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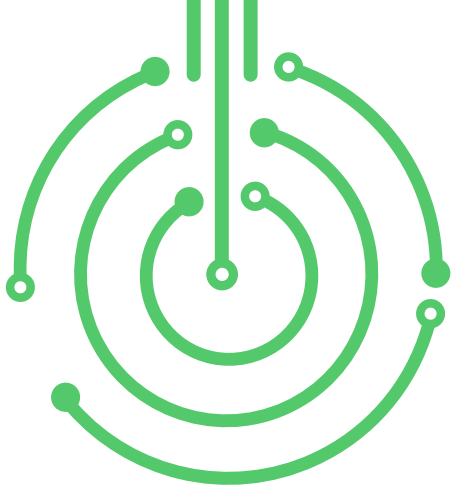


10 Minutes Timer for AC Loads

SKU: EL153546

10 Minutes Timer for AC Loads

The project described here is a 10-minute timer using an Arduino microcontroller, capable of driving AC loads up to 30A. The timer's progress is visually represented by 10 LEDs, which light up sequentially, each for 1 minute, totaling 10 minutes. The project is powered by a single 230V AC supply, converted to 12V DC for the relay and further regulated to 5V for the microcontroller by an onboard isolated AC to DC converter and an LDO (U1), respectively. Snubber circuitry consisting of C8, and R18 are used on relay contacts to prevent damage to the relay contact and reduce arcing.

The operation of the timer is initiated by a trigger switch. Once activated, the microcontroller starts the sequence, triggering the relay and illuminating each segment of the bar graph one by one, with a 1-minute delay between each segment. This results in a total timer duration of 10 minutes, as each of the 10 segments represents one minute.

For the software side, the project utilizes Arduino code specifically designed for this 10-minute timer application. The code is downloadable and intended for programming a new ATMEGA328 microcontroller. It's worth noting that the code can be modified to accommodate different time durations as needed. The project documentation includes references for bootloader and Arduino programming connections, providing a comprehensive guide for setup and customization.

Note: This project involves high voltage, and users should have expert knowledge, and follow strict safety precautions!

This project demonstrates a practical application of microcontrollers in controlling and automating tasks, with the added benefit of visual feedback through the LED bar graph display. It's a useful example for those interested in electronics and automation, showcasing how simple yet effective solutions can be developed using Arduino and basic electronic components.

FEATURES

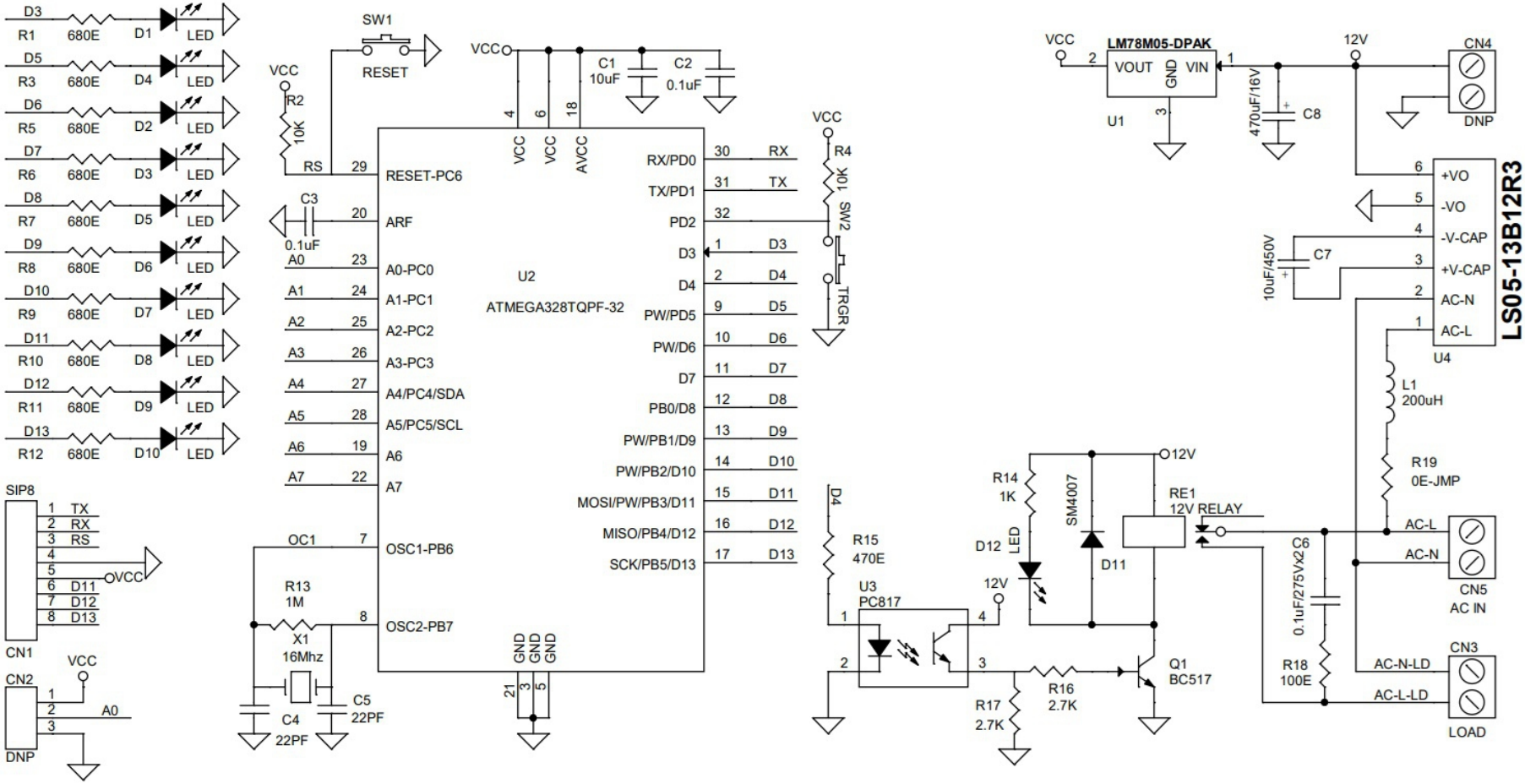
- Power Supply 230V AC
- Load up to 30Amps /230V AC
- 10 Segments Bar-Graph for Time (Each LED 1 Minute)
- On Board Trigger Switch
- On Board Reset Switch
- LED for Relay Operations
- 4 X 4MM Mounting Holes
- PCB Dimensions 88.98X53.96MM

Connections

- Water Pump
- Fan
- Lights
- Geyser
- Heater

Info: Project involves working with high voltage, specifically 230V AC, which poses significant safety risks if not handled properly. It is crucial for individuals undertaking this project to possess expert knowledge in electronics and electrical safety. Moreover, adhering to strict safety precautions is paramount to prevent accidents and ensure a safe working environment.

Schematic

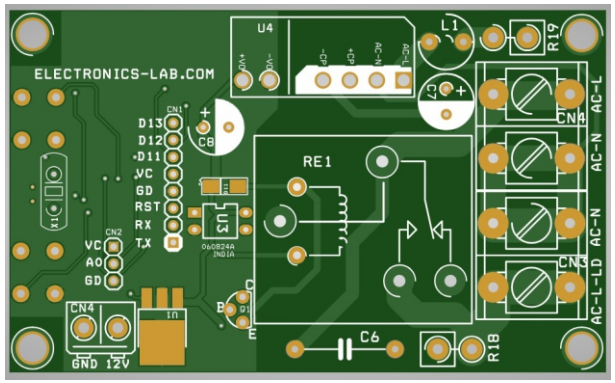

D3
R1 680E D1 LED
D5
R3 680E D4 LED
D6
R5 680E D2 LED
D7
R6 680E D3 LED
D8
R7 680E D5 LED
D9
R8 680E D6 LED
D10
R9 680E D7 LED
D11
R10 680E D8 LED
D12
R11 680E D9 LED
D13
R12 680E D10 LED
SW1
RESET
VCC
R2
10K
RS
C3
0.1uF
A0
A1
A2
A3
A4
A5
A6
A7
OC1
R13
1M
X1
16Mhz
C4
22PF
C5
22PF
C1
10uF
C2
0.1uF
U2
ATMEGA328TQPF-32
RESET-PC6
ARF
A0-PC0
A1-PC1
A2-PC2
A3-PC3
A4/PC4/SDA
A5/PC5/SCL
A6
A7
OSC1-PB6
OSC2-PB7
RX/PD0
TX/PD1
PD2
D3
D4
PW/PD5
PW/D6
D7
PB0/D8
PW/PB1/D9
PW/PB2/D10
MOSI/PW/PB3/D11
MISO/PB4/D12
SCK/PB5/D13
R4
10K
SW2
TRGR
SIP8
CN1
CN2
DNP
LM78M05-DPAK
U1
470uF/16V
C8
12V
CN4
DNP
LS05-13B12R3
U4
+VO
-VO
-V-CAP
+V-CAP
AC-N
AC-L
10uF/450V
C7
L1
200uH
R19
0E-JMP
AC-L
AC-N
CN5
AC IN
CN3
AC-N-LD
AC-L-LD
LOAD
R14
1K
SM4007
RE1
12V RELAY
D12 LED
D11
C6
0.1uF/275Vx2
R18
100E
R15
470E
U3
PC817
R16
2.7K
R17
2.7K
Q1
BC517

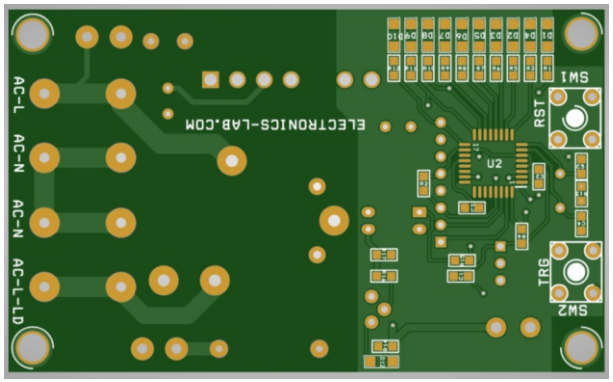
Connections

CONNECTIONS

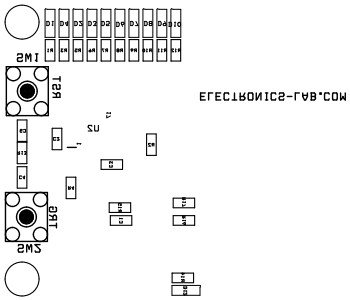
- Cn1: Pin 1= TX, Pin 2=RX, Pin 3=Reset, Pin 4=GND, Pin 5= VCC, Pin 6= D11, Pin 7= D12, Pin 8 = D13
- CN2: Optional, Do Note Install
- CN3: Pin 1 = Load AC-N, Pin 2 = Load AC-L
- CN4: Optional, External 12V Input in Case U4 AC-DC Converter Is not Used
- CN5: Pin 1 = 230V AC L Input, Pin 2 = 230V AC N Input
- D1-D10: LED Segments for Time Display
- D12: Power LED
- SW1: RESET SWITCH
- Sw2: TRIGGER/TIME START

PCB

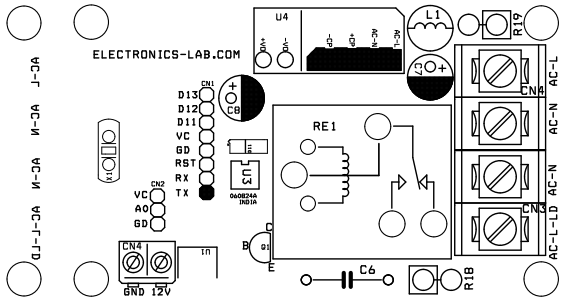




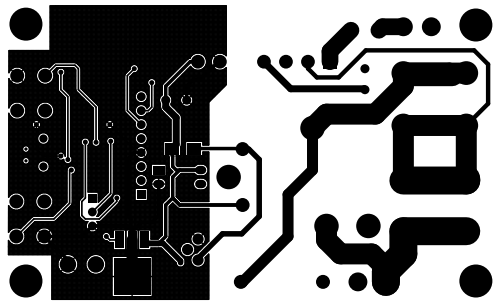
PCB GERBER FILES AVAILABLE



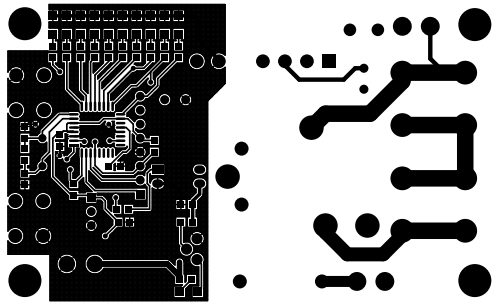
SILK SCREEN BOTTOM



SILK SCREEN TOP



TOP LAYER



BOTTOM LAYER

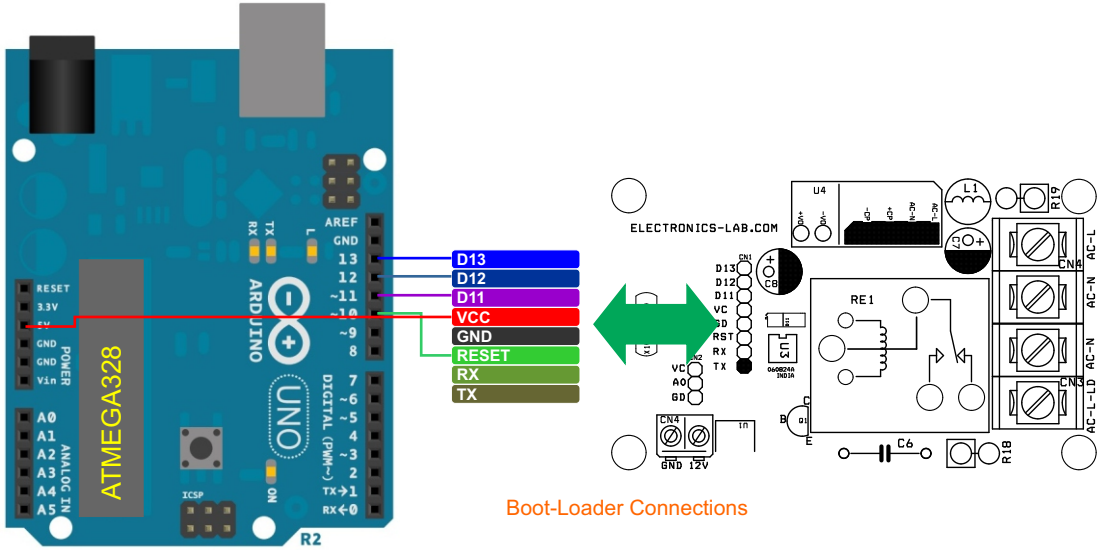
PCB DIMENSIONS 88.98X53.96MM

Parts List

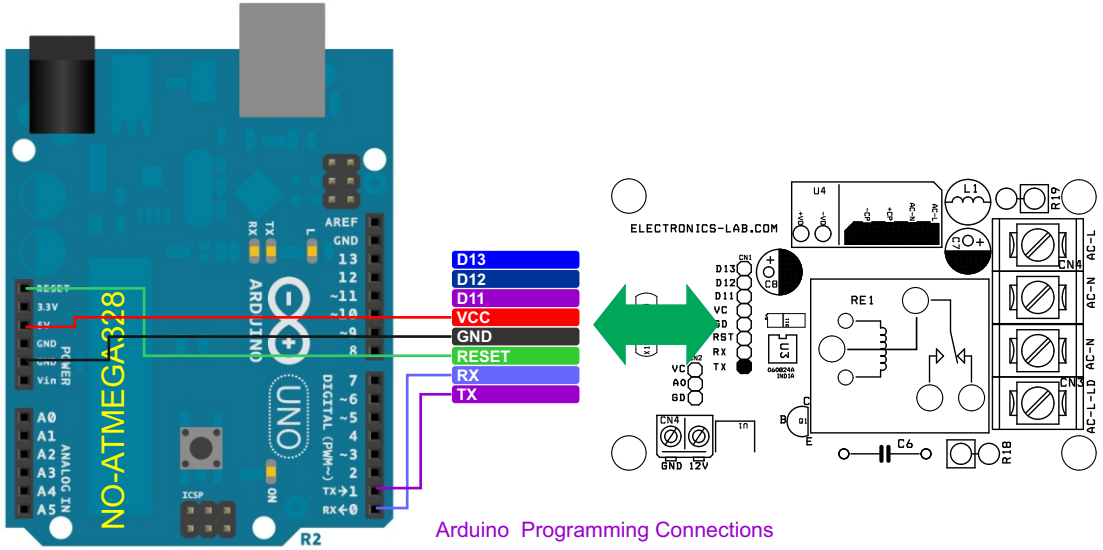
BOM						
NO.	QNTY	REF	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	8 PIN MALE HEADER PITCH2.54MM	WURTH	DIGIKEY	732-5321-ND
2	2	CN2,CN4	DNP		DIGIKEY	
3	1	CN3	2 PIN BARRIER BLOCK	TE CONNECTIVITY	DIGIKEY	A136544-ND
4	1	CN5	2 PIN BARRIER BLOCK	TE CONNECTIVITY	DIGIKEY	A136544-ND
5	1	C1	10uF/16V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	2	C2,C3	0.1uF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	2	C4,C5	22PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
8	1	C6	0.1uF/275VX2	KEMET	DIGIKEY	399-9651-ND
9	1	C7	10uF/450V ELEKTROLYTIC 8MM DIA.	RUBYCON	DIGIKEY	1189-3237-ND
10	1	C8	470uF/16V ELEKTROLYTIC DIA 8MM	PANASONIC	DIGIKEY	P5141-ND
11	11	D1,D2,D3,D4,D5,D6,D7,D8,D9,D10,D12	LED RED SMD SIZE 1206	WURTH	DIGIKEY	732-4991-1-ND
12	1	D11	SM4007	SMC DIODE	DIGIKEY	1655-1N4007FLCT-ND
13	1	L1	1MH 8MM DIA THT OR SMD	WURTH	DIGIKEY	732-3261-ND
14	1	Q1	BC517 TO92	ONSEMI	DIGIKEY	732-4991-1-ND
15	1	RE1	12V RELAY 30A	CIT RELAY	DIGIKEY	2449-L115F11CM12VDCS.9-ND
16	10	R1,R3,R5,R6,R7,R8,R9,R10,R11,R12	680E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
17	2	R2,R4	10K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
18	1	R13	1M 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
19	1	R14	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
20	1	R15	470E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
21	2	R16,R17	2.7K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
22	1	R18	100E 3W THT	VISHAY	DIGIKEY	PPC3W100ATB-ND
23	1	R19	0E-JUMPER WIRE		DIGIKEY	WIRE JUMPER
24	1	SW1	TACTILE SWITCH 4 PINS	CSK	DIGIKEY	CKN9085CT-ND
25	1	SW2	TACTLIE SWITCH 4 PINS	CSK	DIGIKEY	CKN9085CT-ND
26	1	U1	LM78M05-DPAK	TI	DIGIKEY	MC78M05CDTGOS-ND
27	1	U2	ATMEGA328TQPF-32	MICROCHIP	DIGIKEY	ATMEGA328-PU-ND
28	1	U3	PC817	AMERICAN BRIGHT	DIGIKEY	BPC-817(BBIN)-ND
29	1	U4	LS05-13B12R3	MORNSON	DIGIKEY	2725-LS05-13B12R3-ND
30	1	X1	16Mhz	ECS INC	DIGIKEY	X1103-ND

Arduino Programming

More info about Arduino programming and bootloader: https://docs.arduino.cc/built-in-examples/arduino-isp/ArduinoToBreadboard/



Boot-Loader Connections



Arduino Programming Connections

Notes

APP

Android App

DOWNLOAD

Android App launched in 2017 and has 100k+ downloads - rated with 4.5 stars.

SCAN QR CODE

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info@electronics-lab.com
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