



## WHAT DOES A MANAGER DO?

One of the first lessons a beginning manager must learn is that good managers do not Do anything. A manager's role is to manage the people who do actually do the work. The manager's role is to make the group more effective than they would be without him/her.

That doesn't mean that managers spend all day sitting around with their feet up on the desk drinking coffee. Most managers work very hard and work longer hours than anyone on their teams. So what do managers do?

### Build A Team

One of the first things you have to do as a manager is to build your team. Usually, when you become a manager, your team is already in place. You may need to add a few people or replace some people. Don't be in a hurry. Learn about your team and the people on the team before you shake things up. Don't feel you have to prove you're the manager. Take the time to think things through before you make major changes.

### Motivate People

The simplest way to make your team more productive is to motivate them. Motivating people can be a real challenge for many managers because it is so different for each person. You will find that what works to motivate one person won't work for another and will actually be a demotivator for still another. As a manager, you need to find the unique motivators for each member of your team.

### Run The Business

While you are motivating your team, you have to stay focused on the business itself. Managers must handle many specific tasks, mostly related to personnel actions and financial transactions, to keep the company functioning. You will have to make decisions daily about the correct way to do things and to keep your team function as a part of the whole company. It doesn't matter how well your unit performs unless it is in sync with the rest of the company.

### Make Changes & Fix Things

Things go wrong every day. Things change constantly. Managers play a key role in figuring out what is going wrong and doing what is needed to fix it.

### Manage Upward

In addition to managing your team, your role as a manager requires that you also manage the organization above your unit. Your job includes buffering your people from the company power structure. Your boss, and any bosses above him/her, need to go through you and not directly to your team.

### Manage Sideways

In addition to managing upward, you need to work well with your peers. Your team will not function well if they have problems with other departments. You can help them be more effective if you can establish good working relationships with your peers, the heads of the other departments your team needs to work with.

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*By: Mr. F. John Reh, Management Consultants, about.com Guide to Management*

# REMOTE CONTROLLERS—A NEW WAY OF LIFE

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## Abstract:

*In today's fast life every body wants quick and neat operations. In view of this practically in every walk of life different remote controllers are used for various applications may it be entertainment electronics, house hold appliances or many other applications in Defense, Telecommunications etc.. One can easily control a sophisticated console based application with the input and output streams. In this article the author traces the history of the development of various remote controllers, their present status and ultimately the future developments which will ultimately revolutionize the use of remote controllers.*

## INTRODUCTION

The remote control is an electronic transmitter device which is used to provide hands free control of various appliances like to turn on & off the television, media players, air conditioners or open a garage door & so on. The remote control was first used as a television controlling device. But as the needs of the society & the electronic devices have increased around us, the usage of remote control has also increased with time over the years. It allows us to use the appliances around us without much effort & time. The remote control can be contracted to remote or controller. It is known by many other names as well, such as converter clicker, digger, flipper, the tuner or the changer.

But commonly, remote controls are Consumer IR devices used to issue commands from a distance to televisions or other consumer electronics such as stereo systems, DVD players and dimmers. Remote controls for these devices are usually small wireless handheld objects with an array of buttons for adjusting various settings such as television channel, track number, and volume. In fact, for the majority of modern devices with this kind of control, the remote contains all the function controls while the controlled device itself only has a handful of essential primary controls. Most of these remotes communicate to their respective devices via infrared (IR) signals and a few via radio signals. Television IR signals can be mimicked by a universal remote, which is able to emulate the functionality of most major brand television remote controls. They are usually powered by small AAA or AA size batteries.

The advantages of using remote controls are that it saves both time and effort required.

When it comes to handling radioactive materials, remote controls are useful in protecting human health. Remote control cars and boats are used for hobbies and entertainment. Radio control is an advantage because there are military tests currently being conducted to use radio control aircraft for surveillance and air strikes which could save the lives of soldiers.

The disadvantages of using remote controls-- When using mechanical controls, human hands are almost always better suited for the job, mainly because a remote control will do the job slower than a human would be able to. Also, possession of the TV remote control has become a source of conflict in many households. Some even claim that the remote has attributed to laziness. A disadvantage to the infrared TV remote control is that it cannot control TV operations when something is blocking the infrared beam.[3]

## HISTORICAL BACKGROUND

The first remote control was developed in 1898 by Nikola Tesla, which is described in his patent, U.S. Patent 613809, named Method of an Apparatus for Controlling Mechanism of Moving Vehicle or Vehicles. He displayed a radio controlled boat in an electrical exhibition. Next, in 1903, Leonardo Torres Quevedo released the Telekino, for which he obtained a patent in France, Spain, Great Britain and the United States. The Telekino consisted of a robot that executed commands transmitted by electromagnetic waves. This was the world's first apparatus for radio control and was a pioneer in the field of remote controls.

The first machines to be operated by remote control were used mainly for military purposes. The German Navy developed Radio controlled motorboats to destroy the enemy ships during the World War I. The Radio controlled bombs & other remote controlled weapons were used during the World War II, like the Wasserfall missile. The first remote controlled aeroplane flew in the year 1932. In the late 1930's many models of remote control were introduced but all of them were connected to the appliance being controlled through wires.

The first wireless remote control for consumer electronic device was Philco Mystery Control introduced in 1939 was a battery operated low

frequency transmitter. In the late 1940's automatic garage door openers were invented & in the 1950's the first TV remote control were used. The first TV remote control was developed in 1952 by Zenith Electronics Corporation & was called Lazy Bones. It used a cable that ran from TV set to viewer. There was a motor that would rotate tuner in TV set by pushing buttons on remote that would activate the motor. The first wireless TV remote control Flashmatic was invented in 1955. A flashlight was shined towards light sensitive cells in each of the 4 corners of the TV set. Each corner had a different function which turned on & off the TV, changed the channel & controlled the volume. But people used to forget that which corner had which function. In 1957, the Zenith Space Command remote control was developed which was wireless remote control and used ultrasound to change the channel and volume. The problem with ultrasonic control was that clinking metal could affect TV set. It was used for two decades till early 1980's.

In the 1980s Steve Wozniak of Apple, started a company named CL 9. The purpose of this company was to create a remote control that could operate multiple electronic devices. The CORE unit (Controller of Remote Equipment) was introduced in the fall of 1987. The advantage to this remote controller was that it could "learn" remote signals from different devices. It had the ability to perform specific or multiple functions at various times with its built-in clock. It was the first remote control that could be linked to a computer and loaded with updated software code as needed. The CORE unit never made a huge impact on the market. It was much too cumbersome for the average user to program, but it received rave reviews from those who could. These obstacles eventually led to the demise of CL 9, but one of its employees continued the business under the name Celadon. This was one of the first computer-controlled learning remote controls on the market. In 1990 a semiconductor for emitting & receiving IR radiation were used. There is a digital code 4 each button & photo detector was used in TV which identifies IR beam & translated codes into commands.

By the early 2000s, the number of consumer electronic devices in most homes greatly increased, along with the number of remotes to control those devices. Now it's probably a rare situation to find only one (or none) remote control in one's home. Only to operate a home theatre you need as many as five or six remotes. Not to mention the newest trend to have remote-controlled lighting, curtains, toys and even showers. From relieving us from

making the effort to control the devices around us, remote controllers might soon become a nightmare and an obstacle in our way to control the gadgets that we are so dependent on. [2]

## APPLICATIONS

- 1) Industry - Remote control is used for controlling substations, pump storage power stations and HVDC-plants. For these systems often PLC-systems working in the long wave range are used.
- 2) Military - Only in the military field of use of remote controls can you find the jammers and the counter measures against the jammers. They are used to disable or sabotage the enemy's use of remote controls. They are used as IED jamming systems, Radio jamming, Electronic warfare. The distances for military remote controls also tend to be much longer, up to intercontinental distance satellite linked remote controls used by military for their unmanned airplanes.

The arms race and the fact that the enemy is many times closer to the receiver has made it more complicated and too expensive to build radio remote controls for roadside bombs that are immune to jammers. The simplest types of radio remote controls have been almost entirely disabled by the advanced jammers. One of the simplest solutions against the radio jammers is to fool the jammer itself to ignite the bomb. Optical types of remote controls that use light instead of radio are still immune to the jammers.

- 3) Space - Remote control technology is also used in space travel, for instance the Russian Lunokhod vehicles were remote-controlled from the ground. Direct remote control of space vehicles at greater distances from the earth is not practical due to increasing signal delay times.
- 4) Video Games - Video game consoles had not used wireless controllers until recently, mainly because of the difficulty involved in playing the game while keeping the infrared transmitter pointed at the console. Early wireless controllers were cumbersome and when powered on alkaline batteries, lasted only a few hours before they needed replacement.

Some wireless controllers were produced by third parties, in most cases using a radio link instead of infrared. Even these were very inconsistent, and in some cases, had transmission delays, making them virtually useless. The first official

wireless controller made by a first party manufacturer was the Wave Bird for Nintendo Game cube. The Wave bird changed the face of wireless technology in video game consoles. In the current generation of gaming consoles, wireless controllers have become the standard.

- 5) PC control – The existing infrared remote controls can be used to control PC applications. Any application that supports shortcut keys can be controlled via IR remote controls from other home devices (like TV, VCR, AC). This is widely used with multimedia applications for PC based Home Theatre systems.

LIRC (Linux IR Remote control) and WinLIRC (for windows) softwares are developed for the purpose of controlling pc using TV remote and can be also used for home brew remote with lesser modification. They support almost all TV remotes. [7]

### **PRESENT STATUS**

In the current scenario the Remote Control has been playing a very important part in our lives. There are different types of techniques being used in the various Remote Controls being used these days. The techniques commonly used in the Remote Controls are radio control, ultrasonic control, laser control, mechanical control & infrared control. All these technologies are used for various purposes like radio control is used for controlling remote control vehicles like planes, boats or moving cars. Similarly all the technologies are used for various different purposes as explained below in detail about the technologies & their usage in our lives.

### **RADIO CONTROL**

Wireless radio remote control is used mostly in garage door openers, alarm systems, and remote control vehicles. In garage door openers and alarms, a simple tuned transmitter is used which sends a signal to a receiver via radio frequency usually around 400 MHz for garage door openers and alarms and about 75 MHz for radio control models, but they can vary depending on the manufacturer. The radio signals are differentiated using a special digital coding system.

For instance, inside of a garage door opener, there will most likely be a series of switches that are used to set the code for the opener. The code is in binary and this allows the openers to tell the difference between different openers. It is possible for one garage door opener to open the garage door at someone else's house as long as the two openers are set to the same frequency. For the controller to

work, the transmitter creates a serial pattern of ones and zeros using a digital circuit. This code is then sent to the receiver where the pattern is recovered and sent to the decoder circuit. When the circuit that was sent is sent using the same code (the one that was set on the inside of the transmitter), the action that you would like to carry out is carried out.

In remote control models, like boats, airplanes, and cars, the code that is sent out is sent in pulses that have to indicate position, like how far you turn the wheel on the joystick or how far you push the control lever. The code can be changed by simply changing the timing of the pulses or as complicated as sending the actual value of the angle of the control lever using binary numbers. All the information is incorporated into one continuous stream of data and is sent to the receiver. The receiver then picks up the signal and feeds it into the decoding circuitry that separates the various channels and positions all the information. The information is analyzed and then tells the motors that do the controlling what to do.

### **ULTRASONIC CONTROL**

Ultrasonics is the study of all sound like waves whose frequency is above the range of normal hearing. Audible sound is in a range of about 30 to 20,000 hertz (1 Hz = 1 cycle per second). The basic modern source of ultra sound today is specially cut crystals of materials like quartz or ceramics such as barium titanate and lead zirconate. Alternating electrical voltage it applied to opposite faces of a plate made of the material. This produces an alternating electrical expansion and contraction of the plate at the impressed frequency. This phenomenon is known as piezoelectricity when it occurs in crystals. The frequency of alternation is given by the formula,  $f = c/2l$ , where  $c$  is the speed of sound in the object and  $l$  is the thickness of the plate. If the size of the alternating electrical expansion becomes very large, the plate is said to exhibit resonance.

Ultrasonic Control at one time was used in TV remote controls. Problems occurred when other sources of ultrasonic sound affected the TV. Despite this, the ultrasonic remote control was the industry standard for two decades. Telephone answering machines also use ultrasonic control.

### **LASER CONTROL**

Laser control uses a system of algorithms (any method or procedure for computation) on a computer to control the path of vehicles. These vehicles include airplanes, rockets,

missiles, ships, torpedoes, drones, and material transport vehicles. The computer uses the guidance system to utilize the knowledge of where the vehicle is and where it should be. This difference is then processed by the guidance algorithm and then outputs to the vehicle a steering command to reduce the difference between the desired path and the actual path. The trajectory for the vehicle has been computer designed and stored in the computer. As the vehicle heads towards its destination, the values for trajectory, desired position, and velocity are made available at the summation device (where the calculations are made). The vehicle then uses sensors to measure the actual position and velocity and subtracts these values from the reference trajectory. Through calculation, the summation device finds an error signal and then attempts to correct the error to minimize the difference between the reference trajectory and the actual trajectory.

If the vehicle is tracking a target that may or may not be moving, the exact position of the target is not sensed. But instead there is a measurement of the difference between the vector from the vehicle to the target and the vector describing the vehicle orientation. This requires the guidance system to use a different type of sensor from that used in the previous diagram. An example would be radar rigidly mounted to the nose of a vehicle. The target bearing would automatically be measured relative to the attitude or orientation of the vehicle. The role of the guidance system is to process the error signal and use the result to steer the vehicle towards the target.

There are many important attributes that contribute to how effective a guidance system will be. The first is accuracy. A guidance system is no better than the quality of its sensor. The next attribute is speed of response, the system needs to be able to recover from any errors that occur and correct for them quickly. There is also a need for a stable response; a guidance system cannot react so quickly that it will overshoot its target. Another attribute is durability. Nothing behaves like its model and the guidance system needs to overcome these differences and give a good overall performance. For reliability, the backup components are used to insure the guidance system works properly.

### **MECHANICAL CONTROL**

Mechanical manipulators allow people to do manual labor while separated from the work site. They are used in hazardous environments, like coal mines and in fires, and places that are impossible for humans to have

access to. Manipulators have gone into space and underwater to retrieve objects in places where humans could not. They have also been used in microsurgery on eyes and ears. There are two parts of a mechanical manipulator; the operator's control site, or master part, and the remote task site, or slave part. The operator uses handles and switches to demonstrate exactly what he wants the machine to do. The machine then moves on wheels or tracks, and imitates the controller's movements. The manipulator has many joints and links arranged to resemble an arm. On the end of the arm is a gripper that grasps or picks up objects, and can push buttons or open doors. If the operator is nearby the work site, the manipulator is simply mechanical and works like a puppet. However, many times operators must be located far away from the work site, and the manipulator must be run by electric or hydraulic power. Manipulators are often equipped with touch and vision sensors.

For instance, when a manipulator is sent into space it may have a TV camera mounted on its "shoulder" or "wrist". As we continue to explore new and previously unreachable areas, the demand for manipulators increases. Thus, their capabilities must increase. There are now computer-aided manipulators that can retain the information they were sent, and repeat the exact operation at a later time. This is helpful when repetitive operations are required. It allows the computer and sensors at the work site to function for quite some time without the operator intervening. This teaching/memory method is called Supervisory controlled manipulation, and is still being researched.[4]

### **INFRARED CONTROL**

Infrared controls transmit light within the frequencies of 30 KHz and 40 KHz. This is just below the red part of the visible light spectrum. These high frequencies cause infrared light to be invisible to the eye and prevent other light frequencies from interfering. The signals are sent by a binary code, a series of logical zeros and ones. The controller sends different combinations of zeros and ones to tell the receiver what to do. There are three different ways in which code signals hold information. The coding is based on varying the length of pulses, the length of spaces between pulses, or changing the order of spaces and pulses. These codes hold information like the address to the machine and what the machine must do.

When you press a button on a remote it sends a series of signals. The first thing the remote

sends to the receiver is called the header. The header is a burst of highs that alerts all of the infrared receivers in the area. After the header, comes a code including the address to the specific machine you want to operate and then comes the command. As long as you hold down a button the command will continue to occur. When you release the button, the remote sends the machine a string of code that tells it to stop. When signals are received in the machine, they first enter a photo detector. The photo detector determines what type of signal is being sent, and sends it to the appropriate locations so the command can be executed. [1]

## UNIVERSAL REMOTE

The Universal Remote is a Remote Control that can be programmed to operate various brands of one or more types of consumer electronics devices. Low-end universal remotes can only control a set number of devices determined by their manufacturer, while mid- and high-end universal remotes allow the user to program in new control codes to the remote. Many remotes sold with various electronic devices include universal remote capabilities for other types of devices, which allow the remote to control other devices beyond the device it came with. For example, a VCR remote may be programmed to operate various brands of televisions. As programming a universal remote can be a fairly complex procedure, it is most often performed by technically-minded individuals, although non-technical users can often operate the remote after it has been programmed.

For example, the Rē™ Universal Remote Control is a full-featured, activity based IR remote for the iPhone with built-in upgradeable IR database support for nearly all AV devices designed to meet and exceed the performance of high-end traditional remotes. Rē can create remotes for your entertainment devices in any number of rooms or locations. Rē Accessory houses a full-power, wide beam, high-quality IR transmitter so that your A/V equipment will respond quickly and correctly every time at distances up to 40 feet.

- a) With the Wi-Fi-Enabled Universal Remote Control you can control all of your A/V Equipment over your existing Wi-Fi network from any room in the house. It provides with hand-held access to TV listings, program descriptions, news, weather, sports, interactive offers, and information services through the click365 network over your existing wireless network. The Wi-Fi Remote can control a virtually unlimited number of devices and perform up to 255 user-specified activities. The Wi-Fi

universal remote control has a built-in code library and simple product brand search to simplify setup. The WiFi Remote also offers learning functionality so you can completely eliminate the need to use any of your single device remotes.

- b) LCD touch-screen remotes-are better looking & more versatile than lower end models with static button arrays. This Universal RC offers both form & functions. But, their streamlined & high-tech look doesn't always translate into increased ease of use. Unlike the raised buttons on standard remotes, the flat surface of LCD screen can't be navigated by feel. So we have to consult the screen whenever we use these types of remotes.

For example, Sony RM AV3000 stores commands for as many as 18 devices with spaced keys, internal clock for timing ctrl & excellent coverage area.

- c) PC-programmable remotes- are most versatile type of universal Remote Control. These Remote Control have an edge over other universal Remote Control that we don't have to look at the translated manual for proper programming codes for desired function to be performed.

For example, Logitech Harmony 659 is the latest web-programmable universal control which has both good design & usability.

- d) High-end remotes-universal remotes with brilliant LCD screens, intricate PC programmability, unprecedented control over all of your gadgets. Most, but not all, include RF (radio frequency) functionality, so they can interface with base-station units through walls and obstacles, eliminating the need for line of sight to the gear in question. Furthermore, some of these remotes can stream music from your PC via Wi-Fi. This level of intexamploration isn't very simple to attain, though. A number of the remotes are so intricate that they're intended to be configured by a custom installer.

For example, Philips RC9800i is a sleek universal remote with a sharp, easy-to-read, color touch screen. It's built-in Wi-Fi wireless networking can be used to stream music from any PC to your home stereo, as well as images to the remote itself. Another plus is that the remote's firmware is upgradable via a built-in USB port, and you can wirelessly download EPG data via the Internet.

## **FUTURE DEVELOPMENTS**

The future Remote Control will be focused on the latest trends in consumer tech in Remote Control devices that are self learning & use new electronic protocols such as Bluetooth WUSB & Zigbee. It will be relying on spreading & popularizing the use of these protocols by educating the people about these above mentioned protocols, so that these can be used in both consumer & industrial sectors in the near future throughout the world. These protocols are described in detail as follows:

### **WIRELESS USB**

Wireless USB is a short-range, high-bandwidth wireless radio communication protocol created by the Wireless USB Promoter Group which was formed in February 2004 to define the Wireless USB specification. The group consists of Agere Systems (now merged with LSI Corporation), Hewlett-Packard, Intel, Microsoft, NEC Corporation, Philips and Samsung. Wireless USB is based on the Wi Media Alliance's Ultra-Wide Band (UWB) common radio platform.

Ultra-wideband (UWB) is a general term for a new type of radio communication using pulses of energy which spread emitted Radio Frequency energy over 500 MHz+ of spectrum or exceeding 20% fractional bandwidth within the frequency range of 3.1 GHz to 10.6 GHz as defined by the FCC ruling issued for UWB in Feb. 2002. UWB is not specific to Wi Media or any other company or group and there are in fact a number of groups and companies developing UWB technology totally unrelated to Wi Media. Some companies use UWB for ground penetrating radar, through wall radar and yet another company Pulse-LINK uses it as part of a whole home entertainment network using UWB for transmission over both wired and wireless media.

WUSB is a protocol promulgated by the USB-IF that uses Wi Media's UWB radio platform. It is capable of sending 480 Mbit/s at distances up to 3 meters and 110 Mbit/s at up to 10 meters. It was designed to operate in the very broad spectrum from 3.1 to 10.6 GHz frequency range, therefore intervenient bodies can be passed through with no line of sight limitation. Wireless USB is intended to remove the cables from USB peripherals. The WUSB architecture allows up to 127 devices to connect directly to a host. Because there are no wires or ports, there is no longer a need for hubs.

In recent years, the USB Consortium has been talking up the possibility of wireless USB being

a viable control protocol in the home, as it is being currently used in game controllers, printers, scanners, digital cameras, MP3 players, hard disks and flash drives. It is also suitable for transferring parallel video streams, while utilizing the Wireless USB over UWB bandwidth. However, wireless USB products have still to reach stores in significant numbers. However, to facilitate the migration from wired to wireless, WUSB introduced a new Device Wire Adapter (DWA) class. DWA allows existing USB 2.0 devices to be used wirelessly with a WUSB host. WUSB host capability can be added to existing PCs through the use of a Host Wire Adapter (HWA). The HWA is a USB 2.0 device that attaches externally to a desktop or laptop's USB port or internally to a laptop's Mini Card interface. WUSB also supports dual-role devices (DRDs), which in addition to being a WUSB device, can function as a host with limited capabilities. For example, a digital camera could act as a device when connected to a computer and as a host when transferring pictures directly to a printer.

### **ZIG BEE TECHNOLOGY**

Zig Bee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the Zig Bee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. Zig Bee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking.

Zig Bee is a low-cost, low-power, wireless mesh networking proprietary standard. The low cost allows the technology to be widely deployed in wireless control and monitoring applications, the low power-usage allows longer life with smaller batteries, and the mesh networking provides high reliability and larger range. It is a wireless control protocol developed for use in both industrial and consumer settings. It can solve the problem of compatibility by using a pairing process (similar to pairing your Bluetooth headset with your mobile phone). There has been progress on the home front, but it has been slow. There are products in the US, but the rest of the world has still to catch up.

*To be continuing in the next issue.....*

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