# Mobile phone

A **mobile phone** also known as a **cellular phone**, **cell phone**, **hand phone**, or simply a **phone** is a [phone](http://en.wikipedia.org/wiki/Telephone) that can make and receive [telephone calls](http://en.wikipedia.org/wiki/Telephone_call) over a [radio link](http://en.wikipedia.org/wiki/Radio_Link_Protocol) while moving around a wide geographic area. It does so by connecting to a [cellular network](http://en.wikipedia.org/wiki/Cellular_network) provided by a [mobile phone operator](http://en.wikipedia.org/wiki/Mobile_phone_operator), allowing access to the [public telephone network](http://en.wikipedia.org/wiki/PSTN). By contrast, a [cordless telephone](http://en.wikipedia.org/wiki/Cordless_telephone) is used only within the short range of a single, private base station.

In addition to telephony, modern mobile phones also support a wide variety of other [services](http://en.wikipedia.org/wiki/GSM_services) such as [text messaging](http://en.wikipedia.org/wiki/Text_messaging), [MMS](http://en.wikipedia.org/wiki/Multimedia_Messaging_Service), [email](http://en.wikipedia.org/wiki/Email), Internet access, short-range wireless communications ([infrared](http://en.wikipedia.org/wiki/Infrared_port), [Bluetooth](http://en.wikipedia.org/wiki/Bluetooth)), business applications, gaming, and photography. Mobile phones that offer these and more general computing capabilities are referred to as [smartphones](http://en.wikipedia.org/wiki/Smartphone).

The first hand-held cell phone was demonstrated by [John F. Mitchell](http://en.wikipedia.org/wiki/John_Francis_Mitchell) and [Dr. Martin Cooper](http://en.wikipedia.org/wiki/Martin_Cooper_%28inventor%29) of [Motorola](http://en.wikipedia.org/wiki/Motorola) in 1973, using a handset weighing around 4.4pounds (2 kg).In 1983, the [DynaTAC 8000x](http://en.wikipedia.org/wiki/Motorola_DynaTAC) was the first to be commercially available. From 1990 to 2011, worldwide mobile phone subscriptions grew from 12.4 million to over 6 billion, penetrating about 87% of the global population and reaching the bottom of the economic pyramid.

**History**

A hand-held mobile radiotelephone is an old dream of radio engineering. A particularly vivid and in many ways accurate prediction was presented by [Arthur C. Clarke](http://en.wikipedia.org/wiki/Arthur_C._Clarke) in a 1959 essay, where he envisioned a "personal transceiver, so small and compact that every man carries one." He wrote: "the time will come when we will be able to call a person anywhere on Earth merely by dialing a number." Such a device would also, in Clarke's vision, include means for global positioning so that "no one need ever again be lost." Later, in *Profiles of the Future*, he predicted the advent of such a device taking place in the mid-1980s.

[](http://en.wikipedia.org/wiki/File:Mobile_phone_evolution.jpg)Early predecessors of cellular phones included analog radio communications from ships and trains. The race to create truly portable telephone devices began after World War II, with developments taking place in many countries. The advances in mobile telephony have been traced in successive *generations* from the early "0G" (zeroth generation) services like the [Bell System](http://en.wikipedia.org/wiki/Bell_System)'s [Mobile Telephone Service](http://en.wikipedia.org/wiki/Mobile_Telephone_Service) and its successor, [Improved Mobile Telephone Service](http://en.wikipedia.org/wiki/Improved_Mobile_Telephone_Service). These "0G" systems were not cellular, supported few simultaneous calls, and were very expensive.

The first handheld mobile cell phone was demonstrated by [Motorola](http://en.wikipedia.org/wiki/Motorola) in 1973. The first commercial automated cellular network was launched in Japan by [NTT](http://en.wikipedia.org/wiki/Nippon_Telegraph_and_Telephone) in 1979. In 1981, this was followed by the simultaneous launch of the [Nordic Mobile Telephone](http://en.wikipedia.org/wiki/Nordic_Mobile_Telephone) (NMT) system in Denmark, Finland, Norway and Sweden. Several other countries then followed in the early to mid-1980s. These first generatiion ("1G") systems could support far more simultaneous calls, but still used analog technology.

In 1991, the second generation ([2G](http://en.wikipedia.org/wiki/2G)) *digital* cellular technology was launched in Finland by [Radiolinja](http://en.wikipedia.org/wiki/Radiolinja) on the [GSM](http://en.wikipedia.org/wiki/GSM) standard, which sparked competition in the sector, as the new operators challenged the incumbent 1G network operators.

Ten years later, in 2001, the third generation ([3G](http://en.wikipedia.org/wiki/3G)) was launched in Japan by [NTT DoCoMo](http://en.wikipedia.org/wiki/NTT_DoCoMo) on the [WCDMA](http://en.wikipedia.org/wiki/WCDMA) standard. This was followed by 3.5G, 3G+ or turbo 3G enhancements based on the [high-speed packet access](http://en.wikipedia.org/wiki/High-Speed_Packet_Access) (HSPA) family, allowing [UMTS networks](http://en.wikipedia.org/wiki/Universal_Mobile_Telecommunications_System) to have higher data transfer speeds and capacity.

By 2009, it had become clear that, at some point, 3G networks would be overwhelmed by the growth of bandwidth-intensive applications like streaming media. Consequently, the industry began looking to data-optimized 4th-generation technologies, with the promise of speed improvements up to 10-fold over existing 3G technologies. The first two commercially available technologies billed as [4G](http://en.wikipedia.org/wiki/4G) were the [WiMAX](http://en.wikipedia.org/wiki/WiMAX) standard (offered in the U.S. by [Sprint](http://en.wikipedia.org/wiki/Sprint_Nextel)) and the [LTE](http://en.wikipedia.org/wiki/LTE_%28telecommunication%29) standard, first offered in Scandinavia by [TeliaSonera](http://en.wikipedia.org/wiki/TeliaSonera).

**Features**

[](http://en.wikipedia.org/wiki/File:Mobil_uvnitr.png) All mobile phones have a number of features in common, but manufacturers also try to differentiate their own products by implementing additional functions to make them more attractive to consumers. This has led to great innovation in mobile phone development over the past 20 years.

The common components found on all phones are:

* A [battery](http://en.wikipedia.org/wiki/Battery_%28electricity%29), providing the power source for the phone functions.
* An input mechanism to allow the user to interact with the phone. The most common input mechanism is a [keypad](http://en.wikipedia.org/wiki/Keypad), but [touch screens](http://en.wikipedia.org/wiki/Touch_screen) are also found in some high-end smartphones.
* A screen which echoes the user's typing, displays text messages, contacts and more.
* Basic [mobile phone services](http://en.wikipedia.org/wiki/GSM_services) to allow users to make calls and send text messages.
* All [GSM](http://en.wikipedia.org/wiki/GSM) phones use a [SIM card](http://en.wikipedia.org/wiki/Subscriber_Identity_Module) to allow an account to be swapped among devices. Some [CDMA](http://en.wikipedia.org/wiki/CDMA) devices also have a similar card called a [R-UIM](http://en.wikipedia.org/wiki/Removable_User_Identity_Module).
* Individual GSM, WCDMA, iDEN and some [satellite phone](http://en.wikipedia.org/wiki/Satellite_phone) devices are uniquely identified by an [International Mobile Equipment Identity](http://en.wikipedia.org/wiki/International_Mobile_Equipment_Identity) ([IMEI](http://en.wikipedia.org/wiki/International_Mobile_Equipment_Identity)) number.

Low-end mobile phones are often referred to as [feature phones](http://en.wikipedia.org/wiki/Feature_phone), and offer basic telephony. Handsets with more advanced computing ability through the use of native software applications became known as [smartphones](http://en.wikipedia.org/wiki/Smartphone).

Several phone series have been introduced to address a given market segment, such as the RIM [BlackBerry](http://en.wikipedia.org/wiki/BlackBerry) focusing on enterprise/corporate customer email needs; the Sony-Ericsson 'Walkman' series of music/phones and 'Cybershot' series of camera/phones; the [Nokia Nseries](http://en.wikipedia.org/wiki/Nokia_Nseries) of multimedia phones, the [Palm Pre](http://en.wikipedia.org/wiki/Palm_Pre) the [HTC Dream](http://en.wikipedia.org/wiki/HTC_Dream) and the Apple [iPhone](http://en.wikipedia.org/wiki/IPhone).

**Text messaging [**[**SMS**](http://en.wikipedia.org/wiki/SMS)**]**

The most commonly used data application on mobile phones is [SMS](http://en.wikipedia.org/wiki/SMS) text messaging. The first SMS text message was sent from a computer to a mobile phone in 1992 in the UK, while the first person-to-person SMS from phone to phone was sent in Finland in 1993.

The first [mobile news](http://en.wikipedia.org/wiki/Mobile_news) service, delivered via SMS, was launched in Finland in 2000, and subsequently many organizations provided "on-demand" and "instant" news services by SMS.

**SIM card**

[](http://en.wikipedia.org/wiki/File:Typical_cellphone_SIM_cards.jpg)[GSM](http://en.wikipedia.org/wiki/GSM) [feature phones](http://en.wikipedia.org/wiki/Feature_phone) require a small [microchip](http://en.wikipedia.org/wiki/Integrated_circuit) called a Subscriber Identity Module or [SIM card](http://en.wikipedia.org/wiki/SIM_card), to function. The SIM card is approximately the size of a small postage stamp and is usually placed underneath the battery in the rear of the unit. The SIM securely stores the [service-subscriber key (IMSI)](http://en.wikipedia.org/wiki/International_Mobile_Subscriber_Identity) and the [Ki](http://en.wikipedia.org/wiki/Authentication_Center#Authentication_centre_.28AuC.29) used to identify and authenticate the user of the mobile phone. The SIM card allows users to change phones by simply removing the SIM card from one mobile phone and inserting it into another mobile phone or broadband telephony device.

The first SIM card was made in 1991 by Munich smart card maker [Giesecke & Devrient](http://en.wikipedia.org/wiki/Giesecke_%26_Devrient) for the Finnish wireless network operator [Radiolinja](http://en.wikipedia.org/wiki/Radiolinja).[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

**Multi-card hybrid phones**

A hybrid mobile phone can hold up to four SIM cards. SIM and RUIM cards may be mixed together to allow both [GSM](http://en.wikipedia.org/wiki/GSM) and [CDMA](http://en.wikipedia.org/wiki/CDMA) networks to be accessed.

From 2010 onwards they became popular in India and Indonesia and other emerging markets, attributed to the desire to obtain the lowest on-net calling rate. In Q3 2011, [Nokia](http://en.wikipedia.org/wiki/Nokia) shipped 18 million of its low cost dual SIM phone range in an attempt to make up lost ground in the higher end smartphone market.

**Kosher phones**

There are [Jewish orthodox](http://en.wikipedia.org/wiki/Jewish_orthodox) religious restrictions which standard mobile telephones do not meet. To fulfill this demand, phones without Internet access, text messaging or cameras are required.These [restricted phones](http://en.wikipedia.org/wiki/Telephone_numbers_in_Israel#.22Kosher.22_numbers) are known as [kosher](http://en.wikipedia.org/wiki/Kosher) phones and have [rabbinical](http://en.wikipedia.org/wiki/Rabbi) approval for use in Israel and elsewhere by observant [Orthodox Jews](http://en.wikipedia.org/wiki/Orthodox_Jew). Some are even approved for use by essential workers (such as health, security and public services) on the [sabbath](http://en.wikipedia.org/wiki/Shabbat), even though use of any electrical device is restricted.

Although these phones are intended to prevent [immodesty](http://en.wikipedia.org/wiki/Immodesty#Jewish_modesty), some vendors report good sales to adults who prefer the simplicity of the devices.

**Mobile phone operators**

Global mobile phone subscribers per country from 1980 to 2009. The growth in users has

been exponential since they were first made available.

The world's largest individual mobile operator by subscribers is [China Mobile](http://en.wikipedia.org/wiki/China_Mobile) with over 500 million mobile phone subscribers. Over 50 mobile operators have over 10 million subscribers each, and over 150 mobile operators had at least one million subscribers by the end of 2009. In February 2010, there were six billion mobile phone subscribers, a number that is expected to grow.