Reservoir Water Level Monitoring System using Ultrasonic Sensor and Short Text messages (SMS)

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Abstract: The Adventist University of Indonesia constantly acquire water from the water springs around the closest mountains in order to fulfill the needs of the people within the campus area. The water collected from the water springs first stored in a reservoir and later transferred to the campus through networks of pipes. The distance gap between the campus and the reservoir is quite far, not only that, the lack of decent infrastructure around the area makes it relatively difficult as motor vehicles could not access the location of the reservoir and therefore makes it quite difficult to monitor the water level on person. Monitoring the water level in the reservoir is very important because not only it shows the income and outcome of the water into the reservoir, but also the status of the reservoir itself. For example, if the level of water is too high, it must mean that the network of pipes that distributes the water has been jammed, and if the water level is too low, that means there's hindrance occurred in the input system in the reservoir. All this time, some staff from the campus periodically came to the reservoir on person to check on the water level. But following the circumstances in which the lack of decent infrastructure and distance, it is not practical and a waste of time. That being said, the campus needed a system in which it monitors the water level from a distance, and the means of to notify the staffs of the reservoir status. This way the staffs does not have to periodically visit the reservoir to check on the water level and only needed if there's something wrong with the reservoir.

We conducted a research in order to came up with a solution and therefore created a device that monitors the water level that notify the staffs by Text Messages using the Micro controller AVR Mega 32 that is connected with Ultra Sonic Sensor and GSM Modem. The device will automatically notify the staff if there are anything unusual occurred to the reservoir. The Micro Controller AVR Mega 32 that are being used are one of AT Mega with flash memory 32k and has 32 means of inputs and outputs. The Micro Controller also has 8 ADC Canals with the resolution of 10 and 4 Canals of PWM. The Ultra Sonic Sensor that are being used is a transducer that have wave frequency of 40KHz to 400KHz. The GSM Modem that is being used is Wavecom GSM with baudrate default M1206B = 115200 Bps. The Communication Port that

is being used is an RS232. All three are programed using the software NS- One.

The research also shows that the device could measure the water level as low as from 3 cm all the way to 2,5 meter accurately, given the accurate placement of the device in the reservoir. From then, the device will do its measurement automatically and will give the water level report to the staff should anything happen to the reservoir.

Keywords: Water reservoirs, AVR microcontroller 32, SRF08 sensor