

# Design and Implementation of Microcontroller Based Automated Water Level Indicator

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**Abstract:** In this paper we present the idea of water level checking and administration inside of the connection of electrical conductivity of the water. All the more particularly, we explore the microcontroller based water level detecting and controlling in a wired and remote environment. Water Level administration methodology would help in diminishing the home force utilization and additionally water flood. Besides, it can show the measure of water in the tank that can bolster Global Water sorts including cell dataloggers, satellite information transmission frameworks for remote water observing framework. Also, phones with relative high calculation force and great graphical client interface got to be accessible as of late. From the clients point of view it is required to reuse such important asset in a versatile application. At long last, we proposed a web and cell based observing administration convention would decide and faculties water level all inclusive.

**Index Terms**—Conductivity, indicator, microchip, nozzle, and water level sensor.

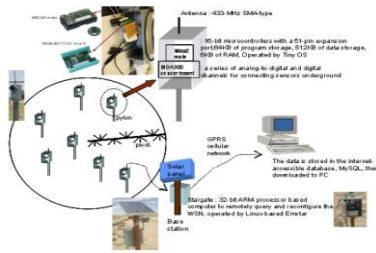
## INTRODUCTION

These days, humankind more intrigued to make it world into an innovation without consider the reaction through the world. From their exercises it will brought about worldwide environmental change and wherever fiasco strikes abruptly. The formatter should make these parts, fusing the pertinent criteria that take after. More than five years back, our nation is regularly stunned by the unpleasant surge fiasco. A few neighborhoods are influence is on eastern of Sabah and a few neighborhoods at Johor, Kelantan, Terengganu and Kedah [1]. The position almost the primary stream and lowlying regions is conceivable to influenced. Amid surges happen, it give influence in human life and their property. By from Department of Drainage and Irrigation (JPS), the misfortunes are near RM 50 million to repair the harm brought about by this catastrophe. What's more, the factual information demonstrate the quantity of casualties just about 40,000 individuals [2]. From the perception, it happens when the water increment to hazardous level in definitely and not observed by the powers. In any case, this condition can be anticipated if the powers dependably know the flow condition of the water level. In this way, in view of the absence of conveyance information gathered in the data framework, some development should be done to help the dominant voices in handling this issue and make the framework more organized[3]. In this manner, outlining the water level locator is one of the

developments to move information in some structure and send it to power at control tower. This water level locator will work in 24 hour for each week. These frameworks additionally give a caution to power to make prompt move if water level increments to hazardous level [3]. The framework can be connected at the stream banks, low-lying territories, dam and the town a long way from town furthermore can be utilized for mechanical part [1],[3]. The more clarification will talk about on philosophy in section 3. In this way, in accordance with advancement of current world, remote checking framework has more in an application. Remote checking framework is a compelling strategy to transmit, examined, oversee and give an input the objective of data. By transmission strategy for observing framework, if a ready condition happens it will send a sign through Short Messaging System (SMS) passage and the approved individual will be advise with the perilous phase of water level. From the ready message approved individual will make a prompt move [4].

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### THE SYSTEM STRUCTURE AND FUNCTION



System is shown in Figure 1:

The sensor hub is in charge of social event the water-level, the door position and the precipitation data. The sink hub is in charge of getting the information transmitted from every sensor hub, and constant transferring to the data focus through GPRS system. The data focus is in charge of getting the information, and giving to the terminal client to visit.

### PROCEDURE

The equipment outline is as appeared in the square chart. It has two microcontrollers set one at the tank and another at the sump. They perform the assignment of controlling, blunder recognition and sequencing the correspondence.

At the tank, two levels of water are considered i.e. at the point when the tank is verging on void as "LOW" and full as "HIGH". Two sensors are set at these two levels. The sensor yields are opened up and given to the tank controller as intrudes on so that the most noteworthy need is for "LOW" level. So the conditions for tank controller to send solicitation are:

- When a level "LOW" is identified.
- When a level "HIGH" is identified.

When an interfere with happens, the tank controller needs to correspond with the one at the sump. So a solicitation is sent from the tank controller through R.F module. For each demand that it sends, the controller at the sump needs to recognize for correspondence adequacy. Assume an affirmation is lost or a mistake happens then the solicitation is retransmitted. The correspondence bits are designed in a manner that initial 4 bits of transmission dependably shows the gadget personality and next piece is blunder identifying bit and last 3 bits are information bit. The gadget recognizable proof piece stays away from the obstruction of signs of two neighboring frameworks

At the sump, controller alongside a handset module is set. The sensor is put for identifying the vicinity or nonattendance of water level. Sensor sign is given as the outer hinder to the controller. At the point when the controller at the sump gets a message of "LOW" water level at the sump, it recognizes to the tank controller and switches the engine. Also, assume the

water level at the sump is at "NO WATER", the controller changes a ringer to alarm the proprietor and sends a solicitation to the tank controller to hold up until water is filled once again into the sump. Controller continues delivering a ringer caution for 60 minutes. Once the sump is filled it cautions the controller at the tank and the tank controller sends the solicitation again to switch the engine. What's more, when a "FULL" water level at the tank is gotten by the sump controller, it switches off. So the conditions for sump controller to send solicitations are:

- When "NO WATER LEVEL" in the sump is distinguished.
- When water is filled back.

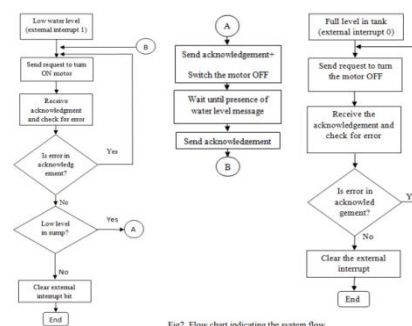


Fig.2. Flow chart indicating the system flow

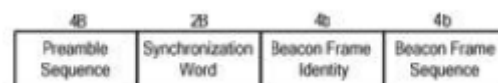
### COMMUNICATION PROTOCOL

#### A. Protocol design

The framework is the various to single remote sensor system, and the position of the sensor hub and sink hub is generally altered in this remote system framework. The framework utilizes the telecast correspondence convention which depends on the transmission reference point casing to fulfill the low power utilization and excess solid request[3]. The convention has characterized two sorts of edge structures: reference point casing and information outline.

#### 1) Beacon frame

The signal casing is shown to the sensor hub by the sink hub. It incorporates prelude arrangement, synchronization word, guide outline recognize and reference point outline grouping. At the point when a sensor hub has new information to transmit, it make CC1020 enter RX state[10] to get the reference point outline. The guide casing is characterized as takes after:



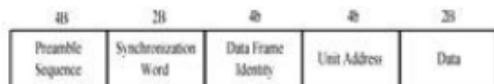
Every reference point outline has 7 bytes. The preface succession synchronizes the transmitter and beneficiary; the synchronization word denote an information casing; the guide outline recognize

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separates between the information outline. The framework utilizes 0110 as the indication of guide casing. The reference point outline grouping denote the distinctive guide edge, and its substantial extent is 0~15.

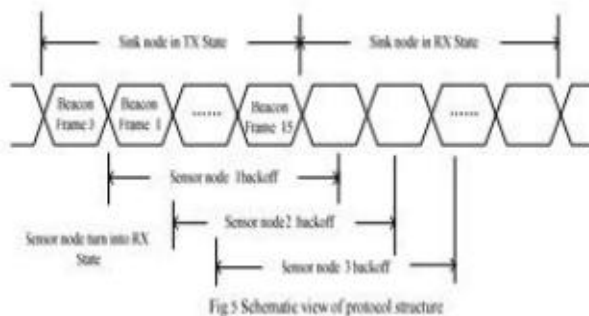
### 2) Data frame

The information casing is the information message transmitted to the sink hub by the sensor hub. It incorporates introduction succession, synchronization word, information outline recognition, unit location and information. It is characterized as takes after:



Since the estimation of the water-level or entryway position sensor and the precipitation sensor needs just two bytes to express, in this manner the information outline contains 9 bytes. The information outline separates between the signal casing. The framework utilizes 1001 as the indication of information edge. The unit address denote the distinctive hub's terminal, and it contains four bits, and can be extended if necessary. The Data contains 2 bytes, communicating the sensor information.

The postponement time of various sensor hub is divergent. This can well maintain a strategic distance from the information crash. The sensor hub is in the example of low-power utilization in different times. The schematic outline of the convention structure is appeared in Figure 5:



### B. Test

In the remote correspondence, the dependability of the information transmission is important[7], and it chooses the framework's execution. The sink hub occasionally transmits the signal edge constantly. Once got the signal casing, the sensor hub transmits a specific number of information casing in the relating opening. The sink hub gets the information transmitted from different sensor hubs, and the got information is checked and numbered. In the research facility, the single-single test and the various single test are carried on independently.

#### 1) Single-single

The analysis is gone ahead with an entryway position sensor hub and the sink hub. The hub starts to transmit the information bundle after got the reference point outline. It transmits out and out 3000 information parcels, and after that acquires the experimental result. The outcome is appeared in Table 1:

**TABLE I. SINGLE-SINGLE**

NO	Packets ransferred	Packet received	Packet Error Rate(%)
1	3000	2991	3.0
2	3000	2987	4.3
3	3000	2994	2.0
4	3000	2991	3.0
5	3000	2990	3.3

#### 2) Multiple-single

The analysis is gone ahead with four sensor hubs and the sink hub. Every sensor hub starts to transmit the information parcel after got the guide outline. Every sensor hub transmits by and large 3000 information bundles, and after that acquires the experimental result. The outcome is appeared in Table 2:

**TABLE II. MULTIPLE-SINGLE**

NO	Packet received				Packet Error Rate (%)			
	Gate1	Gate2	Rain	Water	Gate1	Gate2	Rain	Water
1	2992	2984	2979	2979	2.7	5.3	7.0	7.0
2	2991	2991	2976	2979	3.0	3.0	8.0	7.0
3	2991	2983	2979	2972	3.0	5.7	7.0	9.3
4	2990	2988	2983	2973	3.3	4.0	5.7	9.0
5	2990	2985	2980	2976	3.3	5.0	6.7	8.0

#### 3) The experiment analysis

From the trial result, it can be seen that the PER is under 1% in light of the fact that no aggravation from different hubs. The PER is sufficiently low to fulfill the framework's application demand. The precipitation hub can store the information; the yield of the water-level and door sensor can be kept up. In the event that there is an information misfortune in the correspondence, it has little effect on framework execution[5].

In the perspective of equipment point, there principally have two viewpoints which cause the information loss. The time for CC1020 to change state is unverifiable. CC1020 rushes to the RX state from the unmoving state, and hurries to the TX state from RX state. After changed the state, the steady time is irregular, and it sets aside a few minutes and causes the information bundle misfortune. Then

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again, the fringe parts around CC1020 have very impact on the steadiness. From the trial, it can be found that the PER[7] of the water hub is 0.7%~1% which is greater than the others. It is not identified with the transmission arrange but rather identified with the precisions of the fringe limit, inductance and resistance of CC1020 and welding quality[6].

### CONCLUSION

The water level pointer was effectively planned and can be executed to screen the water level condition consistently. The framework is composed as easy to use programming which gives the points of interest data, to gather information and send related data to the approved work force for prompt activity to ensure the reconnaissance region under controlled.

Moreover, the framework can defeat a few issues confronting in commercial ventures, for example, the deferral in the conveyance of data to the officer. Other than that, this framework additionally can decrease the downtime blunder in enormous commercial enterprises by utilizing the remote framework for correspondence.

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