdoor activities such as pedometer, weather sync, stopwatch and camera remote control. Apart from sports use, it has other functions including dialing, SMS, email, calendar reminder and anti-lost.

Smart watch with E-ink display

Linktop Technology Co. Ltd offers a low power consumption smart watch U1 with an E-ink screen. It can only work with iPhone 4S, iPhone 5, iPhone 5S, iPhone 5C, Samsung Galaxy S4 and Nexus. This watch has to be controlled with an app installed in the user's phone. Its functions include call, SMS, calendar, Facebook alerts, music, camera control, pedometer, weather forecast, barometer and anti-lost.

CONTACT SUPPLIER

Stylish Bluetooth smart watch

Neway Electronic Co. Ltd's smart watch A06 is designed especially for women. It is more like jewelry than a smart watch for its appearance. The screen is embedded with small faux diamonds and can display time and other alerts, such as incoming calls and SMS. It can show incoming calls and SMS. In addition, it contains functions such as calorie and UV test.

CONTACT SUPPLIER

GPS tracker watch for the elderly

Wuhan Qiaoya Broadway Info Tech Co. Ltd offers a GPS tracker watch that is useful for the elderly. It can monitor a user's heart rate and sync data with the server. The user's family can access this data from a website or app on their phone. This watch works during activities such as general fitness exercises, aerobics, running, tennis, golf, resistance training and weight loss monitoring.

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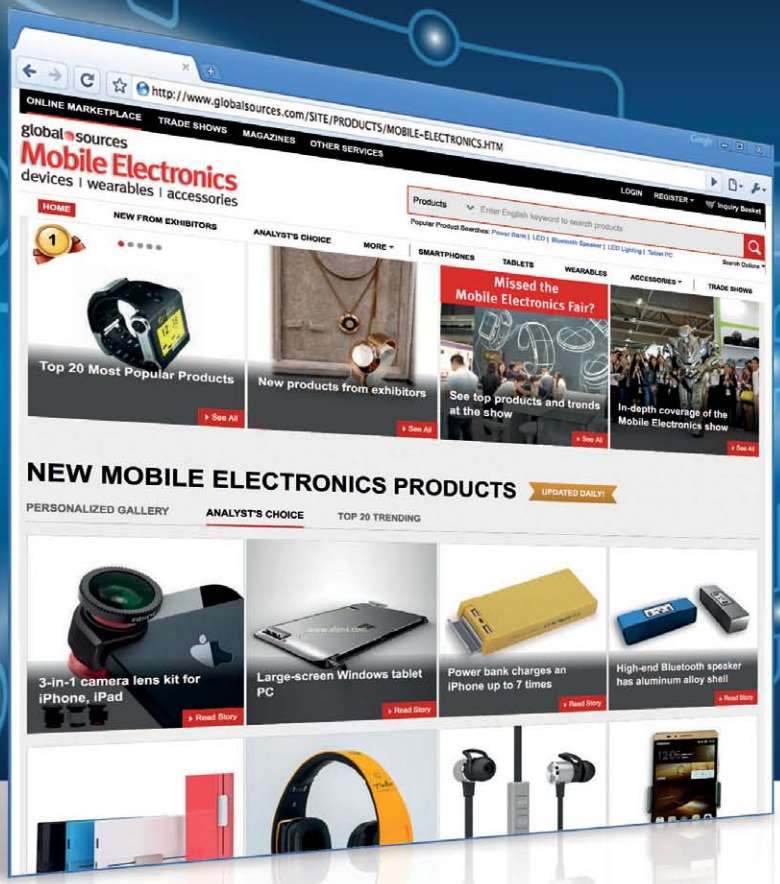

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