Volume 2, Issue 11, November 2012 ISSN: 2277 128X

International Journal of Advanced Research in Computer Science and Software Engineering

Research Paper

Available online at: www.ijarcsse.com

Automated Solar Based Agriculture Pumping

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ABSTRACT : Solar power is absolutely perfect for use with irrigation systems for gardens, allotments, greenhouses, and polytonal. When the sun is shining you need more water and so the solar power is there for the pump. By adding a suitable deep-cycle leisure/marine battery, power can be made available 24 hours per day enabling watering in the evening - the best time to water plants in the summer so that the water has a chance to soak into the ground.

Keywords – Solar, Water, Microcontroller, Agriculture

I. INTRODUCTION

With hosepipe bans becoming more frequent thanks to global warming (and water companies not fixing the leaks which lose 50% of all treated water in the UK), more and more people are starting to collect rainwater and grey water for use in their gardens. The only problem is getting the water from where it is collected and stored, to where it is needed [1].

Solar power is absolutely perfect for use with irrigation systems for gardens, allotments, greenhouses, and polytonal. When the sun is shining you need more water and so the solar power is there for the pump. By adding a suitable deep-cycle leisure/marine battery, power can be made available 24 hours per day enabling watering in the evening the best time to water plants in the summer so that the water has a chance to soak into the ground.

II. SOLAR BASED AUTOMATED AGRICULTURE PUMP SYSTEMS

An automated agriculture pump system can be put together using a suitable 12V programmable timer which will turn on the pump at the same time every evening. Alternatively a bespoke electronic relay control board* can be put together to supply power to the pump (or many different pumps) with your choice of turn on/off times each day. To protect the pump from being damaged if it runs out of water to pump, and to prevent any secondary tanks from overflowing, float switches can be used to detect water levels and their readings fed into the electronic controller[2][3].

Fig.-Electronic Controller

III. BACKGROUND

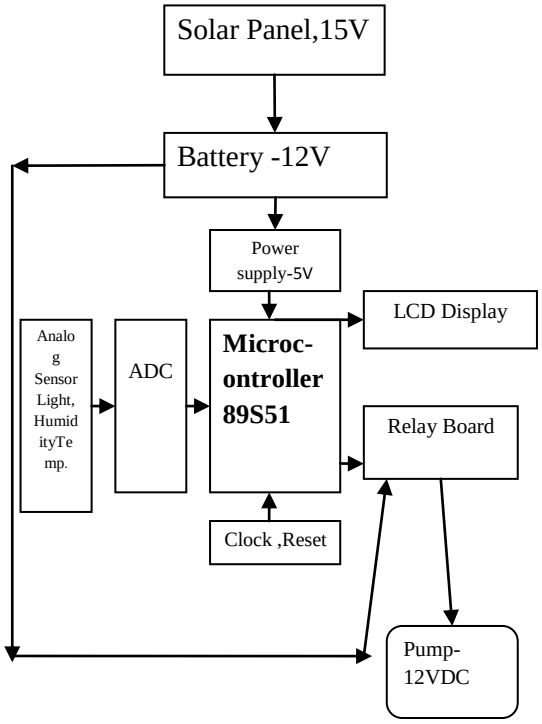
3.1 Introduction to ADC0808

The ADC0808 data acquisition component is a monolithic CMOS device with an 8-bit analogto- digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The 8- channel multiplexer can directly access any of 8-single-ended analog signals. The device eliminates the need for external zero and full-scale adjustments Easy interfacing to micro controller is provided by the latched and decoded multiplexer address inputs and latched TTL TRI-STATE outputs. Incorporating the most desirable aspects of several A/D conversion techniques has optimized the design of the ADC0808, ADC0809.

3.2 Introduction to AT89S51 / 52 Micro Controller (8051)

The AT89Sxx is a low-power, high-performance CMOS 8-bit micro controller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry- standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable flash on a monolithic chip, The Atmel AT89S52 is a powerful micro controller, which provides a highly flexible and cost effective solution to many embedded control applications [5]. The AT89S52 provides the following standard features: 8K bytes of flash, 256 bytes

IV. PROPOSED SYSTEM



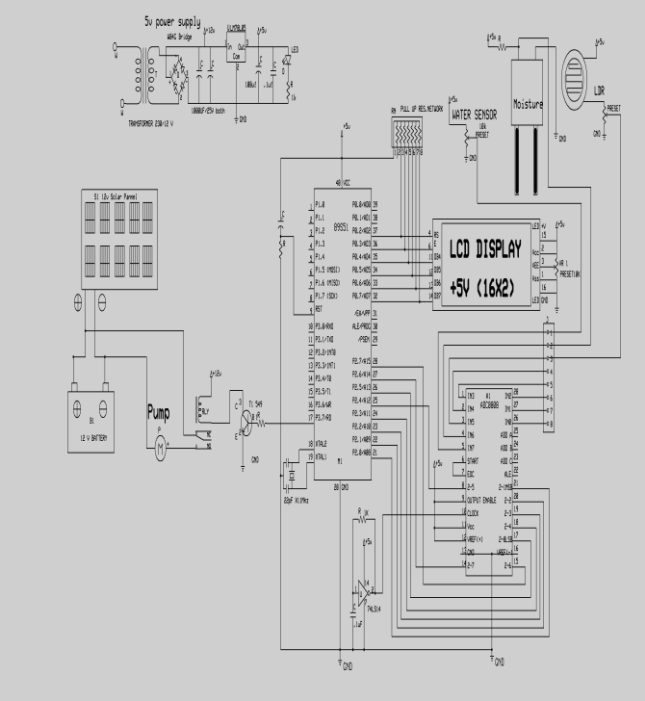
4.1 ADC

Analog inputs are provided by IC1, a 8-bit analog-to digital converter from National Semiconductors .It has 8 analog inputs for interface the analog sensor like temperature, humidity, pressure etc. the successive approximation A/D converter, transforms the analog output of the multiplexer to an 8-bit digital word. The output of the multiplexer goes to one of two comparator inputs. The other input is derived from a 256R resistor ladder, which is tapped by a MOSFET transistor switch tree. The converter control logic controls the switch tree, funneling a particular tap voltage to the comparator. Based on the result of this comparison, the control logic and the successive approximation register (SAR) will decide whether the next tap to be selected should be higher or lower than the present tap on the resistor ladder. This algorithm is executed 8 times per conversion, once every 8-clock period, yielding a total conversion. When the conversion cycle is complete the resulting data is loaded into the TRI-STATE… output latch. The data in the output latch can then be read by the host system any time before the end of the next conversion. The TRI-STATE capability of the latch allows easy interfaces to bus oriented systems. The operation of these converters by micro controller control logic is very simple.

The controlling device first selects the desired input channel. To do this, a 3-bit channel address is placed on the A, B, C input pins; and the ALE input is pulsed positively, clocking the address into the multiplexer address register. To begin the conversion, the START pin is pulsed. On the rising edge of this pulse the internal registers are cleared and on the falling edge the start conversion is initiated.

The ADC0808/ADC0809,can be functionally divided into 2 basic sub circuits. These two sub circuits are an analog multiplexer and an A/D converter. The multiplexer uses 8 standard CMOS analog switches to provide for up to 8 analog inputs. The switches are selectively turned on, depending on the data latched into a 3-bit multiplexer address register.

CIRCUIT DIAGRAM



4.2 AT89S51 micro controller interface

The micro controller read the digital data from ADC and controls the eight corresponding eight analog inputs and its send the data to the PC RS232 port. The ADC0808 converters were designed to interface to most standard microprocessors with very little external logic, but there are a few general requirements, which must be considered to ensure proper converter operation. Most micro controller are designed to be TTL compatible and, due to speed and drive requirements, incorporate many TTL circuits. The data outputs of the ADC0808 are capable of driving one standard TTL load, which is adequate for most small systems, but for larger systems extra buffering may be necessary. The EOC output is not quite as powerful as the data outputs, but normally it is not bussed like the data outputs. The converter inputs are standard CMOS compatible inputs. When TTL outputs are connected to any of the digital inputs a pull-up resistor should be tied from the TTL output to VCC, E 5 kE. This will ensure that the TTL will pull-up above 3.5V. The timing of the START and

ALE pulses relative to channel selection and signal stability can be critical. The simplest approach to microprocessor interfaces usually ties START and ALE together. When these lines are strobe the address is strobe into the address register and the conversion is started. The propagation delay from ALE to comparator input of the selected input signal is about 3.0 ms. If the start pulse is very short the comparator can sample the analog input before it is stable. When using a slow clock of 500 kHz the sample period of the comparator input is long enough to allow this delay to settle out[6].If the ADC0808 clock is l500 kHz, a delay between the START and ALE pulses is required. There are three basic methods to accomplish this. The first possibility is to design the microprocessor interface so that the START and ALE inputs are separately accessible. This is simple if some extra address decoding is available. Separate accessibility of the START and ALE pins allows the microprocessor, via software, to set the delay time between the START and ALE pulses. If extra decoding is not available, then START and ALE could be tied together. To obtain the proper delay, the microprocessor would cause START/ALE to strobe twice by executing the load and start instruction twice. The first time this instruction is executed, the new channel address is loaded and the conversion is started. The second execution of this instruction will reload the same channel address

and restart the conversion. But since the multiplexer address register contents are unchanged the selected analog input would have already settled by the time the second instruction is issued.

V. CONCLUSION

Very good article on designing and installing a simple solar powered well water pumping system suitable for one household Much of this information could be applicable to a residential water system that uses a storage tank. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save manpower, water to improve production and ultimately profit. In today's life human being is becoming so busy that he can't pay his attention to work like water supply. But plants and trees are the sources of oxygen for human being and their existence is also important from growth is also important, but it is necessary that excess supply of water should be avoided to save the water. By providing precise timing for water supply this will help to save water. Water saving is the main aim of our system and with the help of scheduling principle we have tried to achieve that, it will definitely helps the human being to save water and in such a way it will be helpful for earth.

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