



RESIDENTIAL WATER TANK MONITORING USING RF MODULE

Dr. M.L.S. Sai Kumar, Madhupada Sai Supriya, Jujjuru Lakshmi Valli,

Maddala Anusha, Singareddy Venkata sivasai Reddy,

Department of Electrical & Electronics Engineering, Vignan's Institute of Information

Technology, Visakhapatnam-530046, INDIA,

saikumar.morla@gmail.com, madhupadasaisupriya@gmail.com,

lakshmivallijujjuru@gmail.com, anushamaddala12@gmail.com, sivasaireddydp@gmail.com

ABSTRACT:

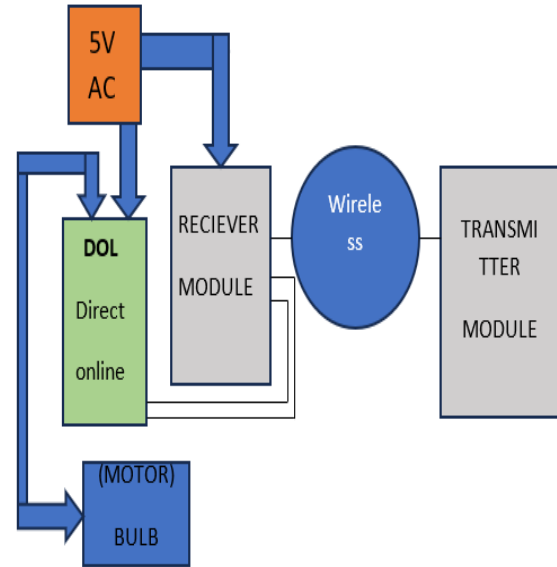
This involves in the improvement of automation in our daily life without having any type of burden to turn motor on and wait until it fills and turn it off again. The idea is to automate the process of water filling system in residential houses using some components like RF module, which includes 433mhz transmitter and receiver separately with two antennas are used to communicate the level of water in the water tank. To achieve maximum time delay and human interference/participation. This project aims to operate a residential water tank motor automatically on & off using RF module.

INTRODUCTION:

Henri Pitot (born May 3, 1695, Aramon, France—died December 27, 1771, Aramon, France) water powered build and creator of the pitot tube, which measures stream speed. Starting his career as a mathematician and cosmologist, Pitot won decision to the Institute of Sciences in 1724. He got to be interested in the issue of stream of water in streams and canals and found that much modern hypothesis was erroneous—for illustration, the thought that the speed of streaming water expanded with profundity. He formulated a tube, with an opening confronting the stream, that given a helpful and sensibly exact estimation of stream speed and that has found wide application ever since (e.g., in anemometers for measuring wind speed). Pitot tube, instrument for measuring the speed (speed) of a streaming liquid. Designed by Henri Pitot (1695–1771), it comprises of a tube with a brief right-angled twist, which is set vertically in a moving liquid with the mouth of the bowed portion coordinated

upstream the weight, measured with a connected gadget, depends on the liquid stream and can be utilized to calculate the speed. Pitot tubes are utilized in anemometers to degree airspeed in wind burrows and on board air ship in flight; they are too utilized to degree the stream of fluids (see stream meter). Based on the water level sensors, motor will get commands to turn on and off dol starter utilizing exchanges from the collector circuit. Water tank watching system has been utilized in the past, but those are worked underneath a wired affiliation and there should to be human participation. Event of this a plc system can utilized. In any case, presenting a plc is more exorbitant and takes a few runs to put as well. In this way, our thought is to supplant this with RF module watching system since, it is less exorbitant than a plc system and more user-friendly than the plc system, which needs planning to work at optional efficiency. our thought of visualization comprises of rf module with internal associations through a Pcb board to the small scale controller, and a precious

stone oscillator with 16MHz is associated as a outside oscillator to check clock beats with an additional capacitor of rating 22PF for continuous clock maintenance, for this circuit we have two input sources one is sun oriented and another one is charging through BMS charging board, the sun based is associated to the BMS charging board and the BMS charging board chooses how the battery is utilized to charge. The battery utilized to control all the components set in the transmission circuit board, this makes a difference in evacuate the utilization of control supply and doesn't require a wired association. Coming to the receiver module circuit, the receiver is associated with an radio wire and it is given with miniaturized scale controller, with inward associations through a Pcb board to the small scale controller, and a precious stone oscillator with 16MHz is associated as an outside oscillator to tally clock beats with an additional capacitor of rating 22PF for continuous clock maintenance, here the control is taken from a wired association source through AC to DC converter and the transistor is given or put between hand-off and the small scale controller as a security safeguard when there is an stream of current in the circuit the transistor works and doesn't send the control to the transfer and transfer doesn't work the DOL starter on & off. we were utilizing a dol starter with 6A of capacity which can work at max for 1HP acceptance engine only.



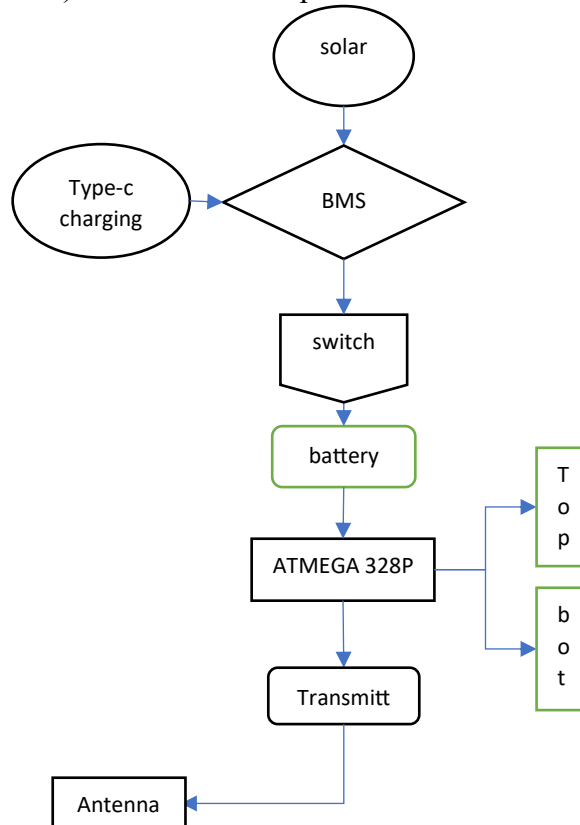
BLOCK DIAGRAM:

Fig no:1 Block Diagram

The RF module is used to be a bridge between the water tank above the upstairs, rf module is split to mini circuits one is transmitter circuit and it is placed on top of the water tank & the second circuit is placed near down stairs which is suited with some extra components like relays, DOL starters etc.by using floating water sensors we detect the level of water and give them to the circuit which is placed above the water tank, this circuit consists a microcontroller which gives commands based on the sensor-s placed in the tank at top level & bottom level so that we can know the status of water level to the transmitter and this is passed wirelessly to the receiver consisting circuit with the help of antenna.

OPERATION:

In Brief, the operation begins with charging the battery. The sun-based board are gadgets that change over daylight into power utilizing photovoltaic cells. The sun-based boards have two beginning terminals (+5v and GND). The TP4056 is a prevalent lithium-ion



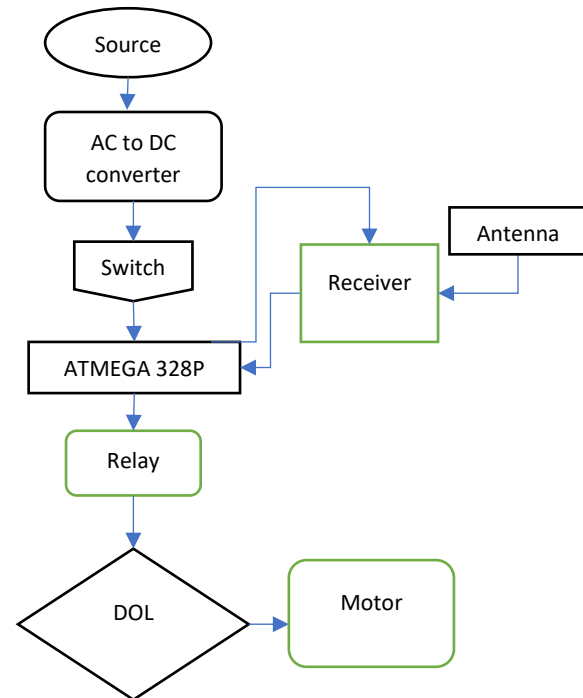
battery charger IC (Coordinates Circuit) commonly utilized in different electronic ventures. It's known for its straightforwardness and adequacy in charging single-cell lithium-ion or lithium polymer batteries. The conclusion terminals of sun powered board are associated to TP4056(+In and -In). Another the conclusion terminals of TP4056 are associated with battery positive and negative terminals. Once more TP4056 B+ is associated to switch and B- is associated to Gnd. The BMS (battery administration framework) module is primarily utilized for battery charging. The BMS module has 2 inputs i.e. one is from sun

powered board and other is from sort c charger. The switch is utilized to control the control supply between BMS and Battery. The switch permits you to control the stream of power. Driven can be associated in parallel with the switch so that when the switch is turned on the driven lights up, demonstrating the control supply is dynamic. Resistor is kept and it is utilized to decrease the stream of current to the Driven. The Atmega 328P microcontroller is utilized to transmit the flag wirelessly utilizing sensors. It's broadly utilized in DIY gadgets ventures and is the microcontroller found on the Arduino Uno board. The Atmega328P highlights 32KB of streak memory for program capacity, 2KB of SRAM for information capacity, and 1KB of EEPROM for non-volatile information capacity. It has 23 general-purpose I/O pins, different communication interfacing counting UART, SPI, and I2C, and different built-in peripherals such as clocks, PWM channels, and analog-to-digital converters (ADC). Its flexibility, mood has taken a toll, and ease of utilize make it a favored choice for a wide run of applications, counting transmitter modules for remote communication. Reset work is utilized for restarting the Atmega 328p microcontroller in case of blunders. Precious stone Oscillator is utilized to create the clock beat timing persistently. The resistor is utilized to stand up to the current stream. The capacitor is utilized for capacity of vitality and it utilized in charging and releasing cases. Capacitor smoothens the control supply by giving extra current at beginning. The Transmitter has 3 pins Vcc, GND and antenna. Receiving wire is associated to the stick of transmitter. The Vcc and GND pins of Transmitter are associated to the small-scale controller Atmega328P of Vcc and Gnd.

The supply is taken from ac to dc converter. capacitor is utilized for capacity of vitality and smoothens the control by giving extra current. The following switch is utilized to control the control supply between ac dc converter and Atmega 328p. The switch permits a stream of current. Driven can be associated in parallel with the switch so that when the switch is turned on the driven lights up, demonstrating the control supply is dynamic. Resistor is kept and is utilized to decrease the stream of current Reset work is utilized for restarting the Atmega 328p miniaturized scale controller in case of blunders. It is given to Atmega 328p microcontroller and the information is prepared and it is given to recipient module. A bc547 transistor is utilized control over current in the supply and it is utilized for assurance reasons. When over current passes through the circuit, the current is grounded. It too makes a difference in operation of hand-off. In this is too it contains gem oscillator which is utilized to produce the clock beat persistently. Atmega 328p would send a flag to transfer module to either open or near the relay contacts, in this manner controlling the stream of control to the associated stack. Antenna is associated with the stick of collector. The transmitted information is given to the recipient module by utilizing antenna. The information is given to Atmega 328p microcontroller. The information is prepared by the atmega328p microcontroller and the transfer is turned in on or off mode. The hand-off controls the operation of dol starter. DOL starter is a coordinate online starter. It is utilized to begin the engines or motors, we took the dol starter rating 6amps which can handle up to 1hp acceptance engine.

ADVANTAGES:

1. RF MODULE monitoring system



- requires less power
- 2. user friendly
- 3. very less human participation/ interference
- 4. it is automatic doesn't need to monitor it
- 5. it is wireless doesn't need any sort of wire connection. Hence damages like wire cuts, lose connections sort of things can be minimized

Software's used:

- <https://easyeda.com/editor> (for circuit design)
- <https://create.arduino.cc/editor> (for code input)

Result and discussions:



- We the team founded an advancement for the water overflowing problem and monitoring of water in the tank every day
- Residential motor water tank advancement is achieved.

Conclusion:

- Automation of the manual monitoring system of a residential water tank is automated.

Appendices:

1.solar board specifications:

Operating Voltage: 5V (With voltage controller module)

Maximum control: 6W

Product measure: 27.5cmx16cmx0.2cm / 10.82x6.3x0.078 in

Working temperature: -30C~70C

2.bc547 transistor

Bi-Polar NPN Transistor

Continuous Collector current (IC) is 100mA

Emitter Base Voltage (VBE) is 6V

Base Current(IB) is 5mA maximum

3.atmega328p

IC sort: AVR microcontroller

Core measure: 8-bit

Program memory measure: 32Kb (16K x 16)

Program memory sort: Flash

Supply voltage: 1.8 V - 5.5 V

Manufacturer: Atmel

4.22pf capacitor

Capacitance: 22pF

Tolerance: $\pm 10\%$

Max voltage: 50V

5.16mhz crystal oscillator

Resonance Resistance 40ohms (max)

Drive Level less than 100 μ W

Frequency Extend: 16MHz

Tolerance(%) :30

Operating Temperature Range: -10°C to +60°C

Dimensions : 10 x 4.4 x 3.3(mm)

6.18650 lithium particle rechargeable cell

Nominal Voltage: 3.6V

Charging Voltage: 4.2V (maximum)

Cell Weight: 48g (approx.)

Cell Measurement: 18.4mm (dia.) and 65mm (height)

7.10 uf capacitor

Tolerance:20 %

Voltage Rating DC:50 V

Ripple Current:68 mA rms

8.cell holder

Support Model :18650 Battery

Shell material: ABS

Terminal: Copper-nickel plating

Dimension:77.1 x 39.8 x 14.9mm

9.slide switch

Mechanical Life : 20,000 cycles.

Initial Contact Resistance : 50m Ω maximum

Dielectric Quality : 1000VRMS

at ocean level.

Operating Temperature : -40°C to 80°C.

Minimum Stack : 10mA, 50mV.

10.433mhz rf transmitter receiver:

Receiver Working Voltage: 3V to 12V

Receiver Working current: 5.5mA

Operating recurrence: 433 MHz

Transmission Remove: 3 meters

(without radio wire) to 100 meters (maximum)



Data Transmission speed: 10Kbps

11. water tin

Weight: 2 kg

Capacity: 20 Liters – Approx. 4 Gallons

Material: Medium-density Polyethylene (MDPE)

12. bms -5046

Input Voltage (V): 4.5-5.2

Operating Temperature (°C): -10 to 85

Rated Current (A): 4.2

Over-Current Security (A): 3

Under-Voltage Assurance (V): 2.5

13. Float sensor:

Float Ball Measure: 18 x 16mm (D*H).

Max Switch Voltage: 100V DC

Max Switch Current: 0.5A.

Max Breakdown Voltage: 220V

DC. Max Carry Current: 1.0A.

Max Contact Resistance: 100mΩ

Temperature Rating: -10 ~ 85 Degree

14. 10kilo ohm resistor

Tolerance: 5%

Power Rating: 1/4 Watt

15. 1 kilo ohm resistor

Resistance: 1K ohm

Tolerance: 5%

Voltage Maximum Operating: 350V

Operating Temp: -55°C – +155°C

16. 100 ohms resistor

Tolerance (%) : 1

Maximum Working Voltage (V) : 350

Operating Temperature (°C): -40 to 150

17. led

Positive terminal of Driven: Cathode

Negative terminal of Driven: anode

Forward Current (In the event that): 30mA

Forward Voltage (VF): 1.8V to 2.4V

Reverse Voltage: 5V

Operating Temperature: -30°C to +85°C

18. Induction engine

Power: 0.75kw

Horsepower: 1 HP.

Phase: 1 Phase.

Voltage: 220 V.

Mounting Sort: Foot Mounted.

Speed: 1440 RPM.

References:

- [1]. Beza Negash Getu, Hussain A. Attia, "Modified water level sensor and controller system", <https://doi.org/10.1109/ICEDSA.2016.7818550>.
- [2]. M. S. Godwin Premi, Jyotirupa Malakar, "Modified WATER TANK LEVEL AND PUMP CONTROL System", <https://doi.org/10.1109/ICCS45141.2019.9065438>.
- [3]. Javed Dhillon, Sourov Das, Nerob Kumar Mohonto, Mehedi Hasan, Sajib Ahmed, Sajal Chandra Das, "IoT based Water Level Watching and Motor Control System", <https://doi.org/10.1109/RDCAPE52977.2021.9633405>.
- [4]. Mehak Mubarik, Aaqib Raza, Haroon Rashid, "Modified Watching and Control System for Assorted Water Levels in Interconnected Distinctive Twin Tanks with Dry Run Security Utilizing Chip Orange Pi", <https://doi.org/10.1109/ISWTA55313.2022.9942783>.
- [5]. Siddhartha Shankar, M Dakshayini, "IoT-Mobile Engaged Savvy Water Level Controlling System to Control Water Wastage", <https://doi.org/10.1109/ICACCI.2018.8554373>.
- [6]. Beza Negash Getu, Hussain A. Attia, "Modified water level sensor and controller system", <https://doi.org/10.1109/ICEDSA.2016.7818550>.



- [7]. Cosmina Illes, Gabriel Nicolae Popa,
Ioan Filip, "Water level control
system utilizing PLC and farther
sensors",
[https://doi.org/10.1109/ICCCyb.2013
.6617587](https://doi.org/10.1109/ICCCyb.2013.6617587).