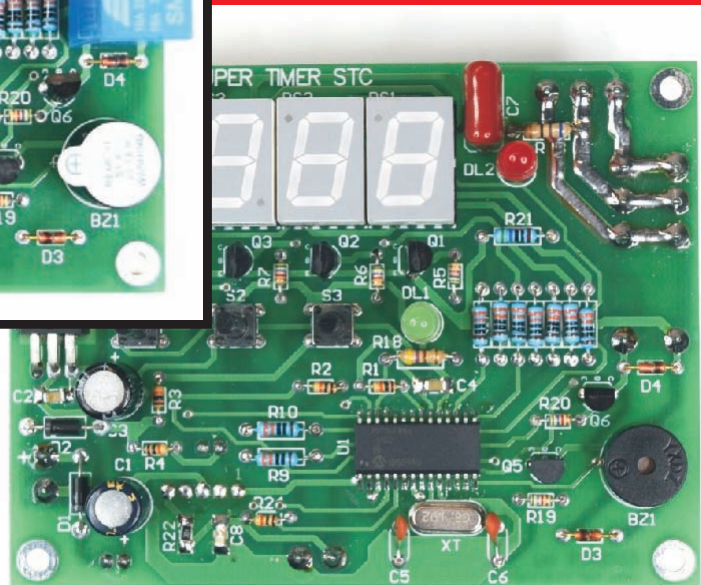
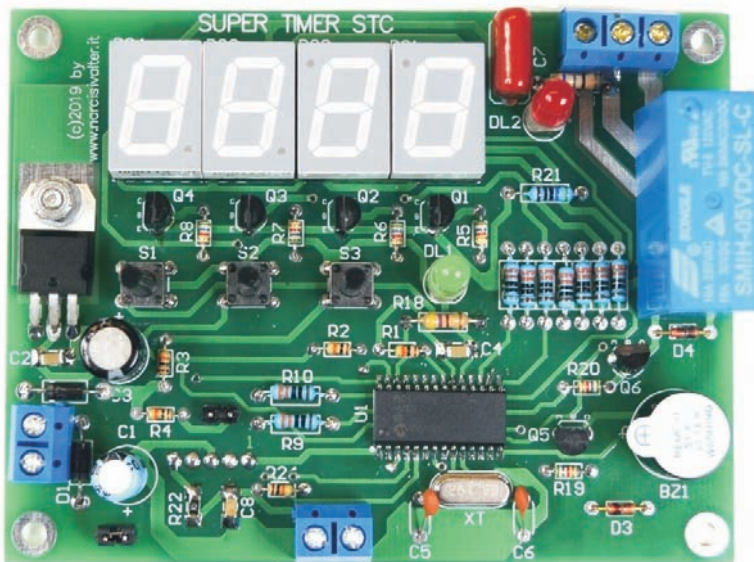




MANUALE DI SERVIZIO SERVICE MANUAL

STC - TIMER per BROMOGRAFO



STC

Programmable Timer for Exposure box

based on PIC16F886 SO-28

STC - TIMER per BROMOGRAFO

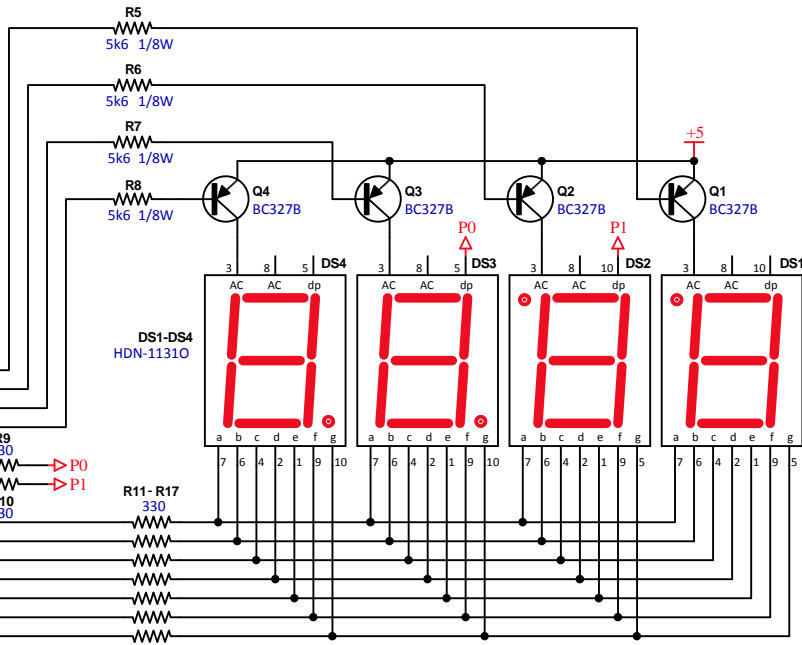
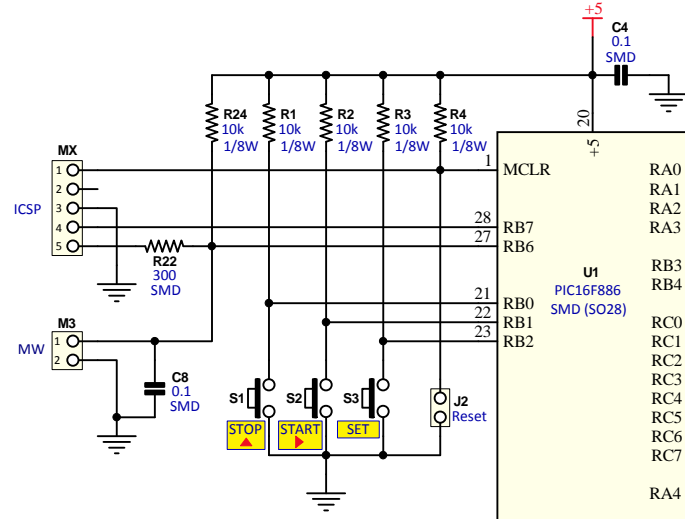
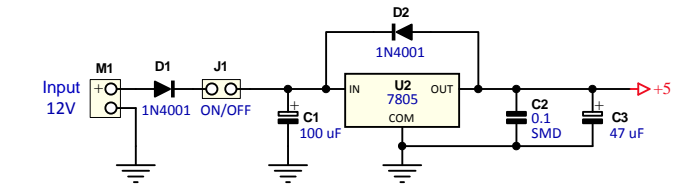
CARATTERISTICHE - FEATURES

CARATTERISTICHE

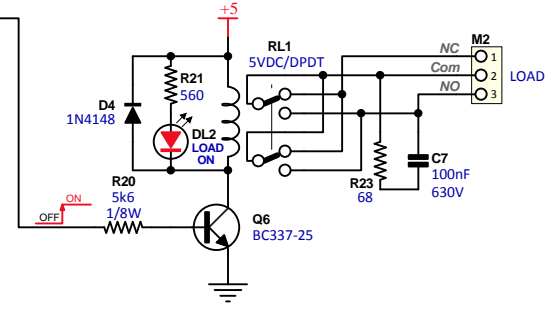
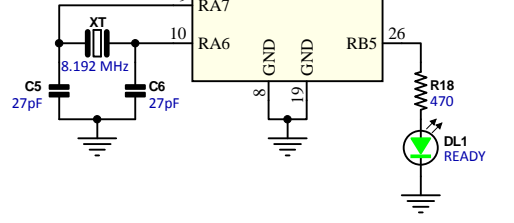
- Tensione di alimentazione: **12Vcc**
- Gestione a **Microcontrollore** (PICmicro 16F886 SO-28)
- Precisione al **Quarzo**
- Conteggio tipo '**Count-Down**' (conto alla rovescia)
- **Facile** da utilizzare
- 3 pulsanti di comando: **START STOP** e **SET**
- **Tempo Programmabile** da **1sec.** a **99min. 59sec.**
- **Memorizzazione** e richiamo automatico all'accensione dei valori programmati dall'utente
- **Buzzer on-board** per segnalazione di fine conteggio e scansione audio dei secondi
- **LED rosso** per visualizzazione stato relè (**LOAD ON**)
- **LED verde** per visualizzazione dello stato di PRONTO (**READY**)
- **Uscita relè:** AC250V 16A su morsettiera a vite (**NC-Com-NO**)
- Visualizzazione: **4 x Display** a 7-segmenti (0,59" - 13 mm.)
- **PCB professionale** serigrafato (doppia faccia)
- Può essere utilizzato come normale Timer multiuso, in camera oscura o per bromografi.
- Dimensioni scheda (mm): **100 x 76**

FEATURES

- Input Voltage: **12Vcc**
- Management with **Microcontroller** (PICmicro 16F886 SO-28)
- **Time** can be set from **1sec.** to **99min. 59sec.**
- Accuracy to **Quartz**
- **Count-Down** Timer
- **Easy** to use
- 3 control buttons: **START STOP** and **SET**
- Installed **16A/250V Relay** and 3 way screw Terminal Block (**NO, Com, NC**)
- **Buzzer on-board** for signalling counting end and for audio scanning of the seconds
- The time and setting are **stored** in the controller's Eeprom, retrieved during Timer's power on
- **Red LED** for showing the **LOAD ON**
- **Green LED** for showing the Timer **Ready**
- Displaying: **4 x Display** 7-segment (0.59" - 13 mm.)
- **Professional quality PCB** with silkscreen (double sided)
- Can be used like a multipurpose timer, **Exposure** light box, **Darkroom** photography, etc.
- Board dimensions: **100 x 76 mm.**



DS1 and DS2 must be mounted overturned (They have a new footprint)

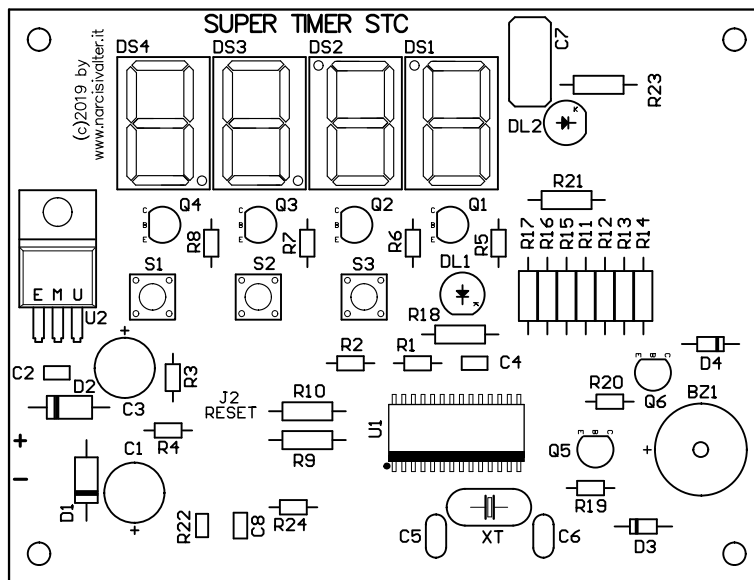


Author: Valter Narcisi - San Benedetto del Tronto (AP)

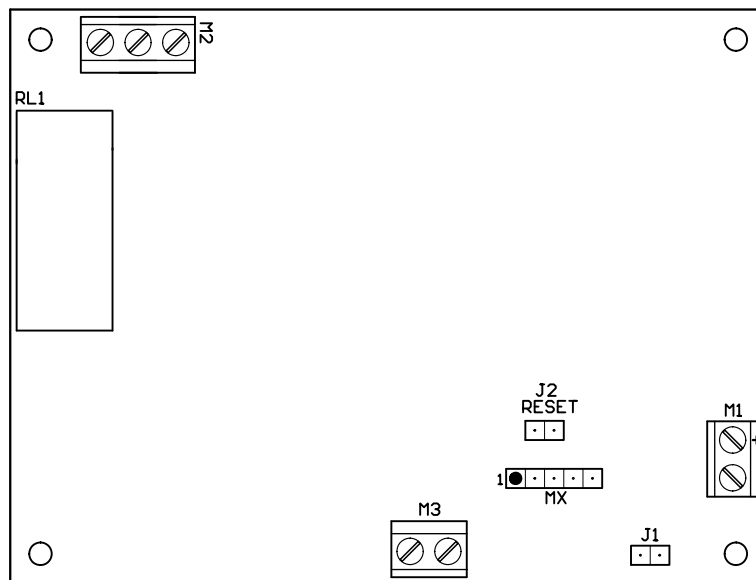
Project: Super Timer per Bromografo MM:SS Year: 2019

Size: A4	DWG no. 1	Rev.: 1	Scale: 1:1	Sheet: 1 of 1
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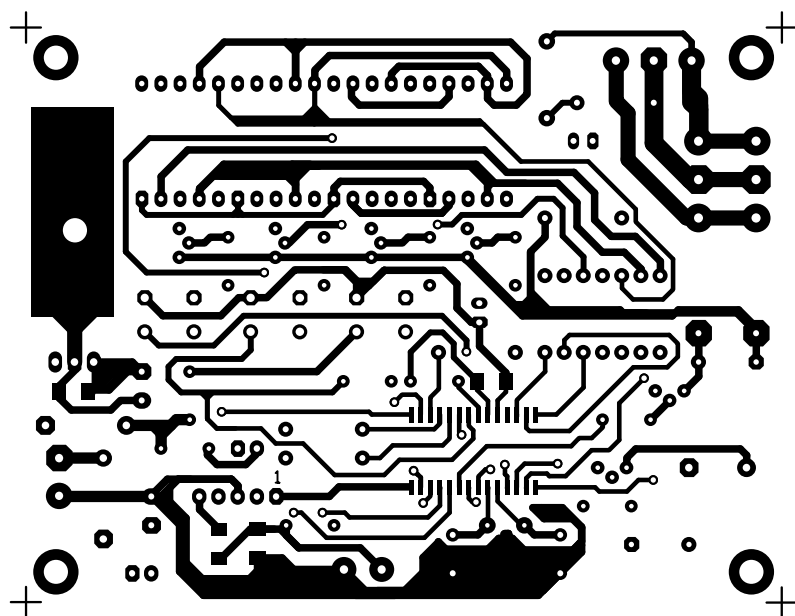
Note: <http://www.narcisivalter.it/progetti/super-timer.html> ©2019 All rights reserved



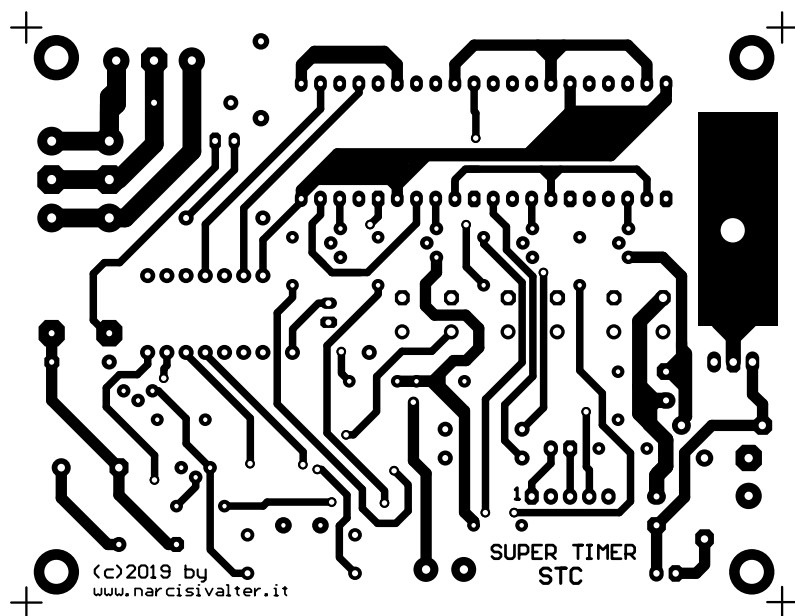
TOP Layout



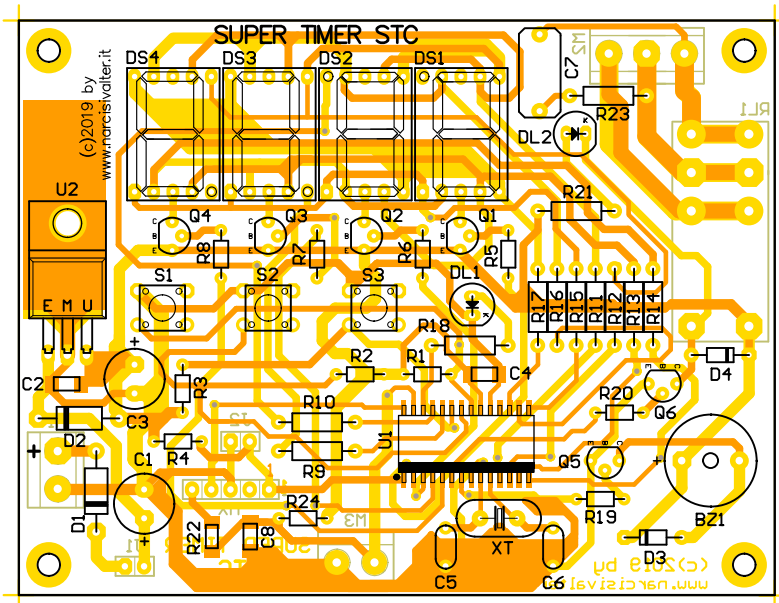
BOTTOM Layout



TOP Master (100x76 mm.)



BOTTOM Master (100x76 mm.)



< .TOP > Na TOP Layout 161016TDB

ELENCO COMPONENTI / COMPONENTS LIST

Designator	Component Value	Notes
R1 ... R4	10k - 1/8 Watt	
R5 ... R8	5k6 - 1/8 Watt	
R9 - R10	330	
R11 ... R17	330	
R18	470	
R19	5k6 - 1/8 Watt	
R20	5k6 - 1/8 Watt	
R21	560	
R22	300 - SMD 1206	
R23	68	
R24	10k - 1/8 Watt	
C1	100 uF	
C2	0.1 - SMD 1206	
C3	47 uF	
C4	0.1 - SMD 1206	
C5 - C6	27pF ceramic	
C7	100nF - 630V	
C8	0.1 - SMD 1206	
D1 - D2	1N4001	
D3	1N4148	
D4	1N4148	
DL1	LED 5mm GREEN	"READY"
DL2	LED 5mm RED	"LOAD ON"
DS1 ... DS4	Display HDN-11310	
U1	PIC16F886 - SMD SO28	
U2	7805	1A or 1.5A
Q1 ... Q4	BC327B	
Q5	BC237B	
Q6	BC337-25	
XT	8.192 MHz HC49S	
BZ1	Buzzer 5 V active	
RL1	Relè 5V - DPDT	
S1 - S2 - S3	Tactile switch 4 pin	"STOP" "START" "SET"
M1	2 way screw 5mm socket	"INPUT 12V"
M2	3 way screw 5mm socket	"OUTPUT"
M3	2 way 2.54mm Strip	"Microswitch"
J1	2 way 2.54mm Strip	"ON/OFF"
J2	2 way 2.54mm Strip	"Reset"
MX	5 way 2.54mm Strip	Only for "ICSP"
Y1	Socket DIP40	For Display

GESTIONE DISPLAY / DISPLAY MANAGEMENT

GESTIONE DEI SEGMENTI / SEGMENTS MANAGEMENT

Digit no.	PORTC (PIC16F886)							Decimal value
	C6	C5	C4	C3	C2	C1	C0	
	<i>g</i>	<i>f</i>	<i>e</i>	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>	
	1	0	0	0	0	0	0	64
	1	1	1	1	0	0	1	121
	0	1	0	0	1	0	0	36
	0	1	1	0	0	0	0	48
	0	0	1	1	0	0	1	25
	0	0	1	0	0	1	0	18
	0	0	0	0	0	1	0	2
	1	1	1	1	0	0	0	120
	0	0	0	0	0	0	0	0
	0	0	1	0	0	0	0	16
BLANK	1	1	1	1	1	1	1	127
	1	1	1	0	1	1	1	119

MSB LSB

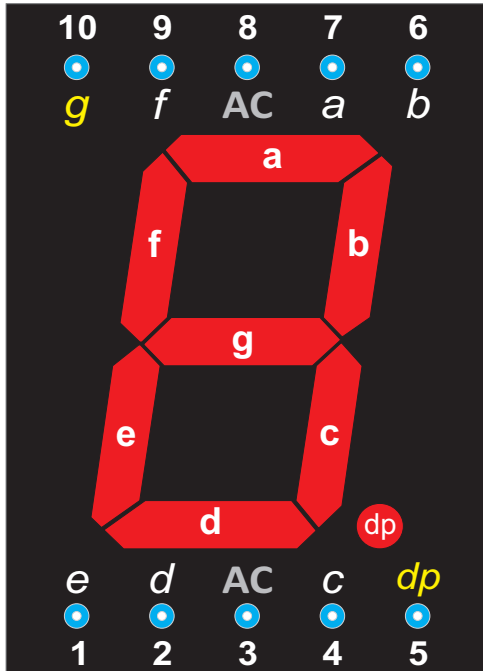
GESTIONE DEL MULTIPLEXER / MULTIPLEXER MANAGEMENT

Display Position		PORTA (16F886)				Decimal value
		A3	A2	A1	A0	
	S Seconds	1	1	1	0	14
	SS Seconds	1	1	0	1	13
	M Minutes	1	0	1	1	11
	MM Minutes	0	1	1	1	7

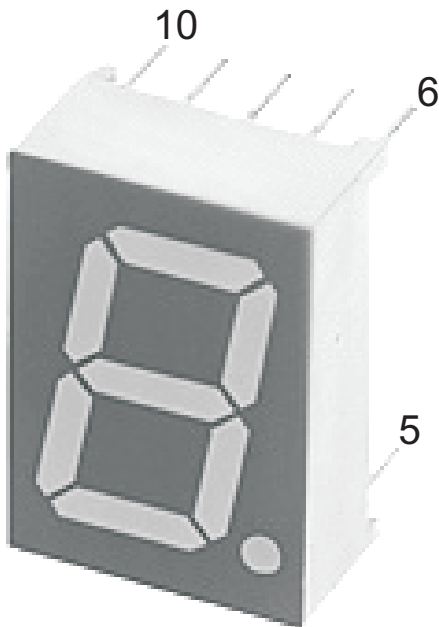
MSB LSB

DISPLAY CAPOVOLTI - OVERTURNED DISPLAY

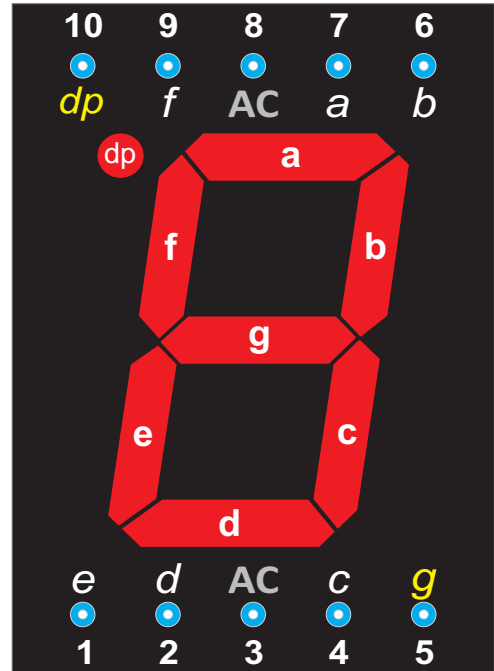
ORIGINAL FOOTPRINT FRONT



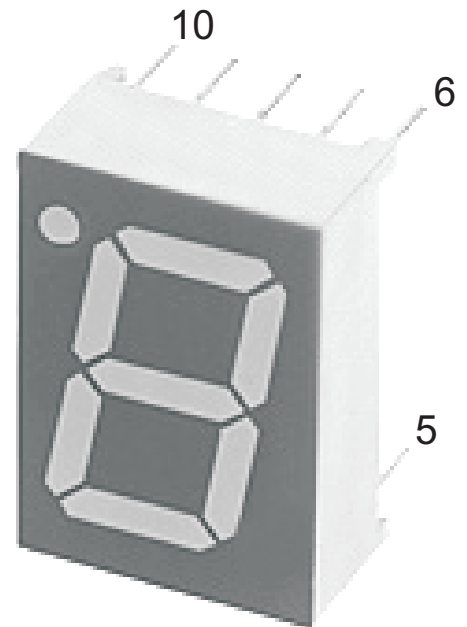
for DS3 and DS4



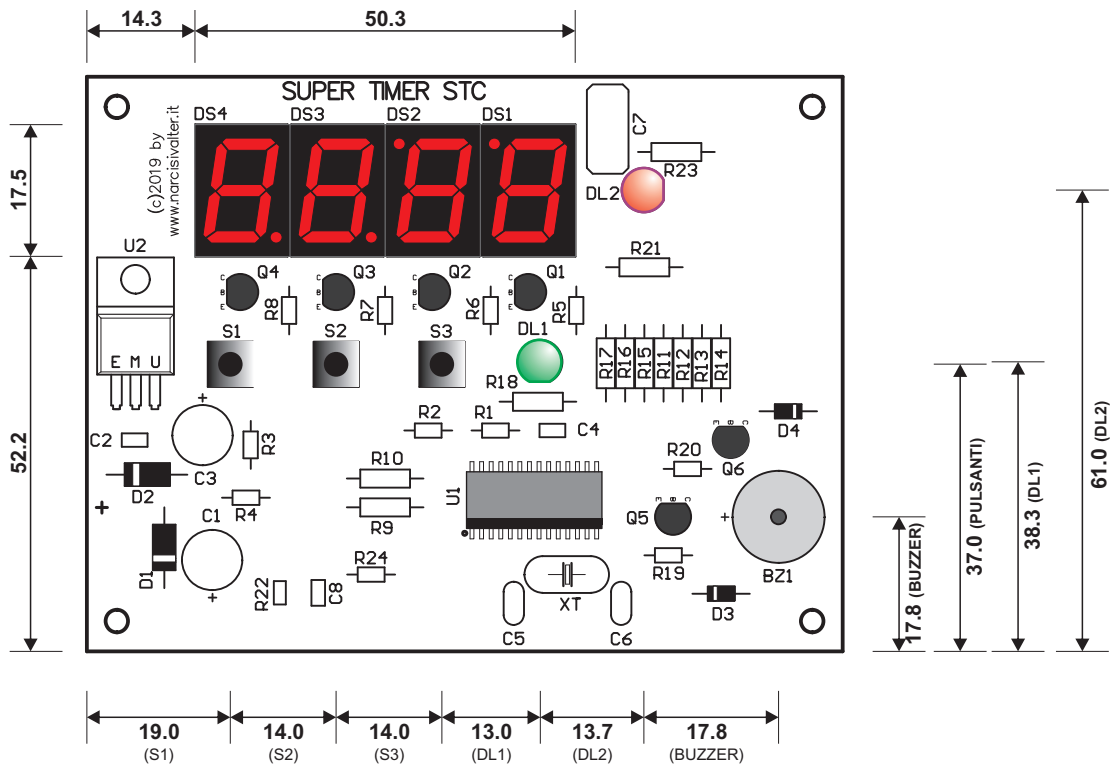
NEW FOOTPRINT FRONT



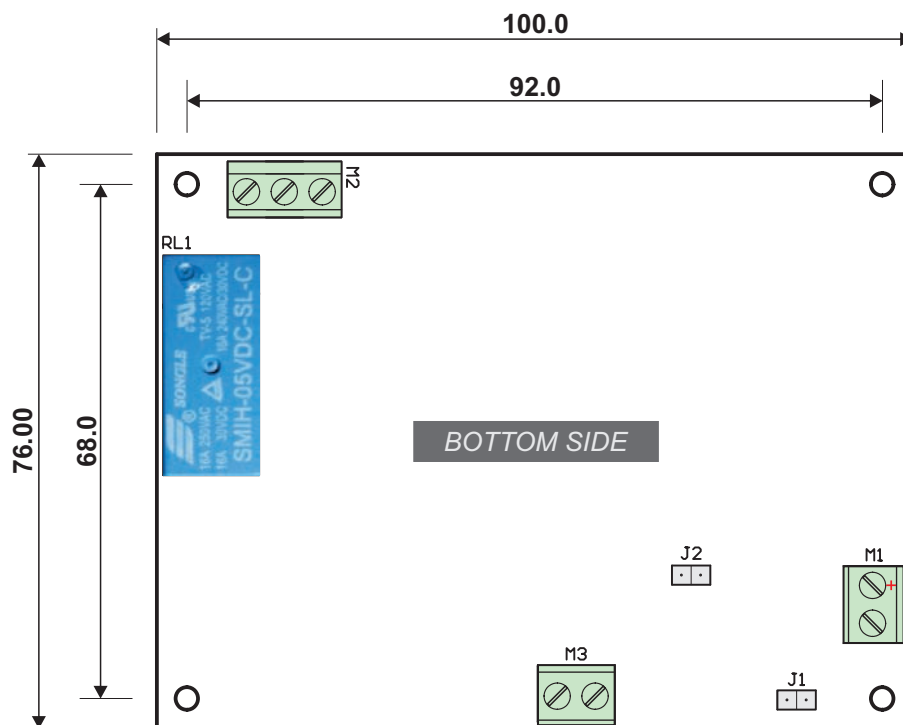
for DS1 and DS2



DIMENSIONI e FORI / DIMENSIONS and HOLES



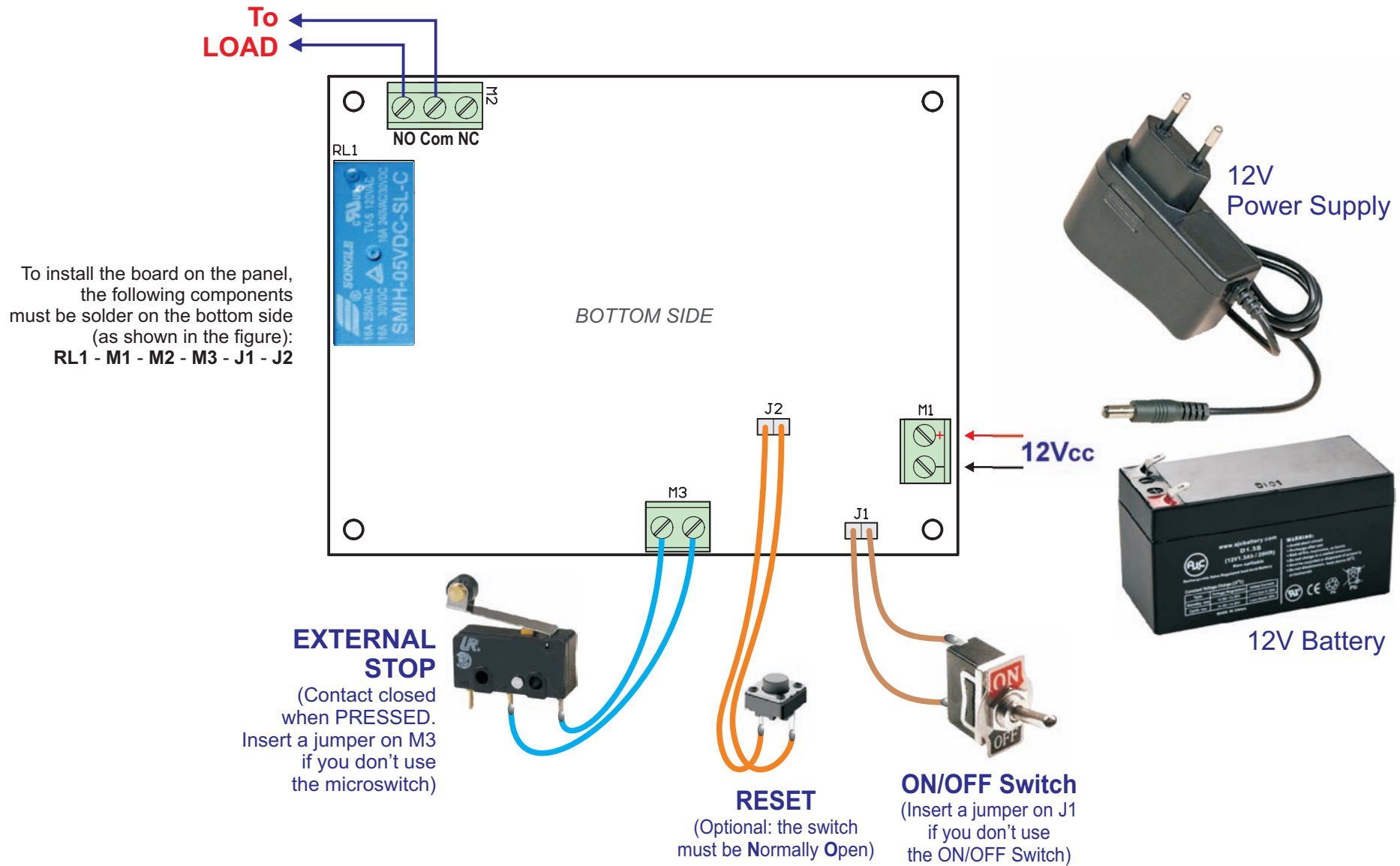
Holes for LEDs, Buttons and Display (mm.)



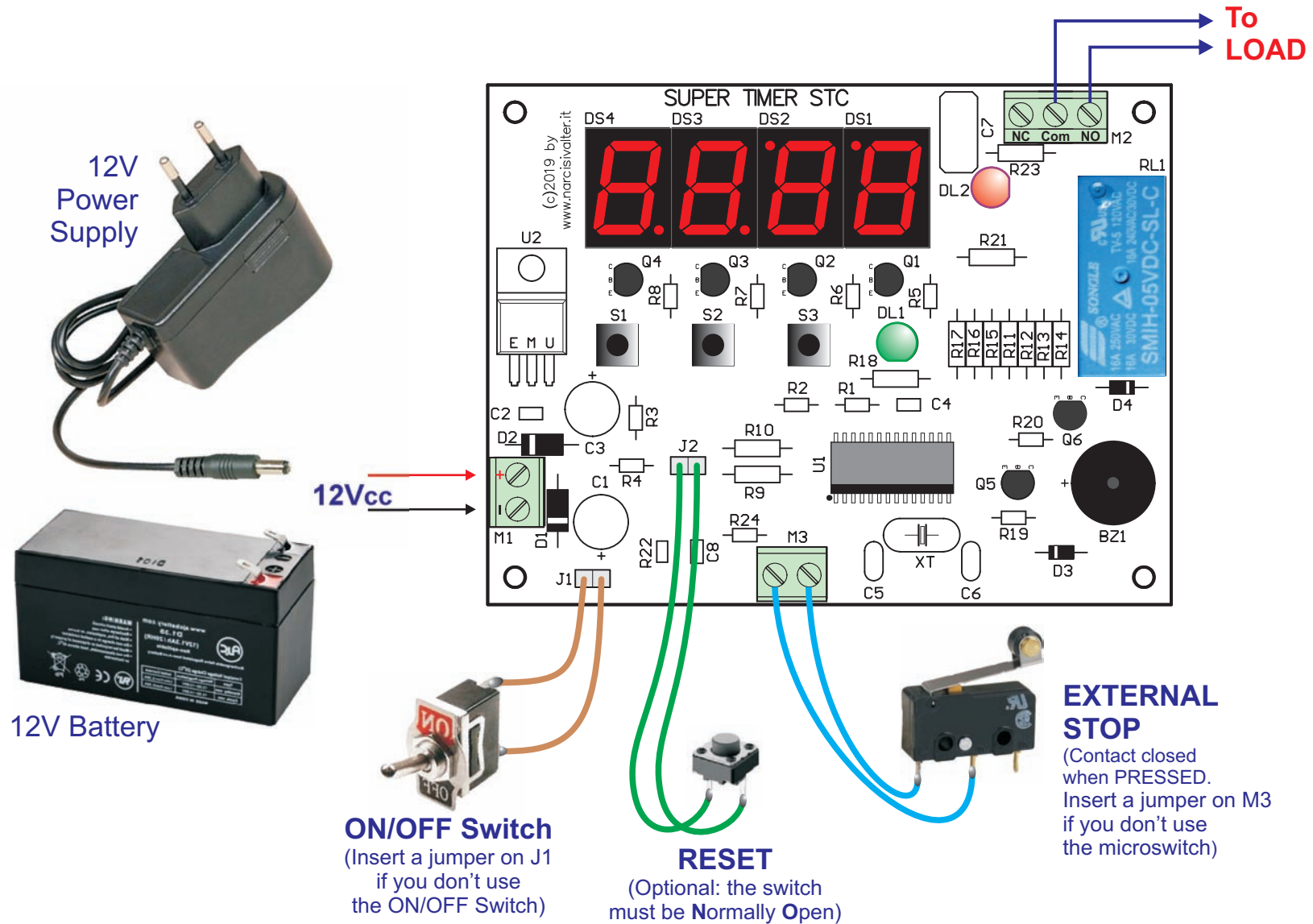
Board dimensions and holes (mm.)

Per il montaggio della scheda su pannello, saldare i seguenti componenti sul lato opposto (come visibile nella figura):
RL1 - M1 - M2 - M3 - J1 - J2

COLLEGAMENTI / WIRING

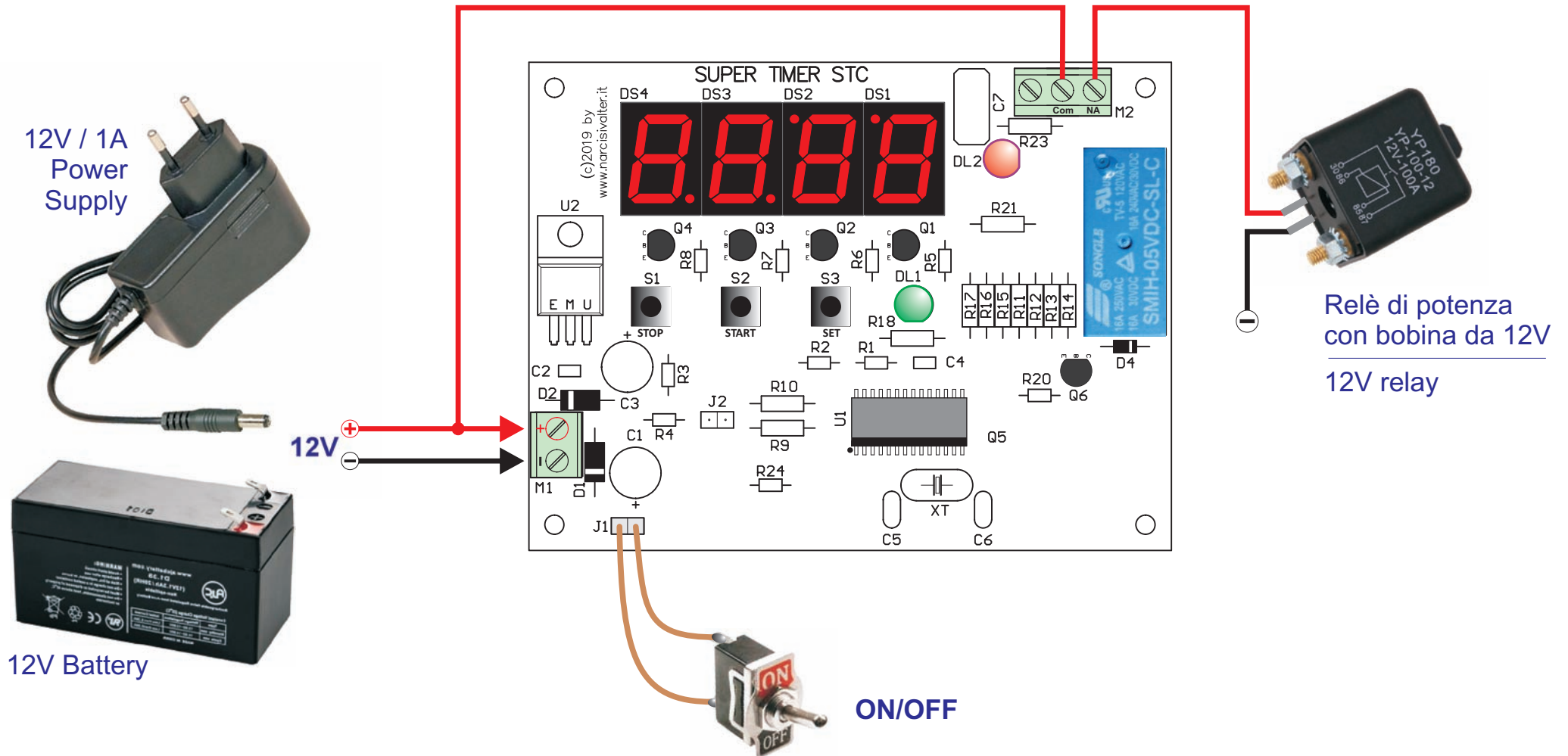


COLLEGAMENTI / WIRING



COLLEGAMENTI / WIRING

Esempio di collegamento di un relè esterno da 12V
Wiring's sample of an external Relay



COMANDI e SPIE / COMMANDS and LEDs

ALL COMPONENTS ARE IN THE TOP SIDE

SOME COMPONENTS ARE IN THE BOTTOM SIDE

