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Develop and Control the Position of Windmill Generator

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Abstract: ***We are going to develop our system to control the position of windmill. This operation is carried out by remote control. The hand held remote system consists encoder and transmitter circuit. The encoder circuit is built around using PIC micro controller, which is used as code generator. To transmit the signal we here use ISM band transmitter. The receiver side circuit consists receiver and switching circuit, the decoder circuit is designed using PIC IC 12F629. The pulses from the decoded circuit is fed to electronic toggle Switch, it switch on the relay for first pulse & switch off relay for next pulse. By using this switching action we can control two relays individually. The forward and reverse action is carries out by using relay logic. The DC motor is used here to traction of windmill, so it is coupled with gears arrangement. So using this arrangement we can easily track the wind mill by remote control.***

Keywords: ISM band, RF transmitter and RF receiver

I. INTRODUCTION

Nowadays, power demand is increased due to huge rate of increase of population. So our very urgent demand is to discover new power source. In this way several no-conventional sources are available in our country among these sources wind power is one of the important non-Conventional power sources. It is our duty to provide advanced control system to increase the performance of windmill system.

Based on the above requirement, we are going to develop a system to control the traction of windmill unit. This system, positioned the windmill unit at the direction of wind by remote operation. By this system we can operate the wind mill in clockwise (or) anticlock wise direction. This system eliminates the manual risk and makes the direction control as automatic control.

II. TRANSMITTER SIDE

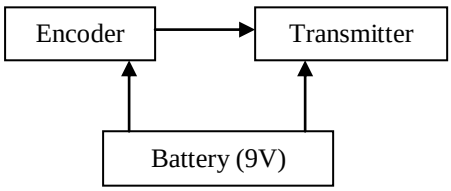

Fig.1. Block Diagram of Transmitter Side

A. Encoder

This block consists IC PIC 12F629 based encoder circuit to enter the operating code. The PIC is advanced version of Micro controller. It is 8-pin flash - based 8-bit CMOS Micro controller. It generates four types of code. Those purposes are

1. Forward ON
2. Forward OFF
3. Reverse ON
4. Reverse OFF

B. Transmitter

This block consist ISM band transmitter to transmit the data for particular operation. It transmits signal at 432.93MHz. It transmits the 4 type of signal for our operation.

C. Battery

This block consist 9V battery to supply transmitter circuit.

III. RECEIVER SIDE

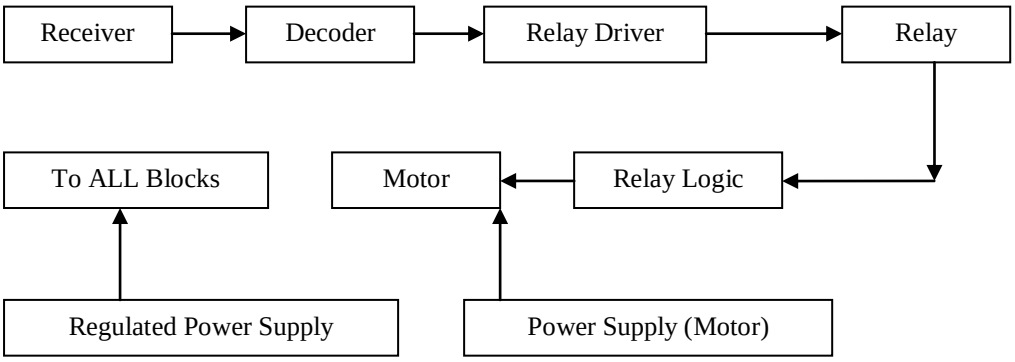

Fig.2. Block Diagram of Receiver Side

A. Receiver

This block consists ISM band receiver to the data from transmitter at 432.93 MHz.

B. Decoder

This block consists IC PIC 12F629 based decoder circuit to decode the operation code.

C. Relay driver

This block consists transmitter based relay driver to drive the relay.

D. Relay

This block consists DC 12V relay to drive the motor through contacts.

E. Relay Logic

This block consists relay contact to create the logic for forward & reverse operation.

F. Motor

This block consists 12V DC motor to provide forward & reverse direction.

G. Power supply (motor)

This block consists +12 V unregulated power supply for operating the +12v dc motor.

H. Power Supply

This block consist, +05V and +12V power supply for control circuit.

IV. POWER SUPPLY

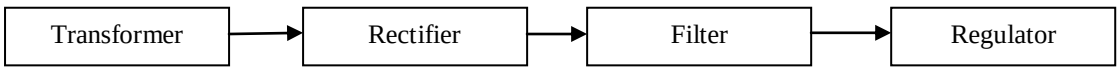

Fig.3. Block Diagram of Power supply

A. Transformer

This block consist step down transformer for our required ratings.

B. Rectifier

This block consist diode based bridge rectifier circuit.

C. Filter Circuit

This block consists capacitor based filter circuit.

D. Regulator

This block consist 7805 regulator IC. It has three terminals.there are input, output and common ground.

V. CIRCUIT OPERATION

The main ac voltage 230v is step down to 9 volt, using 230/9v step down transformer. The low value secondary voltage is fed to the bridge rectifier circuit is formed using four numbers of in4007 diode for first half cycle, diodes d1 and d2 come to action and next half cycle diode d3 and d4 come to action, finally unidirectional dc supply is fed to the filter capacitor. The charging and discharging property of capacitor provide pure smooth DC is nearly peak value of the secondary voltage. The pure DC supply is fed to 7805 regulators IC's input terminal. Due to the regulator action, finally, regulated 5 volts is available at output terminals.

VI. RF TRANSMITTER AND ENCODER CICUIT USING ISM BAND

This circuit consists PIC 12f629 based data encoder and ism band transmitter board. The PIC12f629 is a peripheral interface controller. In transmitter side it acts as a data code generator. It has six port line and two-supply terminals. In which four ports are used select the particular memory register. One port is for data acknowledgement; another one is for data out. ISM band transmitter is used here to send digital data. It is capable to sent data of the rate of 2400 bits per second.

ISM band transmitter is smd package and also a compact in size. It handles the serial data transmits through with (or) without ariel. The operating range is up to 100ft. There are four keys to select particular port. By selecting any one of the ports we can operate any device.

The ultimate aim of this circuit is to generate different data format for different operation and transmit through 432.93 MHz carrier wave. The PIC IC 12f629 has 6 past lines and two-supply pin. Four parts are used to select the data from particular location. The ports from gp 2 to gp5 are concerted to push to on buttons or "no" points of relay. Using 2.2k resistors also pulls up these parts. When any push to "on" buttons (or) relay contacts are closed, the particular port pulled down to ground potential, so the port select the particular data already stored in the memory location and send it through ism band transmitter. There is a led connected in a particular port to acknowledge the key pressed (or) contact closed. The ISM band module generates carrier wave at the frequency of 433.92 MHz. The data format is differing the type of operation. It is 8 bits data first four bits for id operation and second four bits for device operation selection.

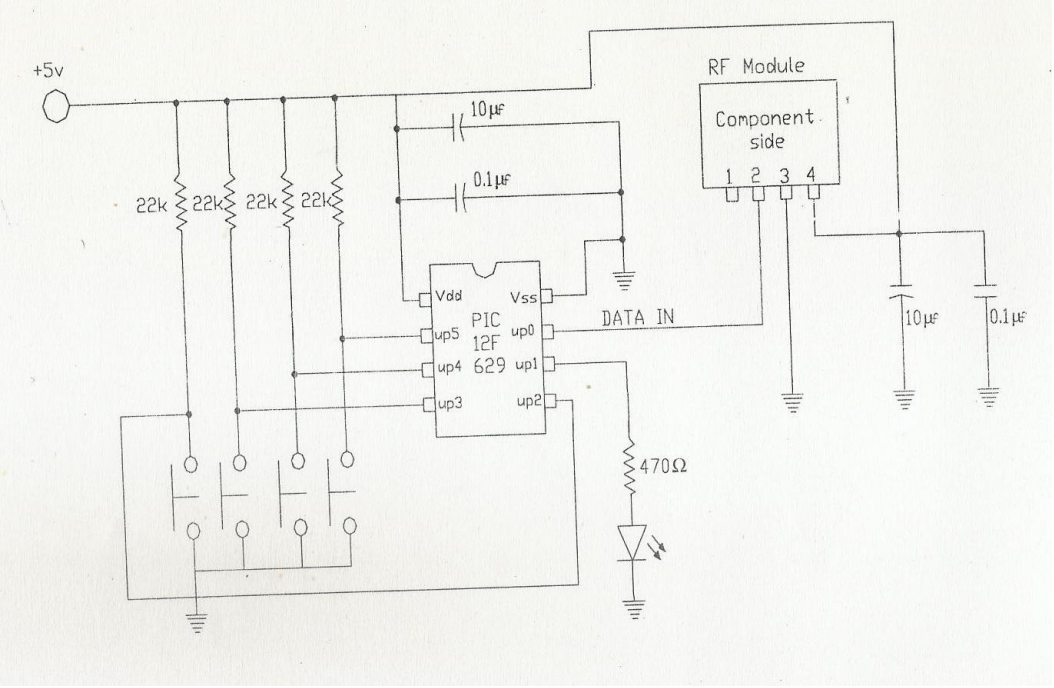

Fig.4. Circuit Diagram of RF Transmitter

VII. RF RECEIVER AND DECODER

This circuit consist RF digital receiver and decoder circuit. The decoding operation is carried out by PIC 12f629. It has six-port line. Four ports are used to give data out. One port is used for data receiving from receiver.

There is also four led's to indicate the port status. There is 10µF AND 0.1µF capacitor arrest noise in the power section. The received digital data's are fed to PIC controller through port GPO.

The receiver is ISM band carrier wave receiving module. It has capable to receive digital data's at the rate of 2400 bits per second. The operating range is up to 100FT.

The module is designed using smd so it is very small in size and it based design also very compact. It is operating at +5v regulated power supply to receive the data just one ariel is connected to RF in of ISM module.

The circuit receives the digital data from far end and decodes the designed data to execution. The heart of the circuit is PIC 12f629. The port 0 is connected to ISM band data out pin. The received data's from module is fed to port 0, and this data also compared with pre-stored data's. If the receiving digital data's are compared with prestored data is equal then a particular allotted port states are to high state. To indicate the port status led's connected in four ports through 470Ω resistors. To operate any other external circuit signals are taken from is port. The PIC controller receive the digital data, the data is 8 bits format. In which msb nipple is to identify the transmitter and remaining four bits are to decide the type of operation. So the PIC accept the data if it is from its own transmitter. If it is not, leave it alone. By this method of operation we can avoid the fool detection.

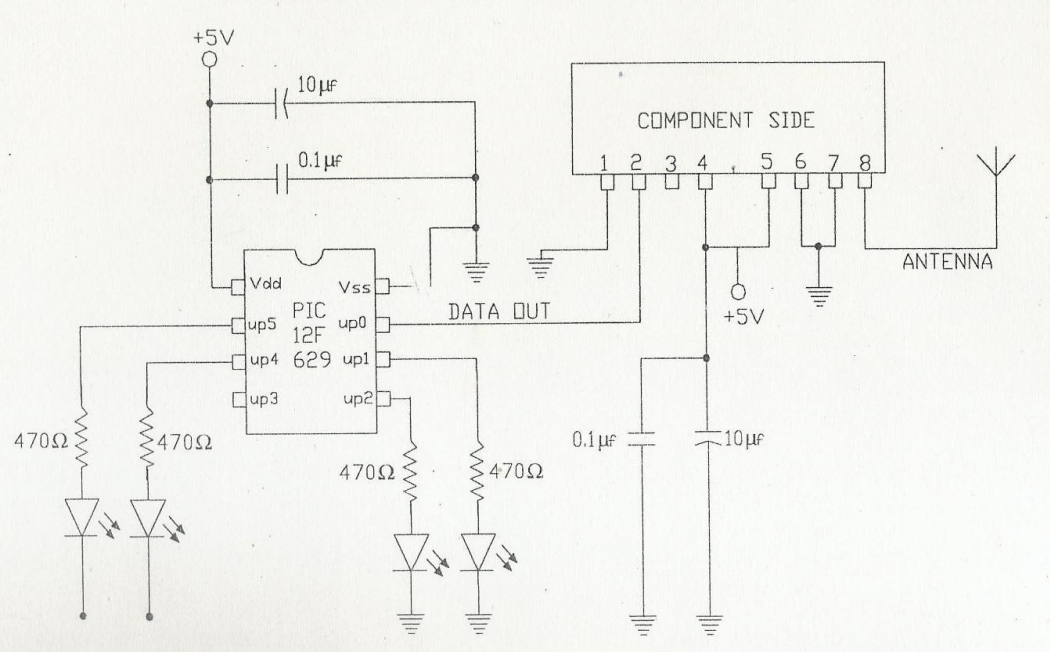

Fig.5. Circuit Diagram of RF Transmitter

VIII. CONCLUSION

This power supply circuit is designed to get regulated output dc voltage. The 230/9volt Transformer is used Step down the Main Voltage (230V) into 9 Volts. The Secondary Voltage of Transformer is rectified using Bridge Rectifier. This Bridge Rectifier is formed using four No. of IN4007 Diodes. The rectified unidirectional dc is smoothed by 1000µF filter capacitor. The smooth DC is then fed to the three terminals +Ve regulator IC called 7805 to get 5v dc supply. The DC motor is used here to traction of windmill, so it is coupled with gears arrangement. So using this arrangement we can easily track the wind mill by remote control.

REFERENCES

[1] Chong, W. T., Pan, K. C., Poh, S. C., Fazlizan, A., Oon, C. S., Badarudin, A. and Nik-Ghazali, N., Performance Investigation of a Power Augmented Vertical Axis Wind Turbine for Urban High-Rise Application, Renewable Energy, 2013, 51:388-397

[2] Ali, A., Goldeb, S., Alama, F. and Moria, H., Experimental and Computational Study of a Micro Vertical Axis Wind Turbine, Procedia Engineering, 2012, 49:254-262

[3] Park, J., Kim, J., Shin, Y., Lee, J. and Park, J., 3 MW Class Offshore Wind Turbine Development, Current Applied Physics, 2010, 10:307-310

[4] Solero L., Caricchi F., Crescimbini F. and Falchetta M., Direct-Drive Wind Generator Pilot Plant for Stand-Alone Units in Extremely Cold Climates, Int J REE, 2001, 3(2):326-329

[5] B. M. Nagai, B. M., Ameku K. and Roy J. N., Performance of A 3 kW Wind Turbine Generator with Variable Pitch Control System, Applied Energy, 2009, 86:1774-1782.

[6] S. N. Bhadra, D. kastha, S. Banerjee (2005), wind electrical system, New Delhi: oxford university press, ISBN – 13: 978-0-19-567093-6; ISBN – 10: 0-19-567093-0. Faculty of mechanical engineering (2011), design data book of engineering, Coimbatore: kalaikathir achagam page no.: 1.40, 8.1 – 8.53.

[7] Fujin Deng, Zhe Chen (2010), wind turbine based on multiple generators drive-train configuration, E-ISBN: 978-1-4244-8509-3, Print ISBN: 978-1-4244-8508-6 page no.: 1- 8.

[8] Shigley J. E., Mischke. C.R., Mechanical Engineering Design, Sixth Edition, Tata Mcgraw – Hill, 2003. Ugural A. C., Mechanical Design An Integrated Approach, Mcraw – Hill, 2003.

[9] Bhandari. V. B., Design of Machine Elements, Tata Mcgraw – Hill Publishing Company Ltd., 1994.

[10] IEEE research paper of highway windmill.

