

Intelligent Pich and Place Robot with Remote Control

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Abstract

The goal of this project was to implement the most efficient and way analyzing robot. In our project, Robot is operated by battery energy. Battery is used to drive the Robot D.C motor. The FM transmitter and receiver circuit is used for this video camera robot. The FM receiver circuit is fitted in the robot. The cordless FM transmitter circuit is used for this project. The FM receiver circuit is having 10 relays. They are used to control rotary motion in forward direction, rotary motion in reverse direction, arm in upward movement arm in downward movement, work piece clamping and work piece releasing in order.

Keywords: Most Efficient, Analyzing Robot, Battery Energy, Robot D.C Motor, FM Transmitter, FM Receiver, 10 Relays

Introduction

This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased. Degrees of automation are of two types, full automation and semi automation. Insemi automation a combination of manual effort and mechanical power is required whereas in full automation human participation is very negligible Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation. Automation plays an important role in automobile.Nowadays almost all the automobile vehicle is being atomized in order to product the human being. The automobile vehicle is being atomized toachieve high safety , reduce man power, increase the efficiency of the vehicle.To reduce the work load, the vehicle accident, the fatigue of workers. Finally to reduce high responsibility and less Maintenance cost

Components and Description

- Battery
- P.M.D.C. Motor
- Angle frame
- Gear wheel Arrangement
- FM transmitter and Receiver



Battery:

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern. We use lead acid battery for storing the electrical energy from the solar panel for lighting the street and so about the lead acid cells are explained below.



P.M.D.C. Motor

An electric motor is a machine which converts electrical energy to mechanical energy. Its action is based on the principle that when a current-carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction is given by Fleming's left hand rule. When a motor is in operation, it develops torque. This torque can produce mechanical rotation. DC motors are also like generators classified into shunt wound or series wound or compound wound motors





Angle Frame

This is made upof M.S. This is used as a body of the vehicle. The front and rear wheels are fitted bellow this bottom frame with the help of end bearings

Gear Wheel Arrangement

There are two types of gear arrangement is used for this project. They are, Spur Gear Arrangement and Forward and Reverse direction of motor The spur gears, which are designed to transmit motion and power between parallel shafts, are the most economical gears in the power transmission industry

FM Transmitter and Receiver

Transmitter

The message to be communicated has to be first converted into an electrical signal by the help of a suitable transducer. The electrical signal so obtained has to be suitable processed and amplified before being fed to the channel. The information signal called the modulating signal is used to modulate a high frequency sine wave signal. The type of modulation depends on the requirements. The carrier signal generated by the oscillator goes to the RF output power amplifiers through the buffer and RF amplifiers. The RF amplifier sends the signal containing all bands of frequencies



Receiver

Practically all receivers today are super heterodyne. The RF amplifier is tuned to the required incoming frequency. The output of the RFA is combined with the local oscillator voltage and normally converted into a signal of lower fixed frequency. This IF signal contains the same modulation as the original carrier. It is then amplified and detected to obtain information. A fixed frequency difference is maintained between the local oscillator and RF frequency with the help of capacitance tuning. IF stage consists of a number of transformers which provides a large gain. The characteristics of the IFA are kept independent of the frequency to which the receiver is tuned, so that the sensitivity of the super heterodyne remains fairly uniform throughout its tuning range



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Architecture

The construction of remote controlled pick and place robot consists of a frame which is used for mounting the components such as D.C motor, Battery and gear wheel. The front and back wheels are fitted in the base of the frame. The front wheel is fixed by the bolt and nut. The rear wheel is fitted with the help of shaft, bearings and bearing cap. The gear wheel (spur) is fixed in this shaft for rotary movement of the arm with gripper arrangement. The D.C motor is coupled with this rotating arm arrangement with proper welding. Another D.C motor is coupled with arm lifting arrangement of the rotating column. The power for driving the motor is taken from the battery. The battery is charged through battery charger. The lead acid D.C 12 Volt battery is used for our project. The receiver circuit is fixed inside the vehicle. The receiver is having 10 relays. These relays output are connected to the D.C motor. The FM transmitter is kept outside the vehicle due to remote operation





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Working Principle

In our project lead-acid battery is used. The lead-acid batteries output is given to the FM receiver circuit. FM Receiver is having 10 relays, they are connected to the three D.C motor in Forward and reverse rotation of operation.

Relay 1	-	Rotary motion in forward
direction		
Relay 2	-	Rotary motion in reverse
direction		
Relay 3	-	Arm in upward movement
Relay 4	-	Arm in downward movement
Relay 5	-	Work piece clamping
Relay 6	-	Work piece releasing

FM TRANSMITTER (CODE GENERATION)

When a button on the keyboard is pressed two tones corresponding to that key is generated. The tones corresponding to that key is generated.



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The tones generated are fed to IC UM9121 5B which is an encoder, it converts the messages into electrical signals and feeds them to the FM transmitter. The FM transmitter thereafter transmits the signal with atmosphere as the medium (or) channel, via a telescopic antenna which provides point to point links. The range of operation of the circuit depends on the range of operation of the FM transmitter employed in the circuit. Thus the signal is transmitted from the keyboard corresponding to the relay to be triggered. Therefore transmission can be done in an efficient manner using this circuit.

TONE DIALING (DTMF)

Dual Tone Multi – Frequency is the method employed in the transmitter part of the circuit. The user by means of this method will be able to control the operations of different relays. The keypad normally consists of 12 keys representing numbers 0 to 9 and the symbols * and # employed for special purposes. When a key is pressed the electronic circuit generates two tones corresponding to that key. It key 5 is pressed, tones of 770 and 1336 Hz will be generated. DTMF, now being the most common method replacing rotary dials has the following advantages.

RECEIVER (DECODER)

The transmitted signals are received by an FM receiver which receives all incoming signals within a particular bandwidth. The reception is also done with the help of telescopic antennas. The signal obtained is fed to IC 8870P which is a decoder. This IC converts the signal to its original form. It gives binary output corresponding to the signal received from the transmitter. This 4 bit binary number is fed to IC4067, which is a 4 to 16 line decoder IC. Depending on the binary input, one of the outputs of IC4067 will go high and the corresponding relay will be activated. This mode has to be held until another deactivating signal is passed, in order to hold this mode a flip flop IC – CD4013 is connected to IC 4067. IC – CD4013 holds this mode until another deactivating signal is fed to the system. Therefore ON & OFF operation of all relays can be controlled by using this logic. The whole system can be reset by pressing the (*) button in the transmitter part of the circuit.



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SUPERHETRODYNE RECEIVER

Mixer:

Also known, as frequency changer is a non-liner resistance having two sets of input terminals and one output terminal.

Local Oscillator:

The type of local oscillator selected for a particular type of receiver depends on factors such as frequency of operation, stability, tuning range etc. The usual short wave receivers, i.e., up to 36 MHz, use mostly the Armstrong or Hartley oscillator. For frequencies in VHF range and above, Colpitts, Ultra Audio, or clamp oscillators are used. All these oscillators mentioned use a single LC tuned circuit, which determines its frequency of operation high stability, is demanded from the oscillators for good receiver performance. For this AFC or a frequency synthesizer can be used. The medium wave broadcast extends from 540 to 1650 KHz width and an IF frequency of 455 KHz. Usually the local oscillator is designed to have a frequency, which is higher than signal frequency by the intermediate frequency. Thus the oscillator should have range from 540 + 450 = 995 KHz to 1650 - 455 = 2105 KHz. Thus gives a maximum to minimum ratio of 2:2:1. Consider now the case if the local oscillator frequency had been designed less than signal frequency by it. This would have resulted in local oscillator range from 85 to 1195 KHz giving a maximum to minimum ratio of about 14:1. The usual tuning capacitors available have a capacitance ratio of approximately 10:1, resulting in a frequency ratio of 3:2:1 thus a ratio of 2:2:1 required for the local oscillator operating above the signal frequency remains well with in the limit imposed by the tuning capacitor, whereas the other system with ratio of 14:1 cannot be covered by the oscillator in one sweep.



RADIO FREQUENCY SECTION

The radio frequency section provides efficient coupling from the antenna input terminals of the receiver to the first stage of RF amplifier so as to amplify the incoming signal before the bit frequency is changed. Its main functions are:

- To provide selectivity against image and IF signals.
- To provide an efficient coupling between the antenna and first stage of the RF amplifier.
- To provide discrimination or selectivity against image and IF signals.
- A super heterodyne receiver has a number of advantages, which makes it a unanimous choice for a large number of receiver applications

Results and Discussions

Advantages

- Emissions are greatly decreased.
- It can reduce dependency on fossil fuels because they can run on alternative fuels.
- Special lightweight materials are used to reduce the overall robot weight.
- Pick and place arm is Attached
- Robot direction is controlled by the remote control.

Disadvantages

- High Initial cost.
- Charger circuit is used to charging the battery

Applications

- Materials handling
- Machine loading and unloading
- Open field work.
- Remote area Analyzing Application
- It is also used in research application

Conclusion

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries. We are proud that we have completed the work with the limited time successfully. The INTELLIGENT PICK AND PLACE ROBOT WITH REMOTE CONTROL is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities.In conclusion remarks of our project work, let us add a few more lines about our impression project work.Thus we have developed a "INTELLIGENT PICK AND PLACE ROBOT WITH REMOTE CONTROL" which helps to know how to achieve low cost analyzing robot with remote



control operation. By using more techniques, they can be modified and developed according to the applications

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