



Magneto Timer Kit

Item # SK101

ASSEMBLY INSTRUCTIONS

Congratulations on purchasing this **Magneto Timer Kit** by Avotek.

This kit was packaged, and the instructions were written, so that each bag number coincides with the step number of the assembly process. **We recommend you do not open any bag until you reach the coinciding step.** This will help to avoid any confusion or lost components. With the exception of the box itself, every other part in the kit is commercially available, so if you lose or damage a part, you can still successfully complete the project.

Many components are polarity sensitive and must be installed in the correct orientation to ensure proper operation and to avoid damaging the component. Polarity-sensitive components are underlined in these assembly steps.

Before beginning to assemble this kit, become familiar with the component reference pages for polarity information and the example of how to form the resistor leads for this printed circuit board (PCB).

FOR THE MOST RECENT ASSEMBLY/REFERENCE REVISION, SCAN THE QR CODE IN THE KIT.

This multipurpose Magneto Timer Kit can be used to

- 1** Time magnetos
- 2** Teach electrical fundamentals including
 - Electrical assembly
 - Electronic component identification and function
 - Soldering and micro-soldering
 - PCB assembly and testing

Component Reference – Page 1

Diodes (D)

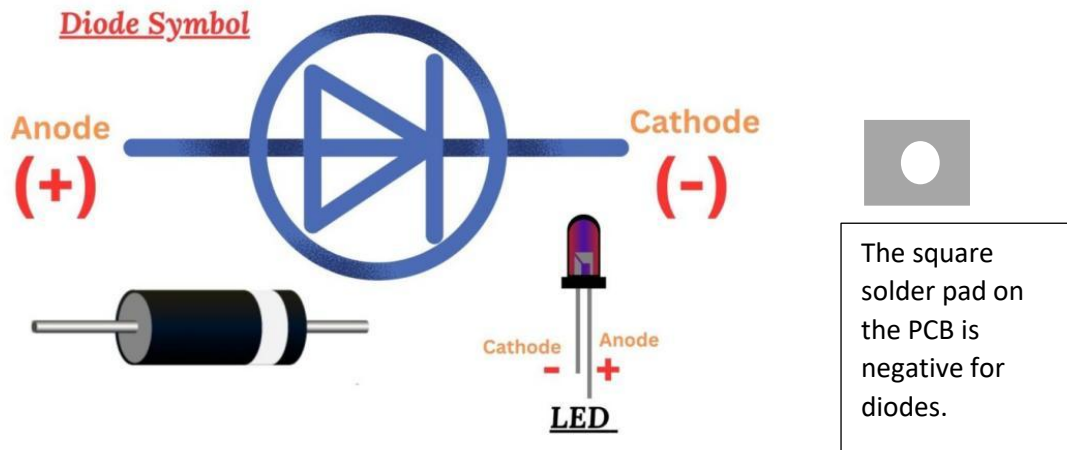


Figure 1.

Resistors (R)

If resistor color bands are difficult to identify, use a multimeter to ensure the correct resistor value.

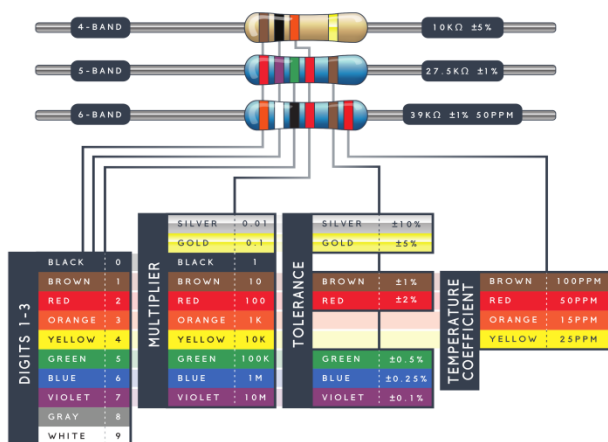


Figure 2.

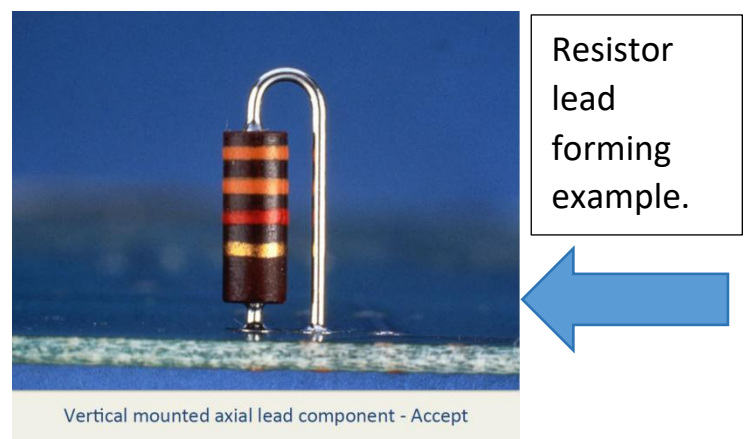


Figure 3.

Component Reference – Page 2

Capacitors (C)

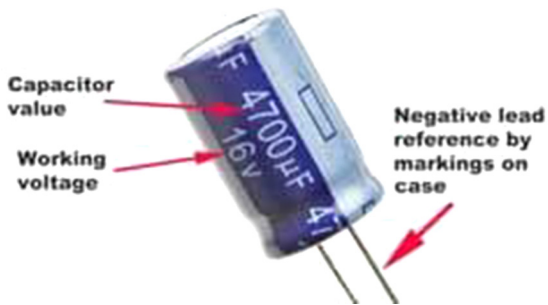


Figure 4.

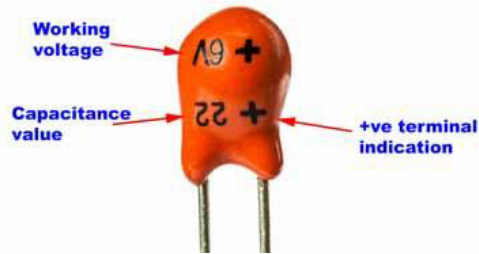


Figure 5.



The square solder pad on the PCB is positive for capacitors.

Integrated Circuits (IC)

The notched side identifies IC orientation, and the dot signifies pin 1.



Figure 6.

Magneto Timer Box Assembly

** Indicates components with polarity sensitivity.*

1. Install and solder R1, R4, R8, R10, IC1 Socket * Note the polarity of the socket.

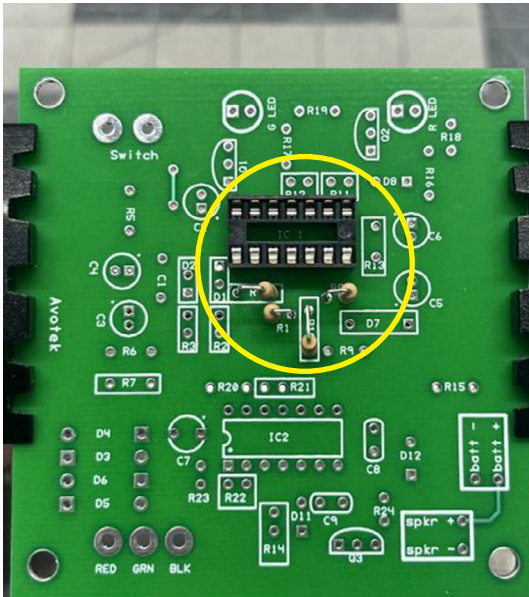


Figure 7.

2. Install and solder R9, R20, R21, IC2 Socket* Note polarity of the socket.

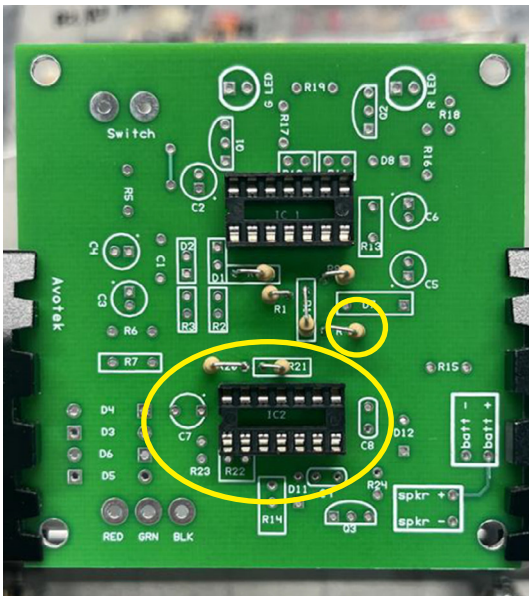


Figure 8.

Bag 1 (Step 1)

R1: Brown, black, yellow, gold
R4: Yellow, violet, orange, gold
R8: Brown, black, yellow, gold
R10: Brown, black, orange, gold
IC1: 14-pin socket*

PCB

NOTE: All resistor leads are to be formed as shown in the component reference page 1, figure 3

Bag 2 (Step 2)

R9: Blue, gray, red, gold
R20: Yellow, violet, red, gold
R21: Yellow, violet, orange, gold
IC2: 14-pin socket*

3. Install and solder R2, R3, D1*, D2*, D7*

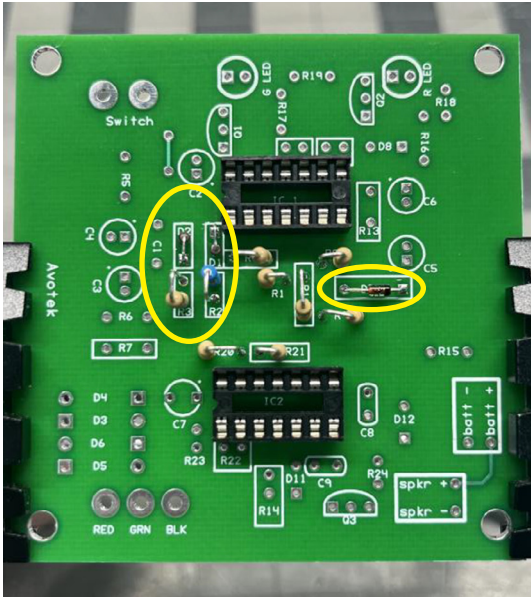


Figure 9.

4. Install and solder R22, R23, C7*, C8

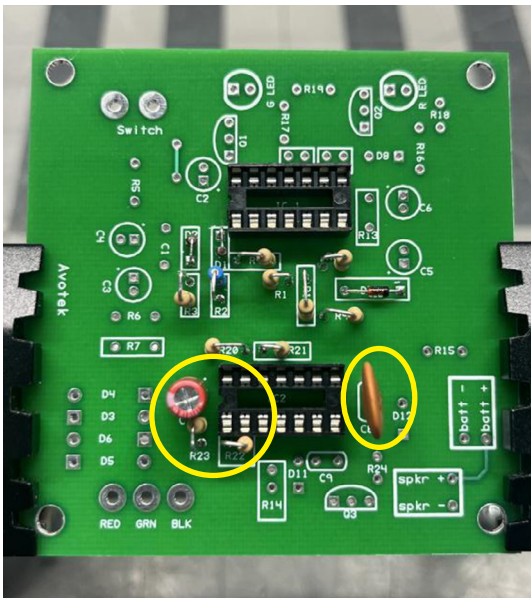


Figure 10.

Bag 3 (Step 3)

R2: (BLUE) Brown, black, green, gold

R3: Brown, black, yellow, gold

D1: IN4148*

D2: IN4148*

D7: IN4148*

Diode polarity as shown on
component reference page 1,
figure 1

Bag 4 (Step 4)

R22: Red, red, orange, gold

R23: Yellow, violet, red, gold

C7: 1 μ f 50 volt*

C8: 0.01 μ f

Capacitor polarity as shown on
component reference page 2,
figures 4 and 5

5. Install and solder D3*, D4*, D5*, D6*

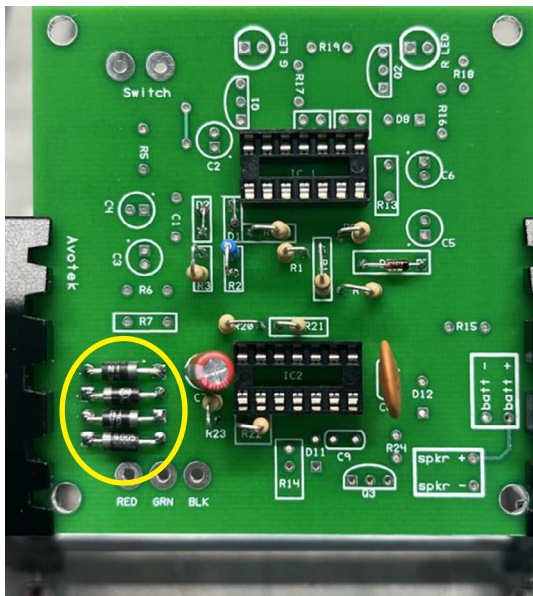


Figure 11.

6. Install and solder R22, R23, C7*, C8

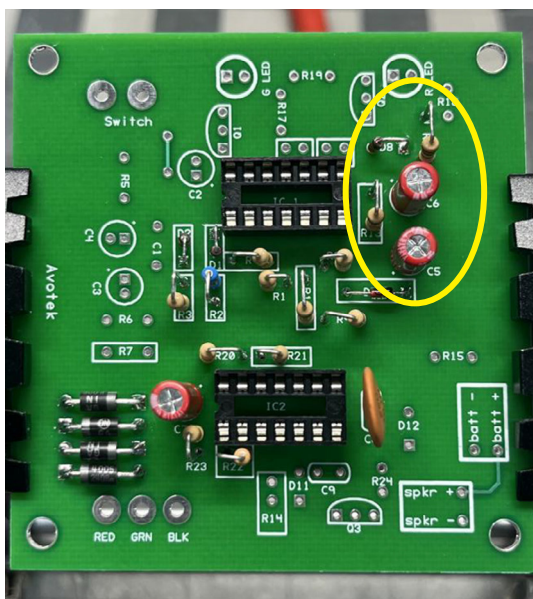


Figure 12.

Bag 5 (Step 5)

D3: IN4005*

D4: IN4005*

D5: IN4005*

D6: IN4005*

Diode polarity as shown on
component reference page 1,
figure 1

Bag 6 (Step 6)

R13: Brown, black, orange, gold

R16: Brown, black, red, gold

C5: 1 μ f 50 volt*

C6: 1 μ f 50 volt*

D8: IN4148*

7. Install and solder R5, R11, R12, C2*

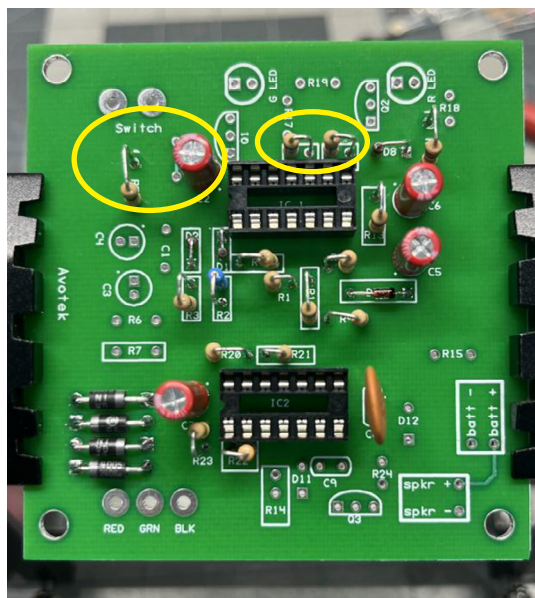


Figure 13.

8. Install and solder R17, R19, Q1* (Q = transistor), Green LED*

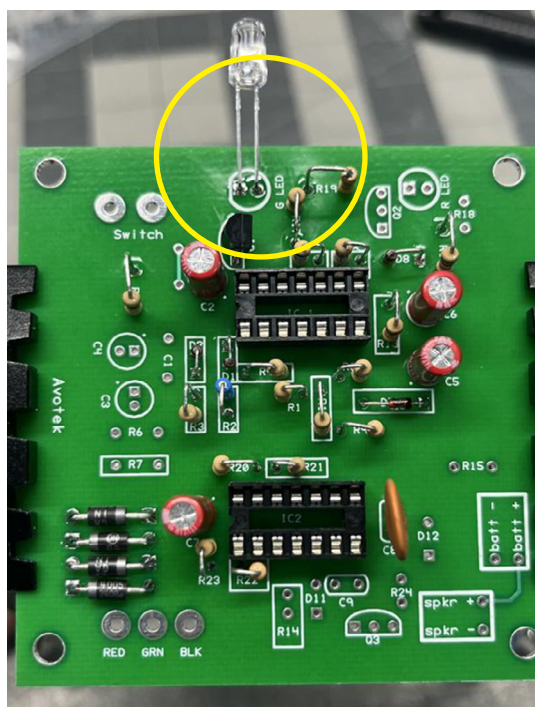


Figure 14.

Bag 7 (Step 7)

R5: Brown, black, yellow, gold

R11: Brown, black, yellow, gold

R12: Blue, gray, red, gold

C2: 1 μ f 50 volt*

Bag 8 (Step 8)

R17: Brown, black, red, gold

R19: Red, violet, brown, gold

Q1: 2n2222*

Green LED*

NOTE: Do not trim the LED leads. Instead, bend them enough to pass through the solder hole. This ensures there is enough length left to allow the LEDs to reach the light holes at the front of the enclosure.

9. Install and solder R18, Q2*, Red LED*

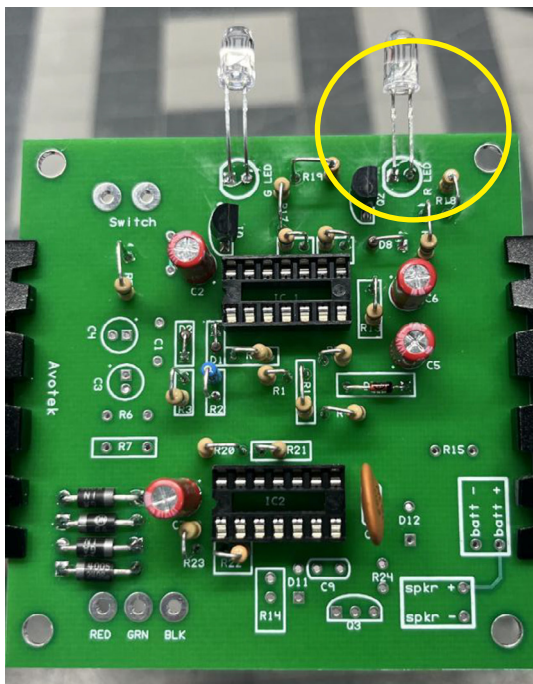


Figure 15.

10. Install and solder C1, C3*, C4*, R6, R7

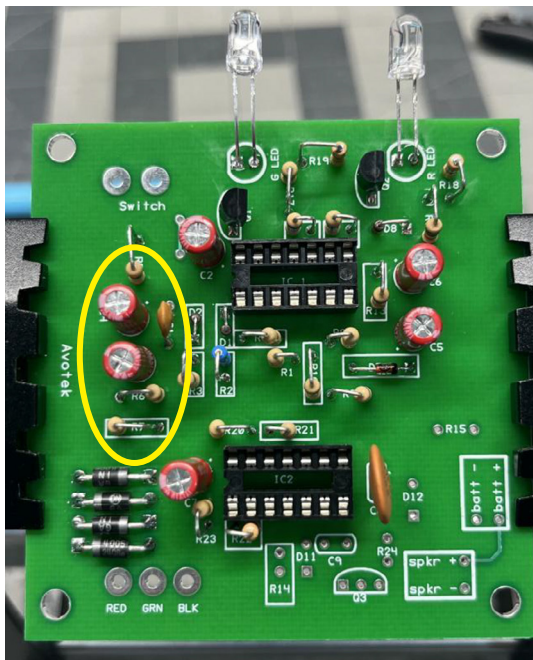


Figure 16.

Bag 9 (Step 9)

R18: Red, violet, brown, gold

Q2: 2N2222*

Red LED*

NOTE: Do not trim the LED leads. Instead, bend them enough to pass through the solder hole. This ensures there is enough length left to allow the LEDs to reach the light holes at the front of the enclosure.

Bag 10 (Step 10)

R6: Brown, black, red, gold

R7: Brown, black, red, gold

C1: 470 pf

C3: 1 μ f 50 volt*

C4: 1 μ f 50 volt*

11. Install and solder R14, D11*, C9, Q3*

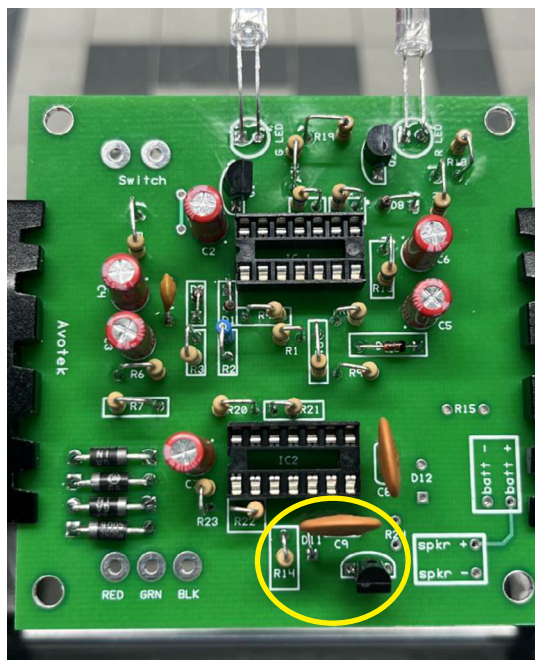


Figure 17.

12. Install and solder R15, R24, D12*

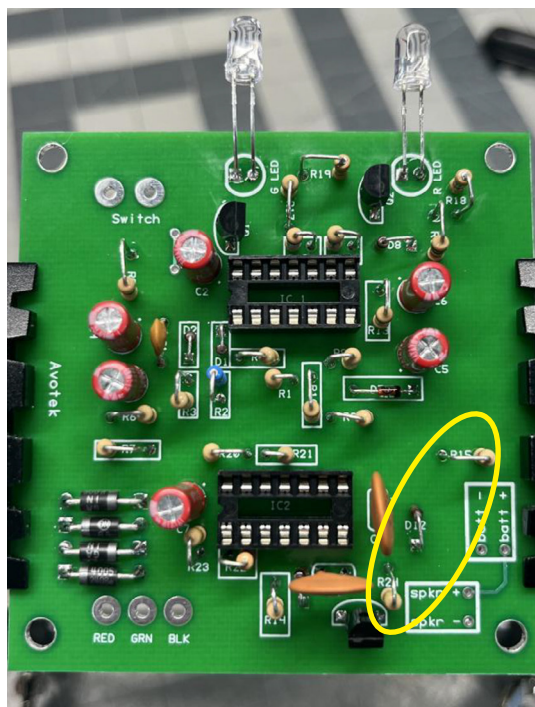


Figure 18.

Bag 11 (Step 11)

R14: Red, red, red, gold

D11: IN4148*

C9: 0.01 μ f

Q3: 2N2222*

Bag 12 (Step 12)

R15: Red, red, red, gold

R24: Yellow, violet, red, gold

D12: IN4148*

13. Install and solder speaker wires*, battery wires*, speaker capacitor*, test leads, and switch. Install IC1*, IC2*.

NOTE: IC leads should be gently bent inwards on a flat surface to align with the socket.

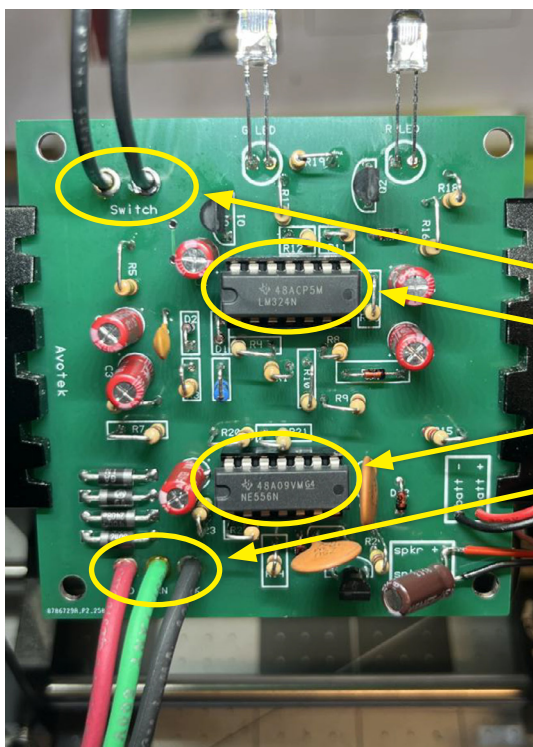


Figure 19.

Bag 13 (Step 13)

Speaker, battery adapter, speaker capacitor* (1 μ f 100v), test leads, switch

- Switch
- LM324 chip
- 556 Timer chip
- Test wire leads (Match wire color to PCB)

For IC orientation, refer to figure 6 on page 2.

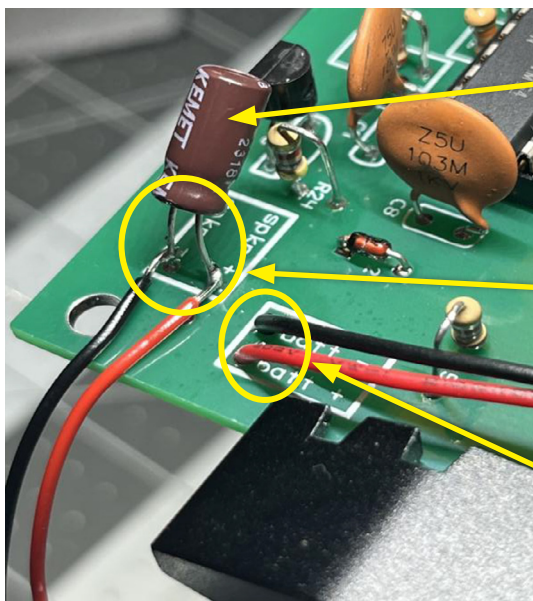


Figure 20.

Speaker capacitor* (1 μ f 100 volt)
Solder speaker capacitor on the topside of the PCB. Leave the capacitor leads about 1/2" long to allow the speaker wires to be wrapped and soldered to them.

After removing the adapter plug from the speaker wire ends, place the speaker under the PCB, wrap the stripped speaker wires around the speaker capacitor leads, then solder.

Attach the battery wires to the PCB.

14. This consists of several sub-steps:

- a. Using a hammer or rivet squeezing tool, rivet the battery clip to the case.
- b. Install LED sleeves and grommet onto the case.
- c. Route the test leads through the grommet.
- d. Install the PCB and add a zip tie to the test leads inside the case to act as a strain relief.

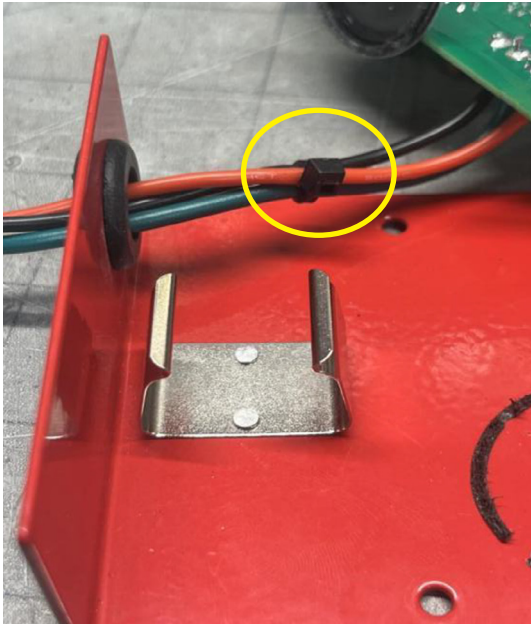


Figure 21.

Bag 14 (Step 14)

Mounting hardware
Plastic spacers
Threaded stand-offs
Grommet, alligator clips
Alligator clip covers (red, green, black)
Battery hold-down clip
Rivets
LED sleeves
Zip tie

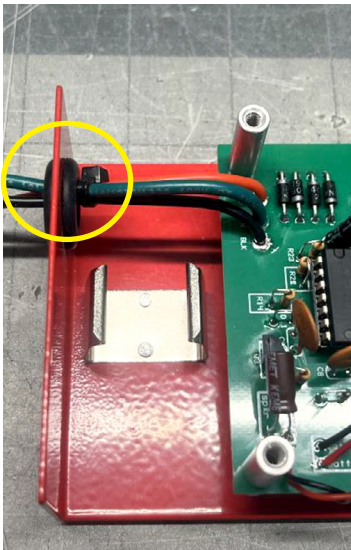


Figure 22.

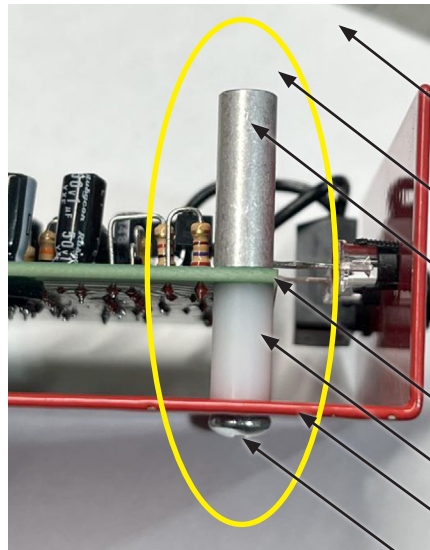


Figure 23.

Hardware installation from top to bottom:

- 6-32 x 3/8" screw (not pictured)
- Cover (not pictured)
- 6-32 x 3/4" threaded standoff
- Circuit board
- 1/2" nylon spacer
- Bottom cover
- 6-32 x 1" screw

15. **Install the colored alligator clip covers first**, then solder the test leads to the alligator clips (Bag 14).

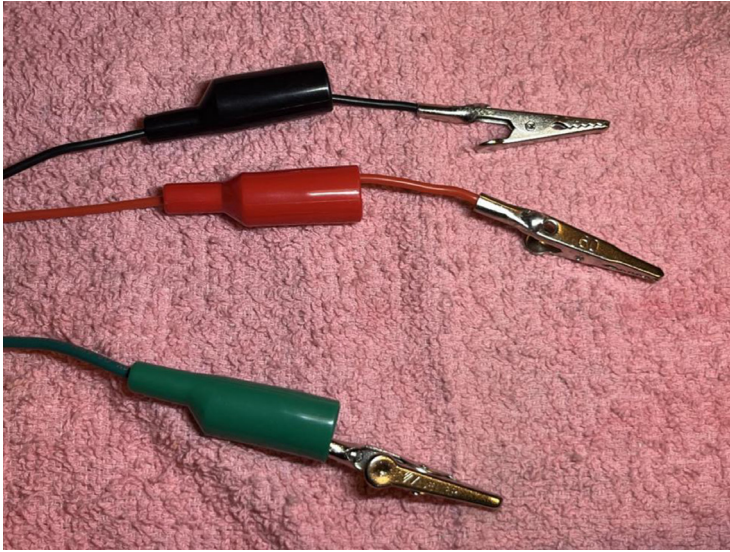


Figure 24.

16. Install the cover and test the unit. For the testing procedure, see the **Testing the Magneto Timer** section on page 17.



Figure 25.

Magneto Timer Kit Components

Bag 1

R1 = 100 k color: brown, black, yellow, gold
R4 = 47 k color: yellow, violet, orange, gold
R8 = 100 k color: brown, black, yellow, gold
R10 = 10 k color: brown, black, orange, gold
14-pin female socket
PCB

Bag 2

R9 = 6.8 k color: blue, gray, red, gold
R20 = 4.7 k color: yellow, violet, red, gold
R21=47 k color: yellow, violet, orange, gold
14-pin female socket

Bag 3

R2 = 1 megohm color: brown, black, green, gold
R3 = 100 k color: brown, black, yellow, gold
D1 = IN4148
D2 = IN4148
D7 = IN4148

Bag 4

R22 = 22 k color: red, red, orange, gold
R23 = 4.7 k color: yellow, violet, red, gold
C7 = 1 μ f 50 volt
C8 = 0.01 μ f

Bag 5

D3 = IN4005
D4 = IN4005
D5 = IN4005
D6 = IN4005

Bag 6

R13 = 10 k color: brown, black, orange, gold
R16 = 1k color: brown, black, red, gold
C5 = 1 μ f 50 volt
C6 = 1 μ f 50 volt
D8 = IN4148

Bag 7

R5 = 100 k color: brown, black, yellow, gold
R11 = 100 k color: brown, black, yellow, gold
R12 = 6.8 k color: blue, gray, red, gold
C2 = 1 μ f 50 volt

Bag 8

R17 = 1 k color: brown, black, red, gold

R19 = 270 color: red, violet, brown, gold

Q1 = 2N2222

Green LED

Bag 9

R18 = 270 color: red, violet, brown, gold

Q2 = 2N2222

Red LED

Bag 10

R6 = 1 k color: brown, black, red, gold

R7 = 1 k color: brown, black, red, gold

C1 = 470 pf

C3 = 1 μ f 50 volt

C4 = 1 μ f 50 volt

Bag 11

R14 = 2.2 k color: red, red, red, gold

C9 = 0.01 μ f

D11 = IN4148

Q3 = 2N2222

Bag 12

R15 = 2.2 k color: red, red, red, gold

R24 = 4.7 k color: yellow, violet, red, gold

D12 = IN4148

Bag 13

Speaker

Battery adapter

Speaker capacitor 1 μ f 100 volt

Test leads

Switch

IC1 = LM324

IC2 = LM556

Bag 14

Mounting hardware

Plastic spacer

Threaded stand-off

Grommet

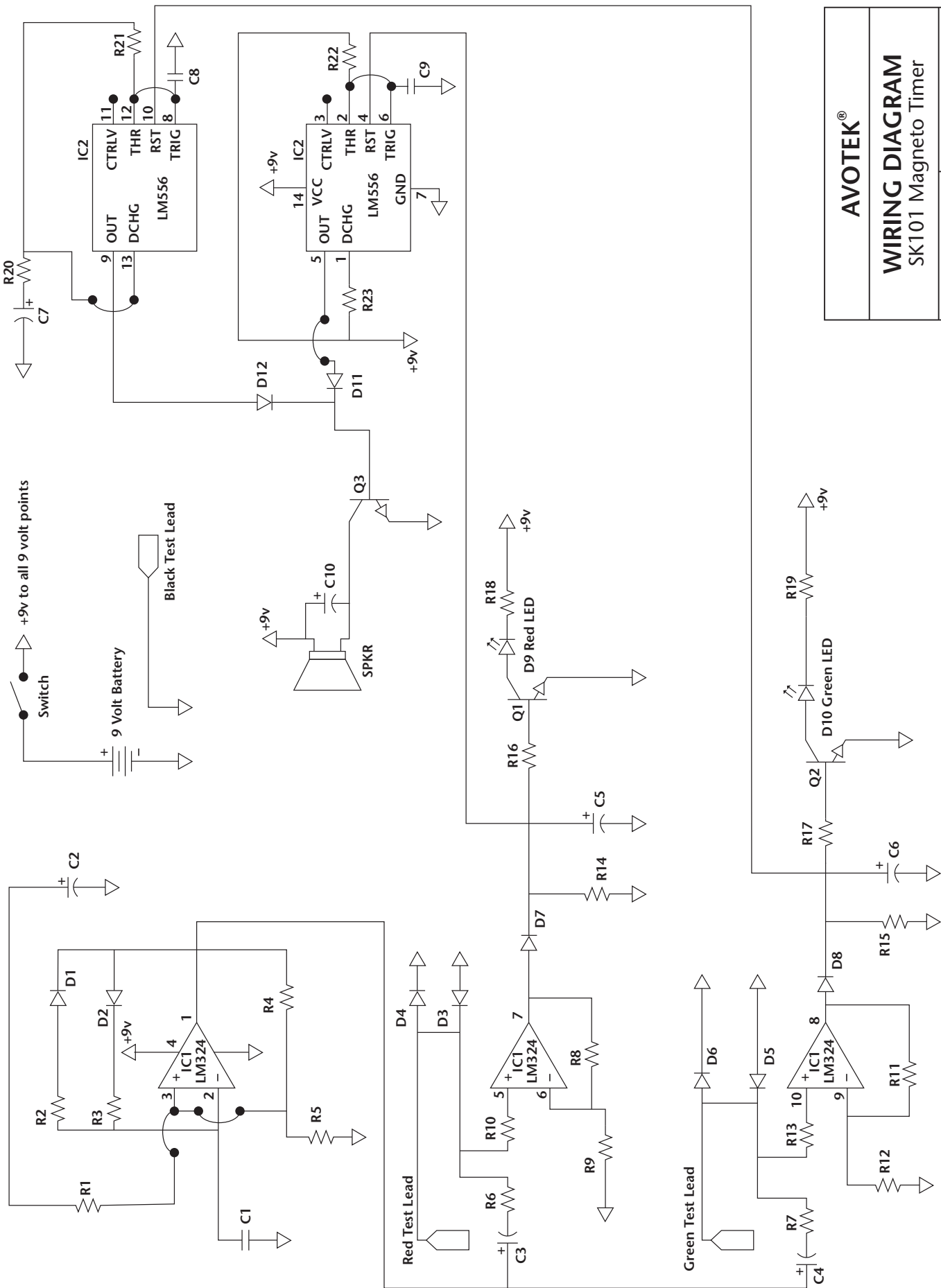
Alligator clips and covers

Battery hold-down clip

Rivets

LED sleeves

Zip tie



AVOTEK®

WIRING DIAGRAM

SK101 Magneto Timer

Revision 1.0

DATE
12/31/2024

Testing the Magneto Timer

To test the timer, turn the unit on and touch the red test lead to the black test lead. You should hear a pitch change and the red indicator light should turn off. Repeat this procedure with the green test lead. You should hear a pitch change and the green indicator light should turn off. Contacting the three test leads together should result in no noise and both lights being off.

The timer is now ready to test magneto timing. For the proper timing procedures, always consult the aircraft maintenance manual.

Reference

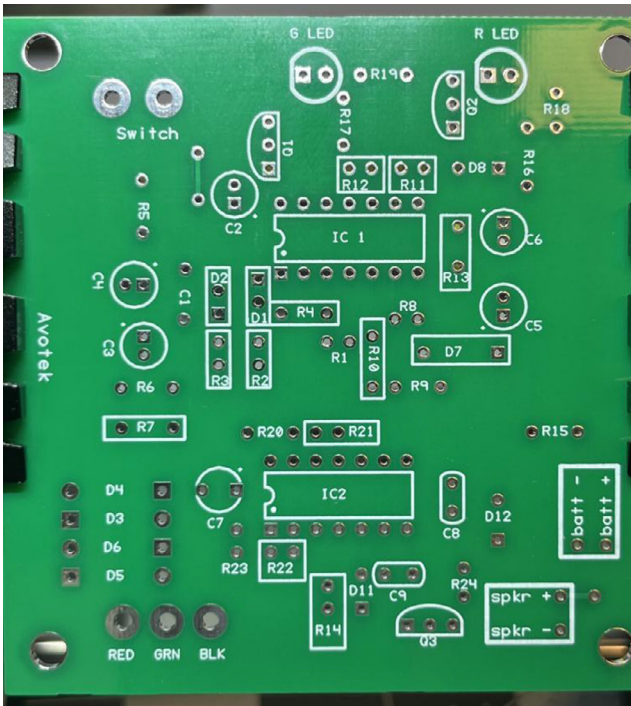


Figure 26. The PCB before assembly.

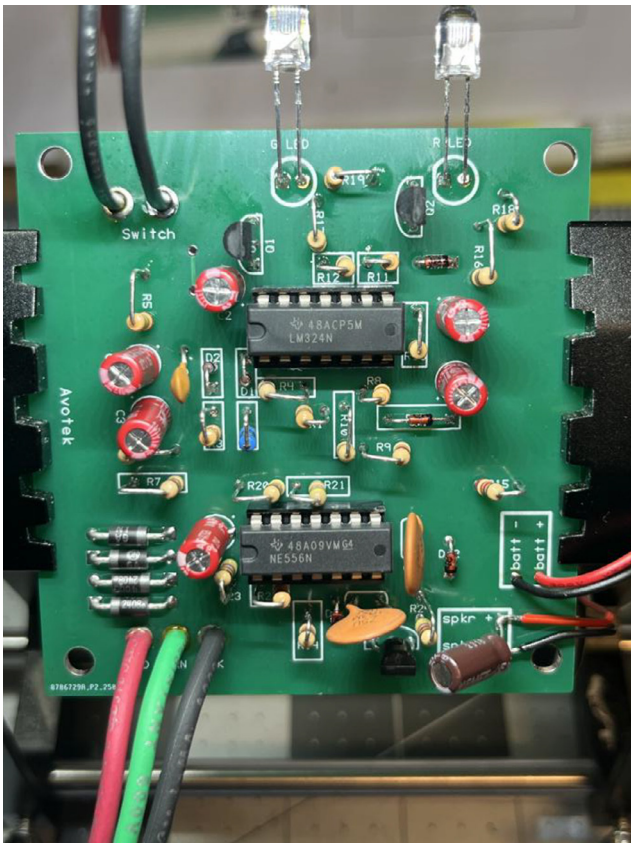


Figure 27. The PCB after assembly and the magneto timer is fully functional.



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