Digital Electronics

Experiment 13: Project

Digital Clock [HH:MM:SS] with parallel data loading (entry).

Components:

Index	Components	Use	Quantity
1	IC 74161	4-bit Counter	6
2	IC 4511	BCD converter	6
3	7 Segment Display (Common Cathode)	LED Display	6
4	IC 7400	NAND gate	5
5	IC 7432	OR gate	3
6	Tactile Switch	Data Entry	16
7	3-way Switch	Load activation	4
8	470 Ω Resistor	Input	16
9	NE 555 timer	Generate clock pulse	1
10	IC 7805	5 V supply	2
11	12/5 V ,1 A Adapter	Power	1
12	1 KΩ Resistor	Limiting current in Display	6
13	1.2 KΩ Resistor	Providing voltage drop in load switch	4

Schematic Explanation:

Red Wire: Vcc

Black Wire: Ground

Blue : Vertical=> Connections of Display

Horizontal=> B and D input from 74161 to 4511

Green: Horizontal=> Tactile switch

Vertical=> A and C input from 74161 to 4511

Yellow: Horizontal**=>** Connections of 7400 and 7432 with 74161

Vertical=> Connections of load & load switch

470 Ω Resistor: For grounding inputs of 74161

Tactile Switches: For inserting High logic in inputs of 74161

Three-way Switch: To activate input loading into IC 74161

74161: Counter

4511: BCD to decimal converter

7400: For applying NAND logic

7432: For applying OR logic

***Instructions For Use*:**

ON/OFF:

Press the pushbutton switch on the top/left corner.

Resetting the clock:

Disconnect the supply, or set all load swiches to ON, then again set them to OFF.

Setting values of hour and minute of clock:

Tactile switches follow 8421 BCD code value. Press the appropriate tactile switch, make appropriate load switch ON, then again make it OFF. Then release the pressed tactile switches. The selected input will be loaded into the counter and will be seen in the display.

- For inputs of Tens digit of minute: Yellow tactile switch, M2 load switch
- For inputs of Unit digit of minute: Red tactile switch, M1 load switch
- For inputs of Unit digit of hour: Black tactile switch, H1 load switch
- For inputs of Tens digit of hour: Orange tactile switch, H2 load switch