

## Pole Climbing Robot for Surveillance Application

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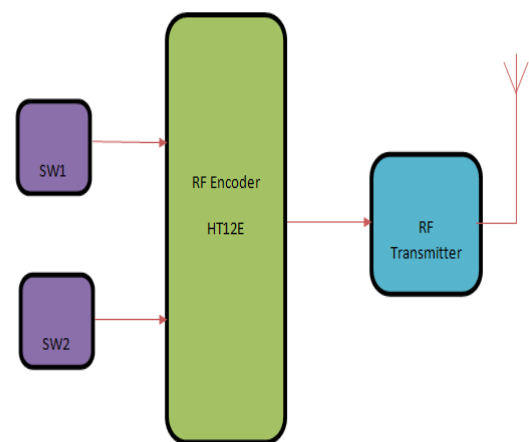
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### Abstract:

Climbing robots are useful when a task requires the use of far-reaching tools or is risky if carried out by humans. These robots can be equipped with video cameras, microphones, other sensors, and robotic manipulators to perform certain tasks. Here in this project a new type of pole-climbing Robot mechanism is proposed, the configuration and characteristics of the mechanism are introduced. The Robot mechanism action of hold pole, put pole, main move, and process of climbing pole, fixed to the pole, and across barriers are analyzed. The principal theory which is used in the pole-climbing Robot is elaborated the control system of pole-climbing robot is designed. Analysis shows that: The mechanism has the characteristics of compact body, easy control, good move characteristics, and is a promising application of pole-climbing Robot structure. Our prototype of 'Pole Climbing Robot' has the capability to climb over the poles and perform the desired task smoothly. We need to design a wireless circuit which helps robot climb on the pole, can be controlled using wireless technology like RF technology.

In this project we are using a new gripping mechanism for climbing the pole for that we are using two power supplies one from lead acid battery and another from directly ac power .The H Bridge is used to control the direction of the motors used for climbing purpose. Two switching arrays are used for controlling the robot The RF modules used here are STT-433 MHz Transmitter, STR-433 MHz Receiver, HT12E RF Encoder and HT12D RF Decoder. The two switches are interfaced to the RF transmitter through RF Encoder. The encoder continuously reads the status of the switches, passes the data to the RF transmitter and the transmitter transmits the data. This project uses regulated 5V, 9V 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/18V step down transformer.

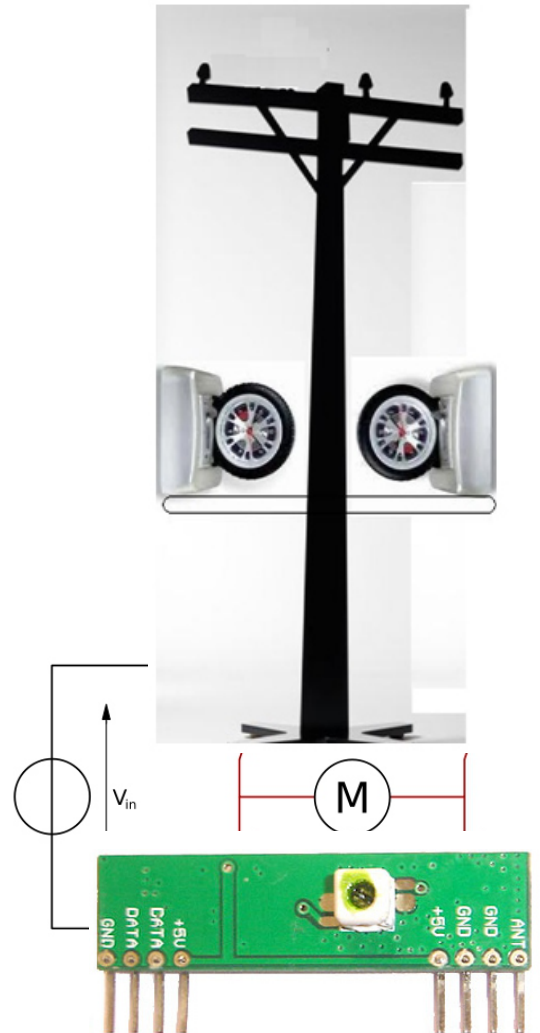
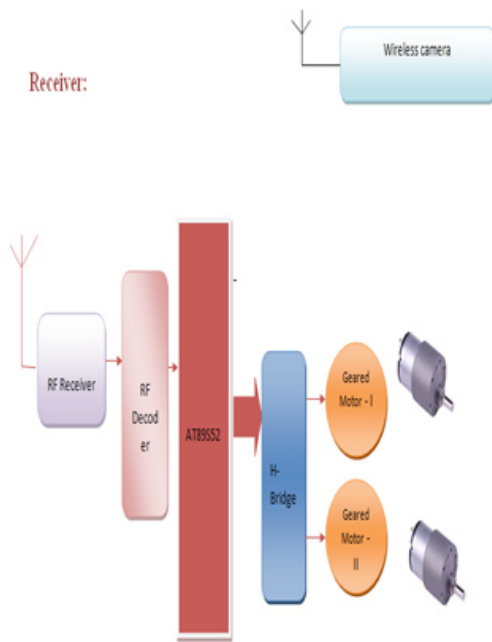
Transmitter:



### AT89S52 FEATURES

- Compatible with MCS-51® Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory – Endurance: 1000 Write/Erase Cycles
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-bit Timer/Counters
- Eight Interrupt Sources
- Full Duplex UART Serial Channel
- Low-power Idle and Power-down Modes

- Interrupt Recovery from Power-down Mode
- Watchdog Timer
- Dual Data Pointer
- Power-off Flag



**RF TRANSMITTER STT-433MHz:**



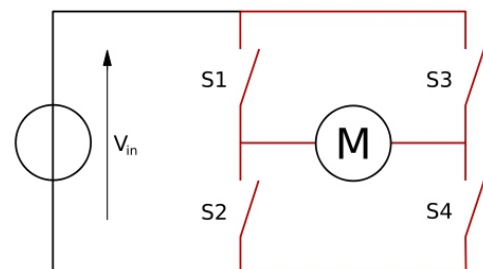
**STT-433MHz TRANSMITTER**

- The STT-433 is ideal for remote control applications where low cost and longer range is required.
- The transmitter operates from a 1.5-12V supply, making it ideal for battery-powered applications.
- The transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance.
- The manufacturing-friendly SIP style package and low-cost make the STT-433 suitable for high volume applications.

The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two Data pins are provided in the receiver module. Thus, this data can be used for further applications

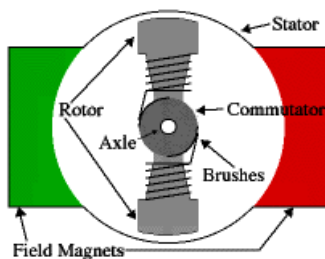
**DC MOTOR:**

An electric motor is a machine which converts electrical energy into mechanical energy.



### Principles of operation:

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.



### Wireless camera:

Wireless cameras are proving very popular among modern security consumers due to their low installation costs (there is no need to run expensive video extension cables) and flexible mounting options; wireless cameras can be mounted/installed in locations previously unavailable to standard wired cameras. In addition to the ease of use and convenience of access, wireless security camera allows users to leverage broadband wireless internet to provide seamless video streaming over-internet. (Model: SP-007AS)



**Fig Wireless A/V camera**

### A/V transmitter:

The camera is with 1.2GHz, with Audio and CMOS and receiver unit with manual frequency adjustment. This wholesale product is already popular with China Tronic customers because of consistent high quality.

- Linear Transmission Distance: 50-100m
- Transmission Signal: Audio, Video
- Receiving Signal: Audio, Video

### Technical parameters of transmitting unit:

- 1.Video Camera Parts: 1/3CMOS, 1/4 Image Sensors
- 2.System: PAL/CCIR NTSC/EIA
- 3.Effective Pixel: PAL: 628 x 582, NTSC: 510 x 492
- 4.Image Area: PAL: 5.78 x 4.19mm, NTSC: 4.69 x 3.45mm
- 5.Horizontal Definition: 380 Lines
- 6.Scanning Frequency: PAL/CCIR: 50Hz, NTSC/EIA: 60Hz
- 7.Minimum Illumination: 3 LUX
- 8.Sensitivity: +18DB-AGL On-Off
- 9.Electrical Level Output: 50mW
- 10.Frequency Output: 1.2Ghz
- 11.Transmission Signal: Audio, Video
- 12.Linear Transmission Distance: 50-100m
- 13.Voltage: DC+9V
- 14.Current: 300mA
- 15.Power Dissipation: 640mW



**Fig Wireless camera**

Technical parameters of receiving unit:

- Wireless Audio/Video Receiver
- Receiving Method: CPU Phase-Locked Loop Locking Frequency Points
- 4-Band Automatic Reception Switch
- Reception Sensitivity: +18dB
- Receiving Frequency: 1.2Ghz
- Receiving Signal: Audio, Video
- Voltage: DC+12V
- Current: 500mA

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