Interesting Facts re mobiles

1. Have you ever used Nokia 1100? Be proud, it was the bestselling electrical gadget in history with more than 250 million pieces sold.
2. $4000 is the cost of first mobile phone in US, in 1983.
3. In 2012 Apple sold more than 340,000 iPhones per day, which is around 4 per second.
4. Be careful while using your mobile phone, it has 18 times more bacteria than toilet handles.
5. Is your phone water proof? 90% of mobile phones in Japan, are waterproof.
6. Insomnia, confusion and headaches are caused due to mobile phone radiation. Experts have identified ringxiety, nomophobia, telephonophobia and frigensophobia as conditions that can effect people.
7. This sounds odd, but you can charge your phone by using urine, scientists developed it.
8. The first mobile call was made by Martin Cooper in 1973.
9. Do you know that the present mobile phones have more computing power than the computers used for the Apollo 11 to land on the moon.
10. In Britain more than 100,000 mobile phones are dropped down in the toilet every year.
11. In 1993, world's first Smartphone was debuted at Florida's Wireless World Conference by BellSouth Cellular, it has a LCD touch screen display. This was designed by IBM and named as Simon ,priced at $899 and only 2000 Simmons are made at that time.
12. In U.S., the mobile phone towers and antennas are often disguised. Engineers have developed ways to install the equipment into telephone poles, clock faces, church roofs and even in signs. Even mobile phone tower is often disguised as plastic trees.
13. 70% of mobile phones are manufactured in China.

Binary counting

Binary counting follows the same procedure, except that only the two symbols *0* and *1* are available. Thus, after a digit reaches 1 in binary, an increment resets it to 0 but also causes an increment of the next digit to the left:

0000,
000**1**, (rightmost digit starts over, and next digit is incremented)

00**1**0, 0011, (rightmost two digits start over, and next digit is incremented)

0**1**00, 0101, 0110, 0111, (rightmost three digits start over, and the next digit is incremented)

1000, 1001, 1010, 1011, 1100, 1101, 1110, 1111 ...

In the binary system, each digit represents an increasing power of 2, with the rightmost digit representing 2^0, the next representing 2^1, then 2^2, and so on.

The equivalent decimal representation of a binary number is sum of the powers of 2 which each digit represents. For example, the binary number 100101 is converted to decimal form as follows:

100101= [**1** × 32] + [**0** 16] + [**0**× 8] + [**1**× 4] + [**0**× 2] + [**1**× 1]

100101= 37

Decimal pattern	Binary number
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111

2^4	2^3	2^2	2^1	2^0	
16	8	4	2	1	
0	0	0	0	0	0

This counter shows how to count in binary from numbers zero through thirty-one.

Introduction

Signals in the real world are analog: light, sound, you name it. So, real-world signals must be converted into digital, using a circuit called ADC (Analog-to-Digital Converter), before they can be manipulated by digital equipment. In this tute I will give a brief overview about analog-to-digital conversion yet keeping a very easy to follow language.

When you scan a picture with a scanner what the scanner is doing is an analog-to-digital conversion: it is taking the analog information provided by the picture (light) and converting into digital.

When you record your voice or use a VoIP solution on your computer, you are using an analog-to-digital converter to convert your voice, which is analog, into digital information.

Digital information isn't only restricted to computers. When you talk on the phone, for example, your voice is converted into digital (at the central office switch, if you use an analog line, or at you home, if you use a digital line like ISDN or DSL), since your voice is analog and the communication between the phone switches is done digitally.

When an audio CD is recorded at a studio, once again analog-to-digital is taking place, converting sounds into digital numbers that will be stored on the disc.

Whenever we need the analog signal back, the opposite conversion – digital-to-analog, which is done by a circuit called DAC, Digital-to-Analog Converter – is needed. When you play an audio

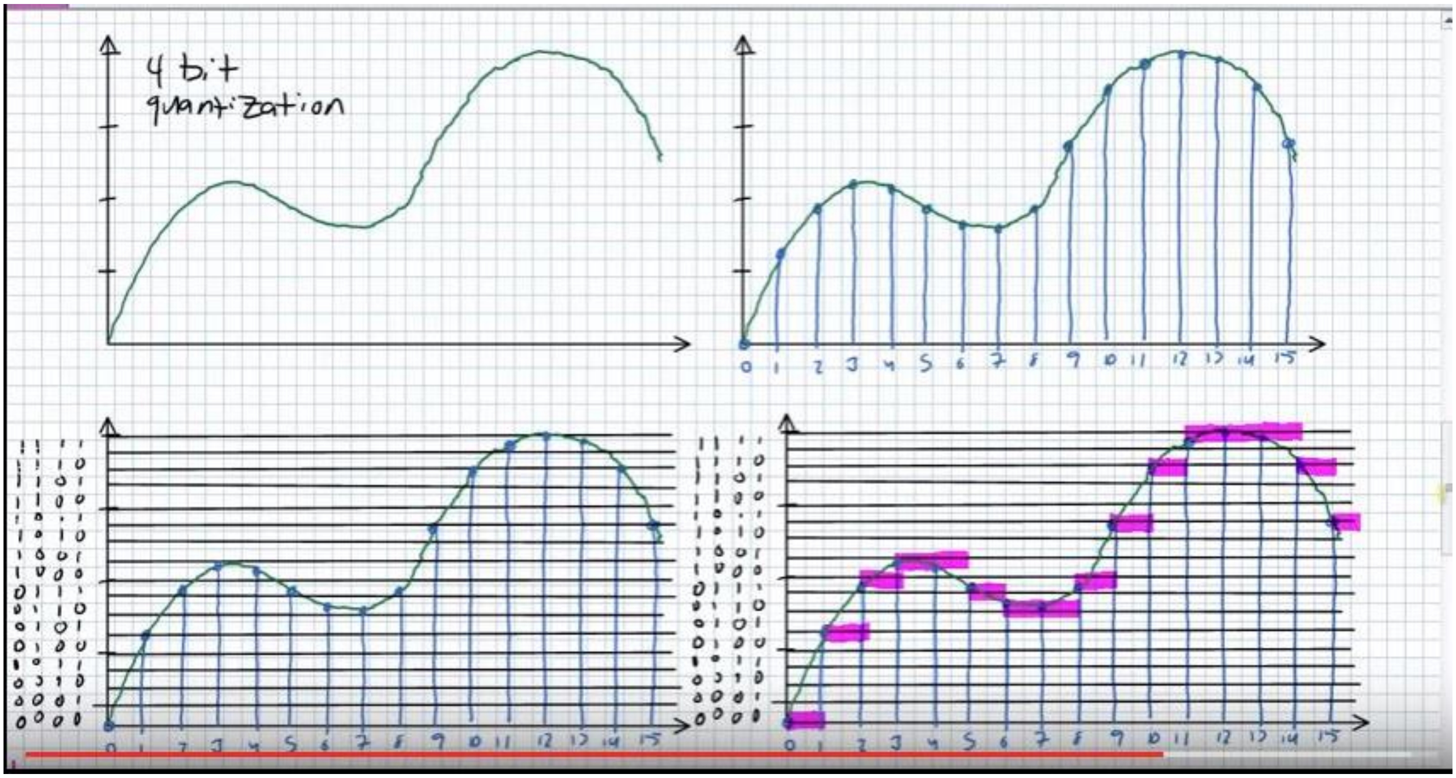
CD, what the CD player is doing is reading digital information stored on the disc and converting it back to analog so you can hear the music. When you are talking on the phone, a digital-to-analog conversion is also taking place (at the central office switch, if you use an analog line, or at you home, if you use a digital line like ISDN or DSL), so you can hear what the other party is saying.

But, why digital? There are some basic reasons to use digital signals instead of analog, noise being the number one.

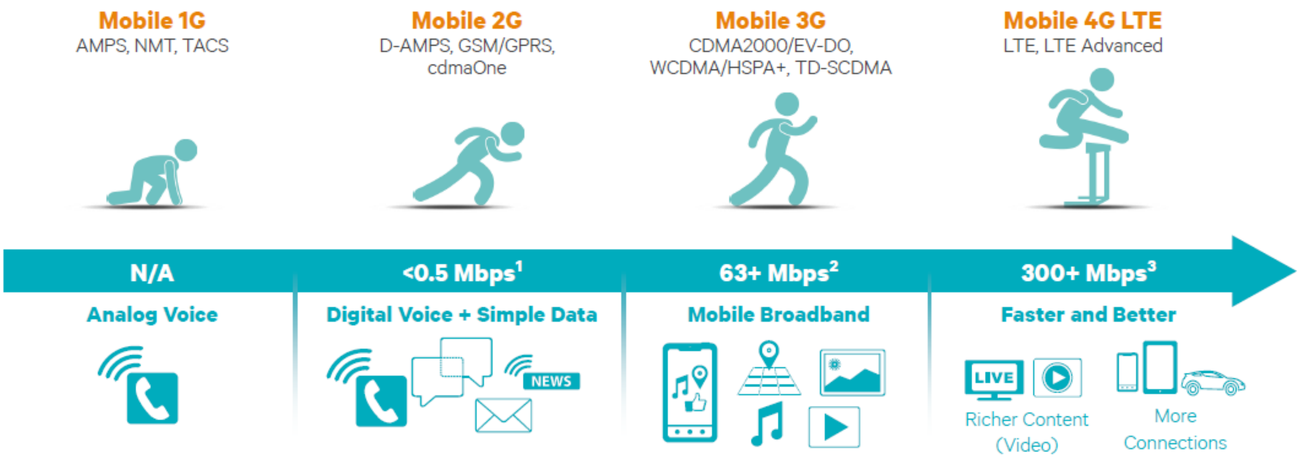
Since analog signals can assume any value, noise is interpreted as being part of the original signal. For example, when you listen to a LP record, you hear noise because the needle is analog and thus don’t know the difference from the music originally recorded from the noise inserted by dust or cracks.

Digital systems, on the other hand, can only understand two numbers, zero and one. Anything different from this is discarded. That’s why you won’t hear any unwanted noise when listening t an audio CD, even if you played it thousands of times before (actually depending on your sounc system you can hear some noise when playing audio CDs, but this noise, called white noise, isn’t produced by the CD media, but by the CD player, amplifier or cables used, and is introduced in the audio path after the digital data found on the CD was already converted back to analog – as you see, the problem lies in the analog part).

Another advantage of digital system against analog is the data compression capability. Since th digital counterpart of an analog signal is just a bunch of numbers, these numbers can be compressed, just like you would compress a Word file using WinZip to shrink down the file size, for example. The compression can be done to save storage space or bandwidth. On all the examples given so far no compression is used. We will talk again about it when discussing surround sound.


4 bit
quantization
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
1111
1110
1101
1100
1011
1010
1001
1000
0111
0110
0101
0100
0011
0010
0001
0000

Powered by evolving mobile technologies for better experiences



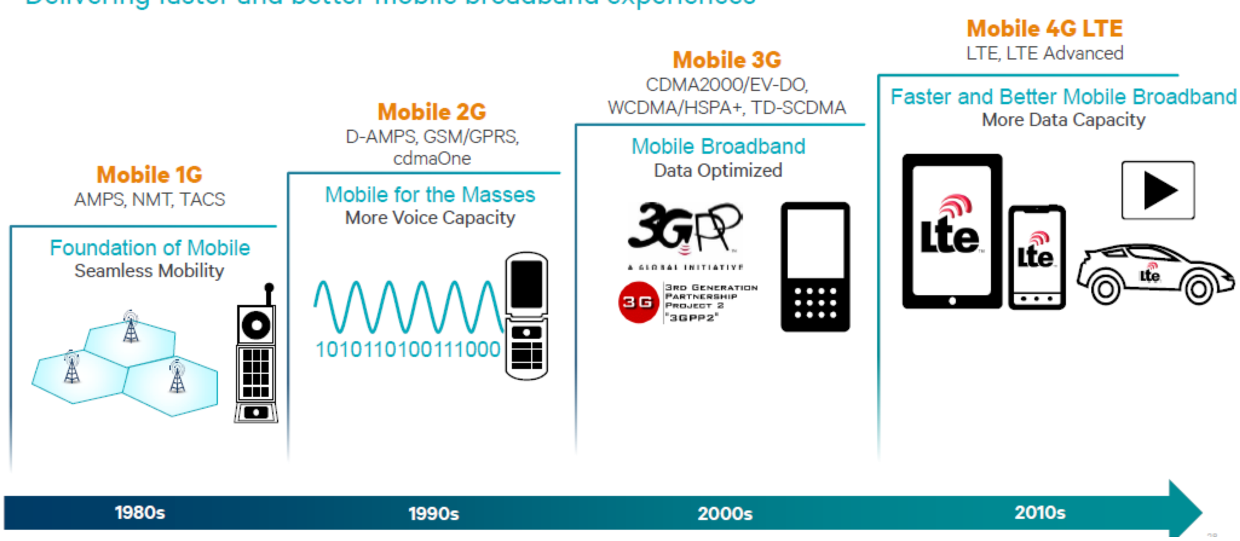
Evolving mobile technologies deliver great mobile experiences

Appreciating the magic of mobile requires understanding the evolution from 1G to 4G LTE

1. 1G established seamless mobile connectivity introducing mobile voice services
2. 2G digital wireless technologies increased voice capacity delivering mobile to the masses
3. 3G optimized mobile for data enabling mobile broadband services, and is evolving for faster and better connectivity
4. 4G LTE delivers more capacity for faster and better mobile broadband experiences, and is also expanding in to new frontiers
5. Qualcomm has been at the forefront of this evolution, pushing wireless boundaries to enable the best mobile experiences

Mobile 4G LTE is evolving to provide more data capacity

Delivering faster and better mobile broadband experiences



Touch screens have totally changed the way we use mobile phones. But how does wiping your finger on a glass screen make things happen inside your phone?

Don't be fooled by the mild-mannered glass surface; you're poking your finger fair smack into an electric field or two when you swipe your phone. (Source: iStockphoto)

Touch screens on phones and tablets really have the X factor. Being able to text, phone or film something just by swiping your finger on glass almost makes up for all those other failed sci-fi promises of the 60s.

But considering how futuristic touch screens seem, they rely on a bit of physics that's almost as old as Newton — capacitance — and the fact that your finger is three parts salty water.

If you stick your finger on a regular piece of glass, the most you can hope for is a smudge.

But if there's an electric field on the other side of the glass, some serious rearranging of electric charges goes on in the glass, in your finger and in the field itself.

And if there are dozens of small electric fields forming and disappearing in a grid formation on the other side of your glass screen, your phone can not only tell when a finger is touching it, it can pinpoint exactly where on the screen that finger is. Here's how.

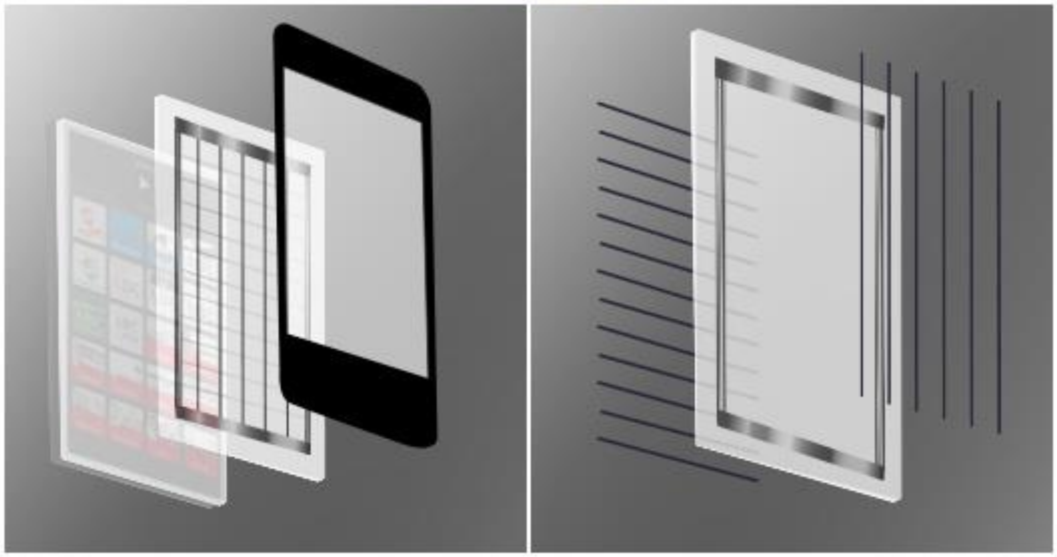
Journey to the centre of the smartphone

The touch detection part of a smartphone is in the top part of the phone, above the LCD screen and the battery and circuits.

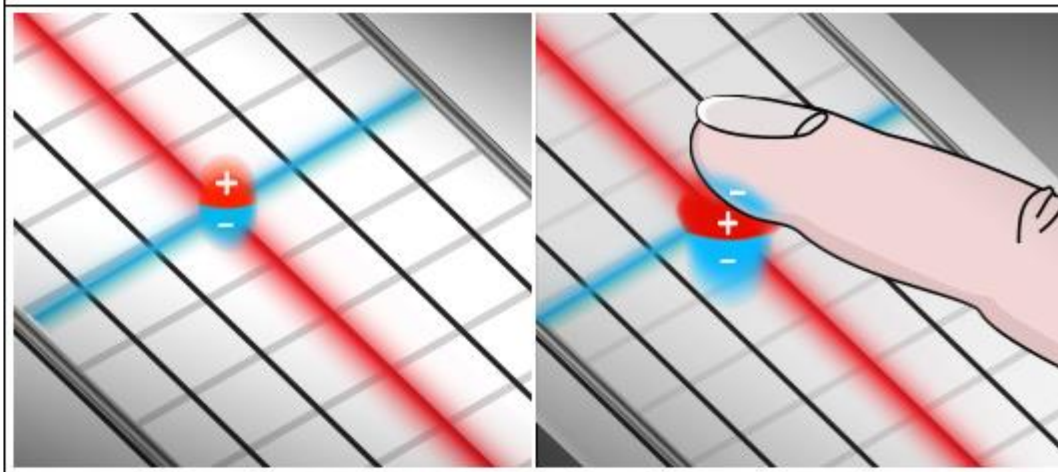
It's made up of two sheets of glass and a bunch of wires that are so skinny they're see-through. The top sheet of glass is the one you touch — it's mostly for protection and to keep your finger away from the business end of things, which happen on the layer of glass below.

This second layer has got the skinny wires running over both sides: across it on one side, and up and down on the other. Together they make up a grid pattern.

Touchy fieldy things



A grid pattern of wires on either side of a sheet of glass, and some hidden sensors around the edge are the key to touch detection.



An electric field around the intersection of the oppositely charged wires affects, and is strengthened by the charge in your finger.

The wires on one side of the glass are hooked up to the battery's positive terminal, and the ones on the other side are hooked up to the negative terminal. But there's only ever one pair of wires — one above and one below the glass — switched on at any one time.

The switching happens really quickly, so every possible pair of wires gets charged up heaps of times in the same order every second.

In every one of these pairs of wires, the one that's hooked up to the battery's positive terminal gets electrons sucked out of it, and the negative terminal pumps electrons into the other wire.

So you always have one wire (the one hooked up to the negative terminal) being more negative than the other.

That difference in charge causes an electric field between the two wires, and it's strongest where the wires are closest — where they cross over.

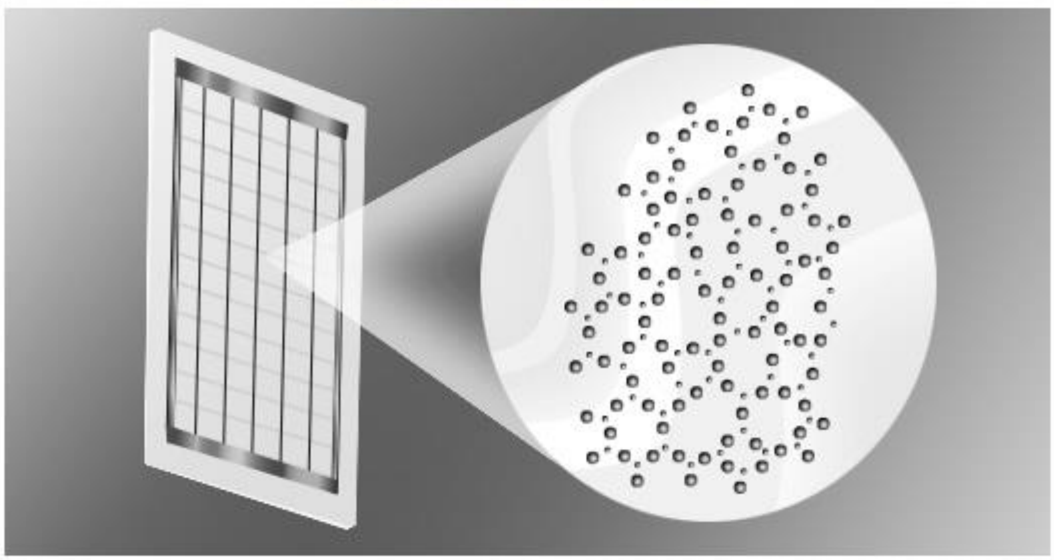
These electric fields are really small, but they still affect nearby charges — like the electrons in the layer of glass.

Glass is an insulator — its electrons are held tightly by its atoms, so they're not free to flow as an electric current. But the electric field between the wires pulls the electrons a little bit towards the positive wire.

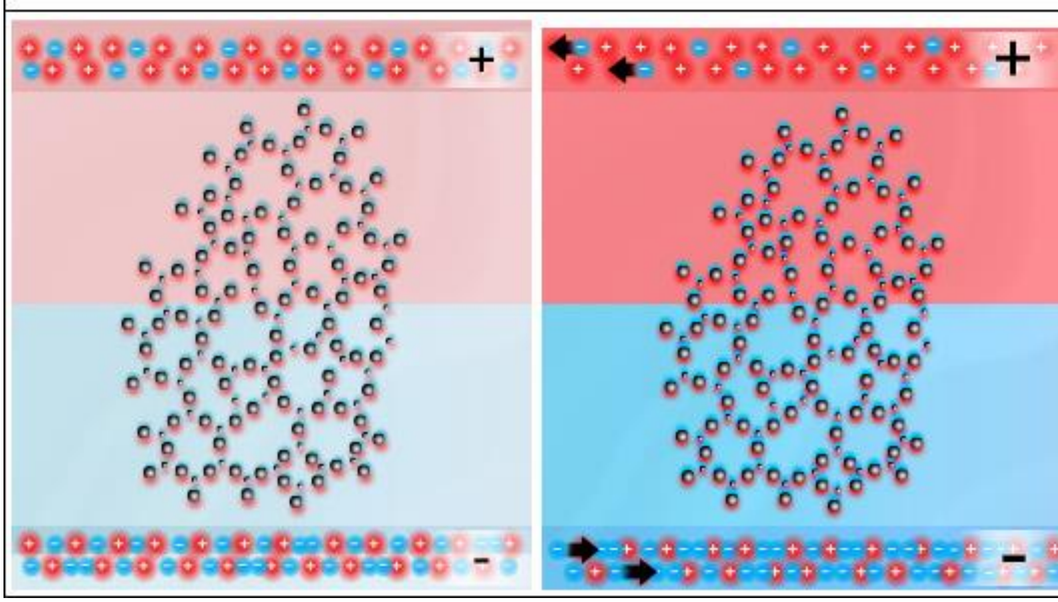
No current flows, but pulling all those electrons closer repels electrons in the positive wire, and attracts more electrons from the battery to the negative wire.

So the positive wire gets a bit more positive (fewer electrons) and the negative wire more negative than it would be without the help of the glass. And that means the electric field gets stronger.

Capacitance in touchscreens



The molecules in glass (above) don't conduct electricity. But when glass is sandwiched between positively and negatively charged wires (below), the electric field surrounding the wires tugs electrons in glass towards the positive wire. This repels electrons in the positive wire making it even more positive, and attracts more electrons to the negative wire – making the electric field even stronger. Adding a finger above the glass ramps up the entire process.



Devices that can store charge in conductors separated by an insulator like this are called capacitors. Man-made capacitors first appeared in the 18th century, but nature had the jump on us by a few billion years

. Lightning is made by thunderclouds and the ground acting like a giant capacitor, and your cells control what goes in and out of them by keeping an electric field across their insulating membrane.

If a dud conductor like glass can increase the electric field at the intersection of the wires, you can imagine what a bag of salty water like your finger can do to it.

Better still, your finger doesn't have to be between the wires — the electric field around intersecting wires pokes up and out of the top layer of glass, right out of your phone.

So when you touch your screen you're putting your finger right into an electric field.

The blood and cells in your finger are full of water with heaps of charged atoms dissolved in it — positive ions like sodium (Na+) and potassium (K+), and negative ions like chloride (Cl-).

When your finger enters an electric field, the field gets to work organising those charges — sucking negative ions towards the positive wires and pushing positive ions away. And with all that extra charge getting organised in your finger, that particular electric field gets stronger so it can suck more charge from the battery to balance things out.

The turbo-charge your finger gives to the nearest electric field doesn't go unnoticed by the phone. The black border around all touch screens covers up a bunch of sensors that constantly measure how much charge is stored at the intersection of every pair of crossed wires.

Once the power to a pair of wires is cut, the electric field disappears, so there's nothing to hold the built-up electrons in place. They leak out from the negative wire into another circuit, causing a small current to flow in it.

The hidden sensors measure how long the current flows for — the more charge stored in the grid lines, the longer it takes to leak out, the longer the current lasts.

Stick a finger on your phone and the electric field at the nearest intersecting wires grows, so more charge is stored there.

Depower the wires and the sensor notices that while all the other wires are producing the standard amount of current, one pair — the wires that intersect near your finger — are high scorers. It's a tactic straight out of the *Battleship* playbook, and it works a treat.

It's a stylus ... it's a finger ... it's a banana!

For all its smarts, your phone isn't detecting a finger — it just knows that something that's about the same conductivity as a finger is touching it. Metals will shoot the electric field through the roof, and cause an outflow current that's way too long. Non-conductors, like gloves, won't have nearly enough effect. But anything that's got about a finger's worth of free-moving charge — like a humble banana — will do the trick. Capacitance has a very democratic sense of touch.

Fiber Optics: Understanding the Basics

Nothing has changed the world of communications as much as the development and implementation of optical fiber. This article provides the basic principles needed to work with this technology.

Speed of Light 299,700 Km / Sec

Distance between Sydney and London 16,983 km

Optical fibers are made from either glass or plastic. Most are roughly the diameter of a human hair, and they may be many miles long. Light is transmitted along the center of the fiber from one end to the other, and a signal may be imposed. Fiber optic systems are superior to metallic conductors in many applications. Their greatest advantage is bandwidth. Because of the wavelength of light, it is possible to transmit a signal that contains considerably more information than is possible with a metallic conductor – even a coaxial conductor. Other advantages include:

• Electrical Isolation – Fiber optics do not need a grounding connection. Both the transmitter and the receiver are isolated from each other and are therefore free of ground loop problems. Also, there is no danger of sparks or electrical shock.

• Freedom from EMI – Fiber optics are immune to electromagnetic interference (EMI), and they emit no radiation themselves to cause other interference.

• Low Power Loss – This permits longer cable runs and fewer repeater amplifiers.

• Lighter and Smaller – Fiber weighs less and needs less space than metallic conductors with equivalent signal-carrying capacity.

Copper wire is about 13 times heavier. Fiber also is easier to install and requires less duct space.

Applications

Some of the major application areas of optical fibers are:

• Communications – Voice, data and video transmission are the most common uses of fiber optics, and these include:

– Telecommunications
– Local area networks (LANs)
– Industrial control systems
– Avionic systems
– Military command, control and communications systems

• Sensing – Fiber optics can be used to deliver light from a remote source to a detector to obtain pressure, temperature or spectral information. The fiber also can be used directly as a transducer to measure a number of environmental effects, such as strain, pressure, electrical resistance and pH. Environmental changes affect the light intensity, phase and/or polarization in ways that can be detected at the other end of the fiber.

• Power Delivery – Optical fibers can deliver remarkably high levels of power for tasks such as laser cutting, welding, marking and drilling.

• Illumination – A bundle of fibers gathered together with a light source at one end can illuminate areas that are difficult to reach – for example, inside the human body, in conjunction with an endoscope. Also, they can be used as a display sign or simply as decorative illumination.

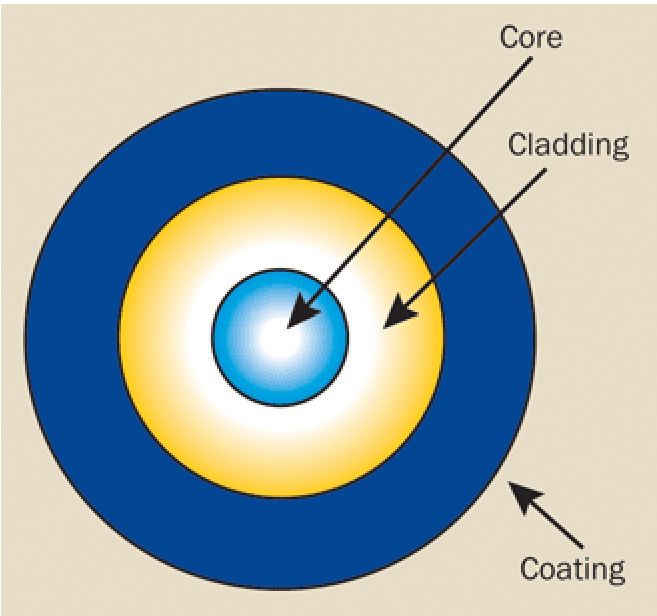


Figure 1. *An optical fiber consists of a core, cladding and coating.*

Construction

An optical fiber consists of three basic concentric elements: the core, the cladding and the outer coating (Figure 1).

The core is usually made of glass or plastic, although other materials are sometimes used, depending on the transmission spectrum desired.

The core is the light-transmitting portion of the fiber. The cladding usually is made of the same material as the core, but with a slightly lower index of refraction (usually about 1 percent lower). This index difference causes total internal reflection to occur at the index boundary along the length of the fiber so that the light is transmitted down the fiber and does not escape through the sidewalls.

Figure 2. *A beam of light passing from one material to another of a different index of refraction is bent or refracted at the interface.*

The coating usually comprises one or more coats of a plastic material to protect the fiber from the physical environment. Sometimes metallic sheaths are added to the coating for further physical protection.

Optical fibers usually are specified by their size, given as the outer diameter of the core, cladding and coating. For example, a 62.5/125/250 would refer to a fiber with a 62.5-µm diameter core, a 125-µm diameter cladding and a 0.25-mm outer coating diameter.

Principles

Optical materials are characterized by their index of refraction, referred to as n. A material's index of refraction is the ratio of the speed of light in a vacuum to the speed of light in the material. When a beam of light passes from one material to another with a different index of refraction, the beam is bent (or refracted) at the interface (Figure 2).

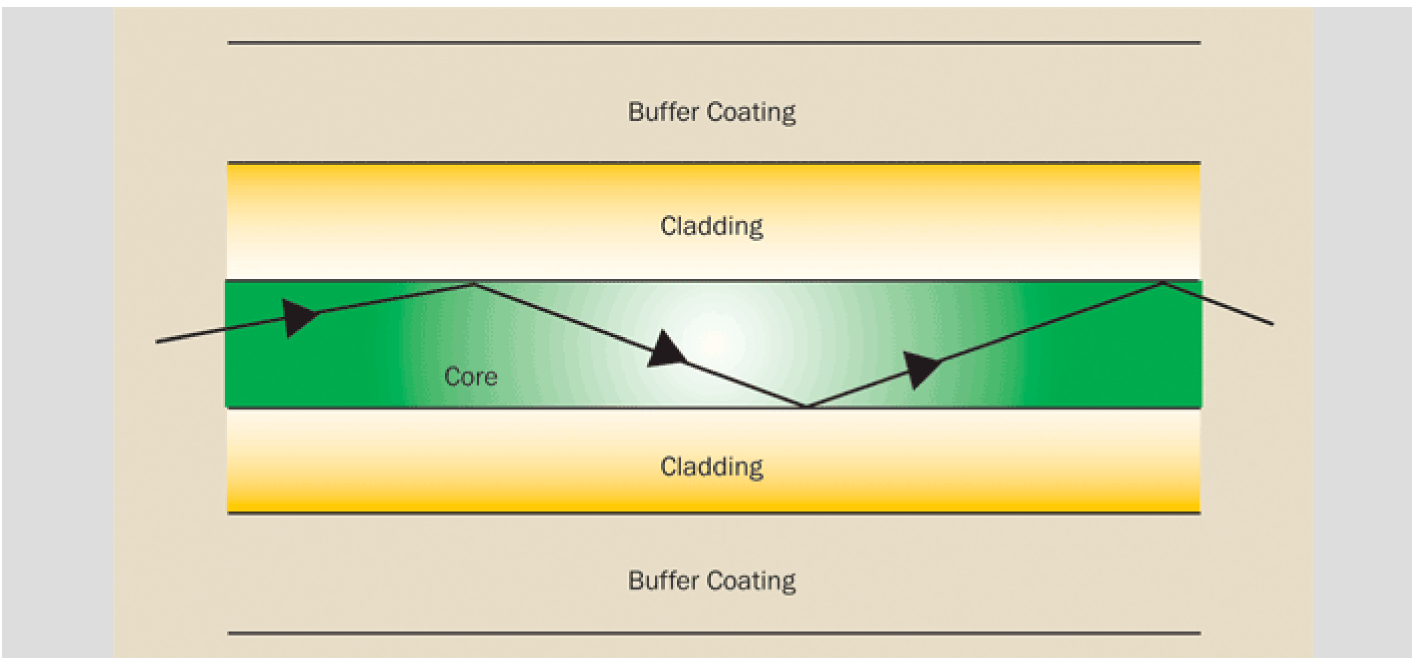


Figure 3. *Total internal reflection allows light to remain inside the core of the fiber.*

Modes

When light is guided down a fiber (as microwaves are guided down a waveguide), phase shifts occur at every reflective boundary. There is a finite discrete number of paths down the optical fiber (known as modes) that produce constructive (in phase and therefore additive) phase shifts that reinforce the transmission. Because each mode occurs at a different angle to the fiber axis as the beam travels along the length, each one travels a different length through the fiber from the input to the output. Only one mode, the zero-order mode, travels the length of the fiber without reflections from the sidewalls. This is known as a single-mode fiber. The actual number of modes that can be propagated in a given optical fiber is determined by the wavelength of light and the diameter and index of refraction of the core of the fiber.

Bandwidth

Bandwidth measures the data-carrying capacity of an optical fiber and is expressed as the product of the data frequency and the distance traveled (MHz-km or GHz-km, typically). For example, a fiber with a 400-MHz-km bandwidth can transmit 400 MHz for a distance of 1 km, or it can transmit 20 MHz of data for 20 km. The primary limit on bandwidth is pulse broadening, which results from modal and chromatic dispersion of the fiber. Typical values for different types of fiber follow:

Fiber Type	Bandwidth
Single Mode	100 GHz-km
Graded Index	500 MHz-km at 1300 nm 160 MHz-km at 850 nm
Step Index	20 MHz-km

Power transmission

The amount of power that a fiber can transmit (without being damaged) is usually expressed in terms of the maximum acceptable power density. Power density is the product of the maximum power output of the laser and the area of the laser beam. For example, a 15-W laser beam focused onto a 150-µm diameter spot produces a power density of

Fiber types

There are basically three types of optical fiber: single mode, multimode graded index and multimode step index. They are characterized by the way light travels down the fiber and depend on both the wavelength of the light and the mechanical geometry of the fiber.

Examples of how they propagate light are shown in Figure 5.

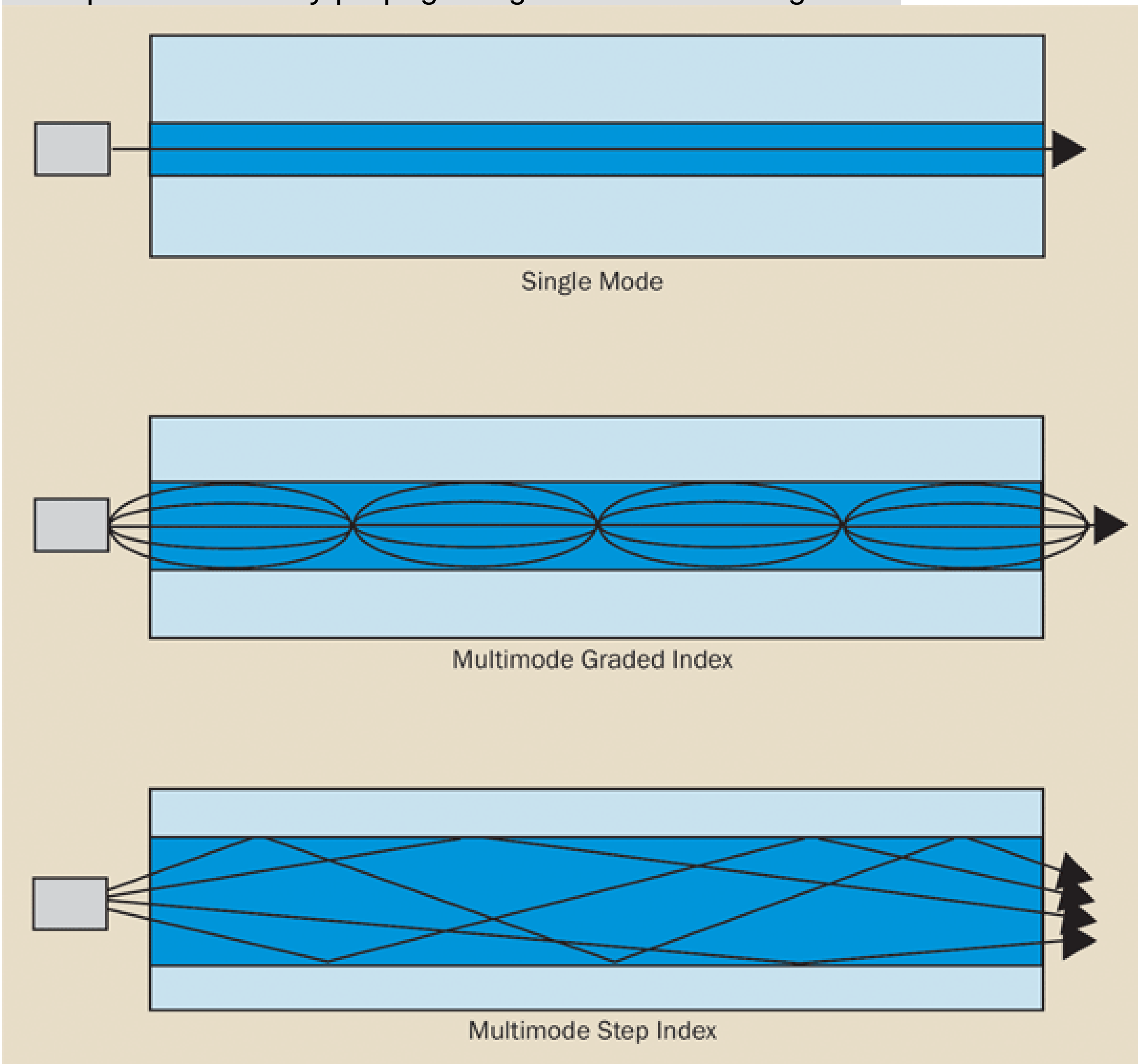


Figure 5. *Modes of fiber transmission.*

Single mode

Only the fundamental zero-order mode is transmitted in a single-mode fiber. The light beam travels straight through the fiber with no reflections from the core-cladding sidewalls at all. Single-mode fiber is characterized by the wavelength cutoff value, which is dependent on core diameter, NA and wavelength of operation. Below the cutoff wavelength, higher-order modes may also propagate, which changes the fiber's characteristics.

Multimode graded index

The core diameters of multimode fibers are much larger than single-mode fibers. As a result, higher-order modes also are propagated.

The core in a graded-index fiber has an index of refraction that radially decreases continuously from the center to the cladding interface. As a result, the light travels faster at the edge of the core than in the center. Different modes travel in curved paths with nearly equal travel times. This greatly reduces modal dispersion in the fiber.

Multimode step index

The core of a step-index fiber has a uniform index of refraction right up to the cladding interface where the index changes in a step-like fashion. Because different modes in a step-index fiber travel different path lengths in their journey through the fiber, data transmission distances must be kept short to avoid considerable modal dispersion problems.

Step-index fibers are available with core diameters of 100 to 1500 µm. They are well suited to applications requiring high power densities, such as medical and industrial laser power