

Electronic Digital Clock
On
“Electronic Digital Clock Using 8085 Microprocessor”

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Last but not the least I am very thankful to our Head of Department and all Members of Computer Science Deptt. who gave us an opportunity to face real time problems while fulfilling need of an organization by making projects for them.

DECLARATION

We hereby declare that the project work entitled “**Electronic Digital Clock**” is an authentic record of my own work carried out as requirements of project for the award of degree of B.Tech(CSE), **Amritsar Group of Colleges, Amritsar**, under the guidance of **Mr Pavitar Singh**.

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Certified that the above statement made by the student is correct to the best of our knowledge and belief.

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OBJECTIVES OF THE PROJECT

The main aim of this project is to design a Electronic Digital Clock using 8085 microprocessor, interfacing with peripheral device 8085, and program implementing the process. The objective of this experiment is to construct a digital clock in the lab using 7-segment LCD screen, 8085 microprocessors program and microprocessors hardware machine.

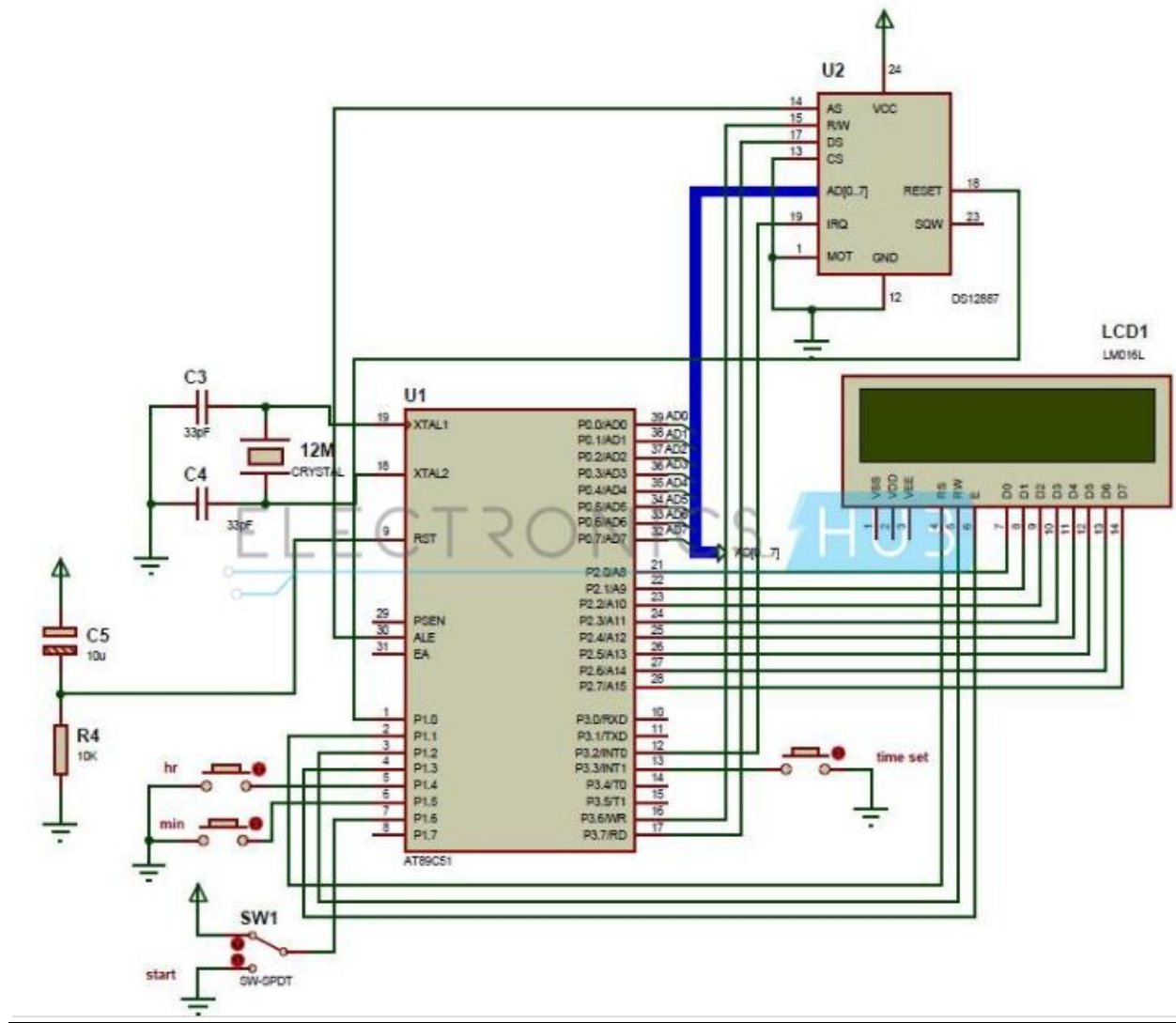
Introduction

A digital clock is a type of that displays the time digitally (eg: numerals or others symbols) is different as analog clock where the time is displayed by the positions of rotating hands. Digital clocks can be very small and inexpensive devices that enhance the popularity of product designs. Digital clocks are now often found in many kinds of devices for example in cars, radios, televisions, microwave oven, standard ovens, computers and cell phones etc.

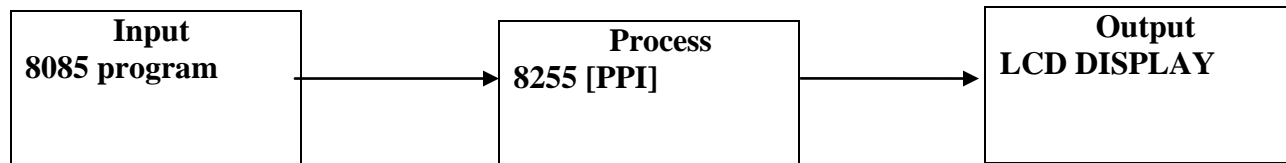
Digital clocks is accurate in their way whereas analog clocks lags sometimes in some kind of measurements devices such as weight measuring machine. however a typical grievance is that when time must be set to Daylight Saving Time, numerous family timekeepers must be rearranged. The fuse of programmed synchronization by a radio time sign is decreasing this issue. Microprocessors play a key part in the functioning of digital clocks and form the heart of how digital clocks function. The microprocessors control how digital clock works and without it a digital clock will not work at all.

The Digital Clock is a solid circuit that assumes control over the errand of showing the time in hours:minutes:seconds design. The 8085 microchip stores the client program in hexa code structure. The chip conveys to the ports of 8255 PPI which thus controls the computerized clock show. The presentation could be a LCD showcase or 7-portion LED show. On the off chance that you utilize 7-portion LED show, then care ought to be taken to utilize pull-up resistors to abstain from over-burdening of the 8255 PPI

Electronic Digital Clock



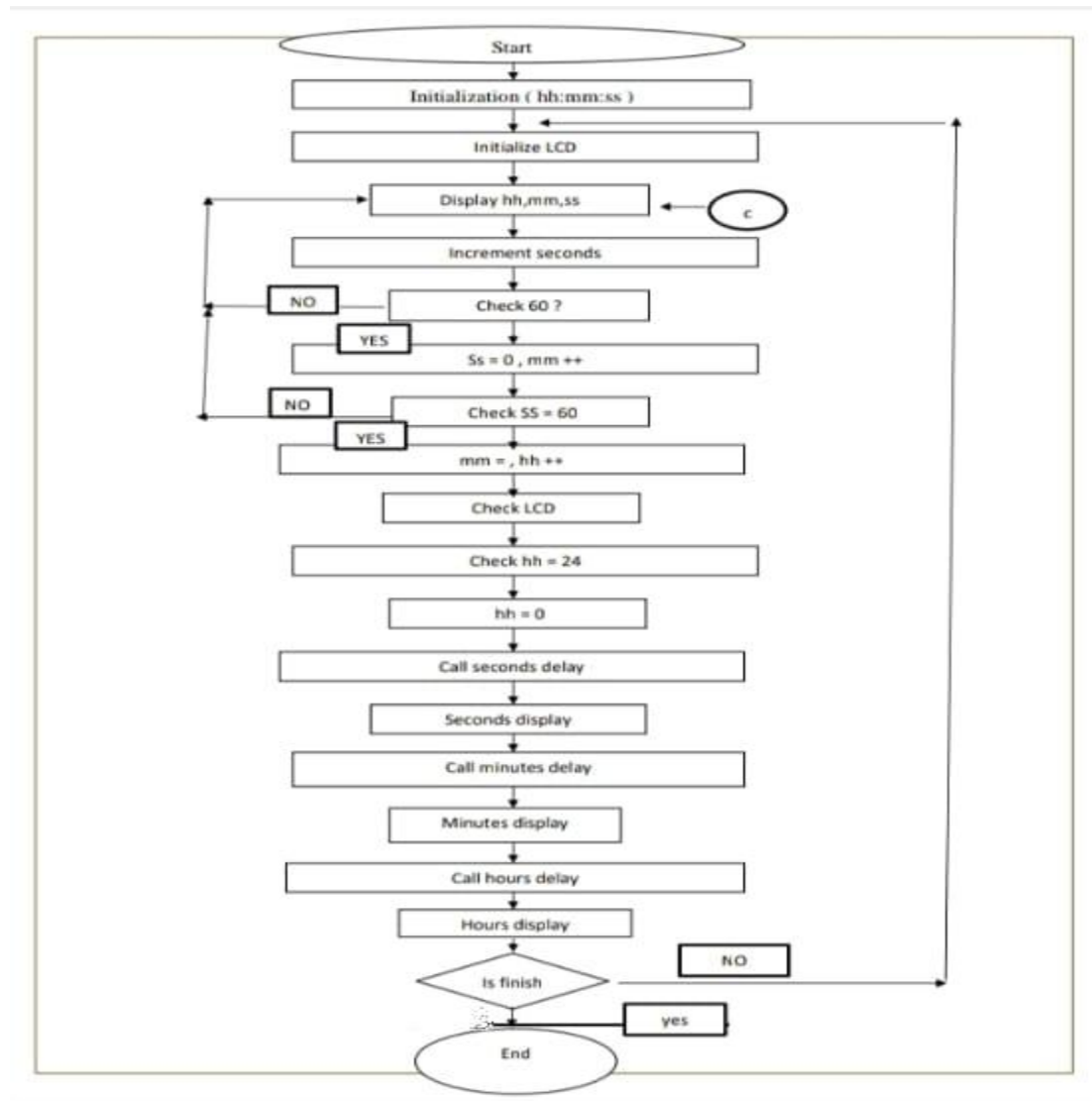
Explanation of block diagram



The above diagram above shows a simple of how a digital clock works. The input is in the form of electric signals from the microprocessor. The electric signals travel through the wires to the hardware of LCD display and intern travels to the screen of 7 – segment LCD display and as a result the full digital clock appears on six different directions, but the sequence of the variations of the digits are different. For example first the seconds is displayed on the LCD screen as soon as the 60 secs completes the another time measurements starts which is minutes and after the completion of the 60 minutes the third time measurements starts which is hours, through this the full digital clock is displayed on the LCD screen. The input part represents the part where as mentioned above the electric signals are transferred to the respective system, This is the part where after the wires are used to make all the respective connections in the LCD screen hardware with the wires, with the microprocessor and the power supply. The most important part of the input process is the part where the program is entered for the microprocessor. This will determine the process and the output of the whole system. Thus before the connections are made the microprocessor is programmed first for the digital clock to function in a correct manner. In the process part the total system after all the respective connections are made does the process of the data input to the system. As stated above the process totally depends upon the input entered to the system. If a single error is made while entering the program then the system will not work. The program itself contains every single instruction for the digital clock and When the input in the form of the lengthy program is transferred to the hardware of 7-segemnt display LCD screen in the form of electric signals and the time starts to displays in the form of Hours, Minutes and Seconds. Then suddenly the clocks runs following the procedure of time measurements which is Seconds then Minutes and then hours completing the full display of digital clock on the 7-segemnt LCD display screen.

Flowchart

The flowchart shows the process taking place inside a particular digital clock with the aid of step by step diagram. The flow chart gives a clearer and better idea of how a particular digital clock works and the makes it easier for one to understand. The following flowchart illustrates how a particular digital clock works.



Assembly Language Program

The program was the main catalyst which makes the digital clock works. The program for the digital clock to work and the program for the delays are entered in order for the digital clock to work is the following:

Address	Opcode	Mnemonic	Comment	
8000	31	LXI SP,8C00		
8001	00			
8002	8A			
8003	2E	MVI H,01	SECONDS	
8004	01			
8005	26	MVI L,01	MINUTES	
8006	01			
8007	0E	MVI B,01	HOURS	
8008	01			
8009	CD	CALL INISIALIZATION		
800A	00			
800B	87			
800C	3E	MVI A,82		
800D	82			
800E	CD	CALL C-WRITE		
800F	00			
8010	88			
8011	3E	MVI A,3A		
8012	3A			
8013	CD	CALL D-WRITE		
8014	00			
8015	89			
8016	3E	MVI A,85		
8017	85			
8018	CD	CALL C-WRITE		
8019	00			
800A	88			
800B	3E	MVI A,3A		
800C	3A			
800D	CD	CALL D-WRITE		
800E	00			
800F	89			
8020	C3	JMP 8100		
8021	00			

8022	81		
8100	3E	MVI A,86	
8101	86		
8102	CD	CALL C-WRITE	
8103	00		
8104	88		
8105	7D	MOV A,H	
8106	E6	ANI FO	
8107	F0		
8108	0F	RRC	
8109	0F	RRC	
810A	0F	RRC	
810B	0F	RRC	
810C	C6	ADI 30	
810D	30		
810E	CD	CALL D-WRITE	
810F	00		
8110	89		
8112	7D	MOV A,H	
8113	E6	ANI OF	
8114	C6	ANI 30	
8115	30		
8116	CD	CALL D-WRITE	
8117	00		
8118	89		
8119	CD	CALL DEL	
811A	00		
811B	86		
811C	7D	MOV A,H	
811D	C6	ADI 01	
811E	01		
811F	27	DAA	
8120	6F	MOV A,H	
8121	DE	SBI 60	
8122	60		
8123	C2	JNZ 8100	
8124	00		
8125	81		
8126	2E	MVI H, 00	
8127	00		
8128	00	ON OP	
8129	C3	JMP 8200	
812A	00		
812B	82		
8200	3E	MVI A,83	

8201	83		
8202	CD	CALL C-WRITE	
8203	00		
8204	88		
8205	7C	MOV A, L	
8206	E6	ANI FO	
8207	F0		
8208	0F	RRC	
8209	0F	RRC	
820A	0F	RRC	
820B	0F	RRC	
820C	C6	ADI 30	
820D	30		
820E	CD	CALL D-WRITE	
820F	00		
8210	89		
8211	7C	MOV A,L	
8212	E6	ANI OF	
8213	0F		
8214	C6	ADI 30	
8215	30		
8216	CD	CALL D-WRITE	
8217	00		
8218	89		
8219	CD	CALL DEL	
821A	00		
821B	86		
821C	7C	MOV A,L	
821D	C6	ADI 01	
821E	01		
821F	27	DAA	
8220	67	MOV A,L	
8221	DE	SBI 60	
8222	60		
8223	C2	JNZ 8100	
8224	00		
8225	81		
8226	26	MVI L,00	
8227	00		
8228	00	ON OP	
8229	C3	JMP 8300	
822A	00		
822B	83		
8300	3E	MVI A,80	
8301	80		

8302	CD	CALL C-WRITE	
8303	00		
8304	88		
8305	79	MOV A,B	
8306	E6	ANI FO	
8307	F0		
8308	0F	RRC	
8309	0F	RRC	
830A	0F	RRC	
830B	0F	RRC	
830C	C6	ADI 30	
830D	30		
830E	CD	CALL D-WRITE	
830F	00		
8310	89		
8311	79	MOV A,B	
8312	E6	ANI OF	
8313	OF		
8314	C6	ADI 30	
8315	30		
8316	CD	CALL D-WRITE	
8317	00		
8318	86		
8319	CD	CALL DEL	
831A	00		
831B	86		
831C	79	MOV A,B	
831D	C6	ADI 01	
831E	01		
831F	27	DAA	
8320	4F	MOV L,A	
8321	DE	SBI 24	
8322	24		
8323	C2	JNZ 8100	
8324	00		
8325	81		
8326	0E	MVI L,00	
8327	00		
8328	00	ON OP	
8329	C3	JMP 8100	
832A	00		
832B	81		

Fig 3: Program for Digital clock function

Program for Delay

The separate program for the delay are entered separately in to the microprocessor. The delays are basically programs dictating that how fast we make the digital clock to run by checking that the full digital clock is working or not. The programs are as follows:

Address	Opcode	Mnemonics	
8600	11 FF 00	LXI D,FFFF	
8603	1B	DCX D	
8604	7B	MOV A,E	
8605	B2	ORA D	
8606	C2 03 86	JNZ 8603	
8609	11 FF 00	LXI D,FFFF	
860C	1B	DCX D	
860D	7B	MOV A,E	
860E	B2	ORA D	
860F	C2 0C 86	JNZ 860C	
8612	C9	RET	

Fig 4: Table for delay program

Hardware Implementation and Results

After the programs for the digital clock system and the delay are written down and entered into the microprocessor the whole operation is executed by pressing the execution button on the microprocessor. Below are a few pictures of the digital clock system constructed using the microprocessor, connecting wires and 7-segement LCD display





The system is set up as shown in the diagram. The 7-segment LCD is connected to the microprocessors along with the connecting wire. After all connections are made and the 8085 lengthy digital clock program is typed into the microprocessors and is then executed. After the execution of the program in the microprocessors the clock starts to display on the LCD screen and is automatically starts from counting the seconds to hours as seen in the above fig 5 and 6.

Discussion

The main challenges faced during the experiment is that the program was written separately before it was typed in into the microprocessor and executed. The program for the digital clock was long and complicated and had to be entered into the microprocessor very carefully, as a single mistype would cause the whole system to dysfunction and give an output not at all desired. The program basically dictated to the whole system to the 7-segment LCD display screen.

At first the seconds is displayed on the screen following the ratios then suddenly minutes can be seen after the completion of whole 60 secs and the minutes counting is displayed. As soon as the 60 minutes completed, the hours counting has been started displaying the whole digital clock on the 7-segment LCD display screen. There were quite a lot of obstacles faced when building the digital clock system but as stated above each one of them was overcome by double checking each and every program line which was entered in the microprocessors so the whole digital clock (hh:mm:ss) can be displayed on the LCD screen which is connected to the microprocessors hardware.

To make the digital clock run faster in order to check the full counting of digital clock, some few changes in the delay program lines has been made very care without disturbing the whole program entered already so that the clock runs more faster then the previous one so that full counting of the clock can be displayed on the LCD screen in order to check working of the whole program.

Advantage of Electronic digital clock

- It is light and compact
- The first thing you can expect from a digital clock is a more accurate time-sheet that is extremely hard to forge that gives accurate tracking of employee hours
- Secure records-most employee attendance software is cloud-based. This means that any information accumulated by a digital clock will be stored in the cloud. In short, employee time-sheets cannot be misplaced or lost, and unauthorized persons cannot access the records.
- Easy tracking-with a digital clock, employee time tracking records will not only be accurate, safe and secure, it will be extremely easy to track the exact number of hours each employee has logged in.

Conclusion

In conclusion it can be stated that the objective of the experiment was successfully achieved, as the digital clock works following the each time measurements. The programs for the whole digital clock and the delay program of every 60 seconds were also entered successfully and as a result the the clock is displayed on the 7- segment LCD screen showing all time measurements from seconds to minutes and finally an hours, after the whole program was executed. This happens when finally 8085 lengthy program was entered carefully and then there was a success achieved in the experiment