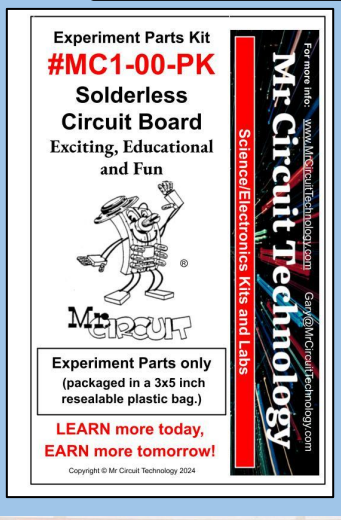
For more info: www.MrCircuitTechnology.com Gary@MrCircuitTechnology.com

Mr Circuit Technology

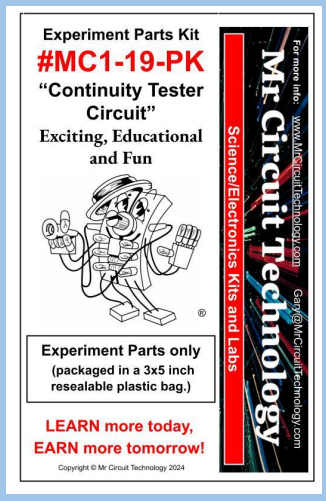
Science/Electronics Experiment Kits and Labs

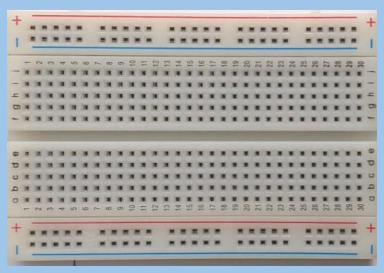
Exp. 19 - "CONTINUITY TESTER CIRCUIT"

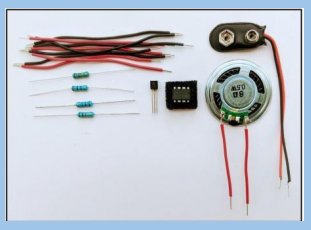


LESSON PLAN

Table of Contents







PREPARATION: You can put the Page 12 poster up on your classroom wall to announce the fact that you are going to do the Science-Electronics Experiment.

Step 1 - Make a copy of pages 1 through 8 for each student. The students can read and do these pages on their own or you can guide them.

Step 2 - Hand out Parts Kit #MC1-00-PK (that has the Solderless Circuit Board) and Parts Kit #MC1-19-PK (that has the experiment parts) with a 9-Volt battery. Give these items to each student along with the 8 pages.

Step 3 - When your students have completed the experiment, collect all the Parts Kits and batteries for later use.

Step 4 - Collect all the Written Quizzes for grading and use the Answer Key to grade them.

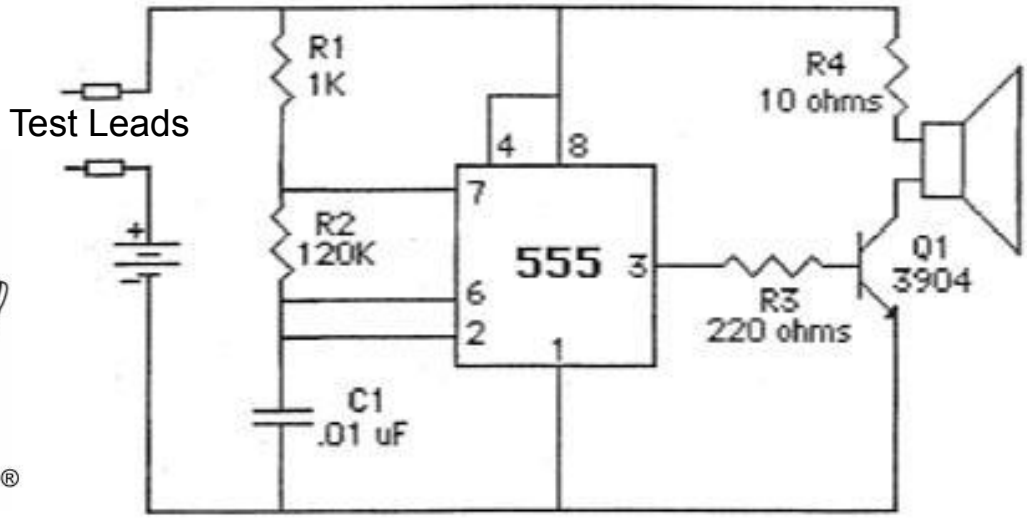
For Tech Support or any questions, you can email us or call 805-295-1642

CONTINUITY TESTER CIRCUIT

MC1-19-R-1

EXPLANATION OF EXPERIMENT part 1 of 2

*** You are going to build a CONTINUITY TESTER circuit. Here is the SCHEMATIC DIAGRAM of the circuit you will build.



This interesting circuit was invented by engineers who needed a circuit that a technician could use to **check for electrical continuity.**

With his continuity tester you can check incandescent light bulbs, fuses, and circuits for continuity.

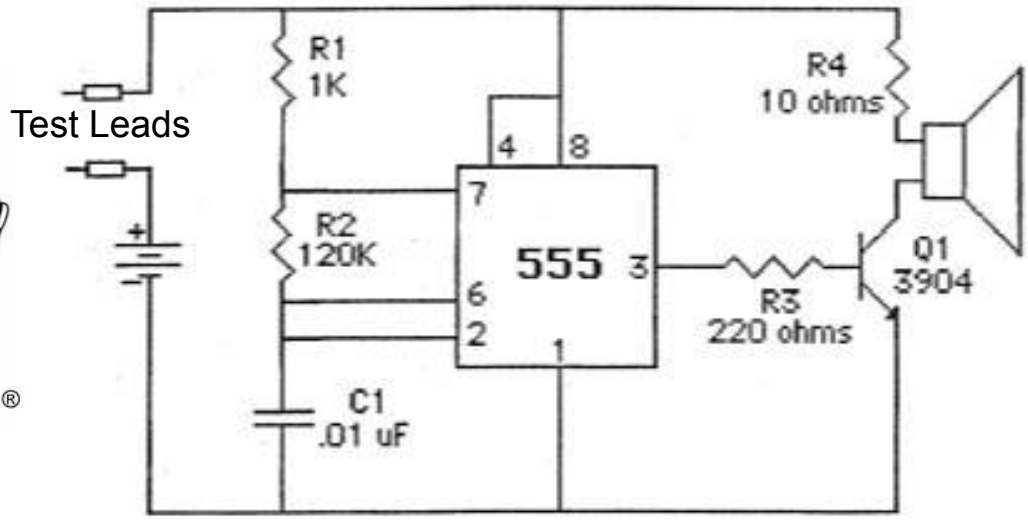
(**Note:** You cannot use this circuit to test LEDs. LEDs do not have a filament which is a thin wire that emits light in an incandescent light bulb. With time, this thin wire breaks in a light bulb so this checker **will work** on incandescent light bulbs.)

Touch the **Test Leads** to either end of a fuse and if you hear a tone, the fuse is good.

(Continue to Page 2)

EXPLANATION OF EXPERIMENT part 2 of 2

Let's talk about how the circuit works. Here is the schematic of the **CONTINUITY TESTER** circuit that you will build.



The 555 IC in this circuit is working as a **CLOCK** which means the 555 is putting out clock pulses.

The pulses coming from Pin 3 on the 555 are sent to the speaker through a transistor. The transistor amplifies the sound and makes it louder.

When the Test Leads sense continuity, the circuit is completed and there is a tone emitted from the speaker.

This is a great addition to any technicians tool box for troubleshooting electronics.

(Continue to Page 3)

CONTINUITY TESTER CIRCUIT

MC1-19-R-3

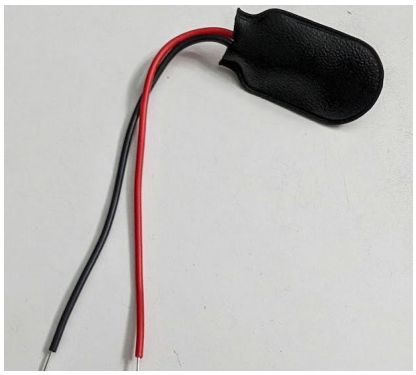
PURPOSE OF THIS EXPERIMENT

*** To build a CONTINUITY TESTER circuit using a 555 Integrated circuit.

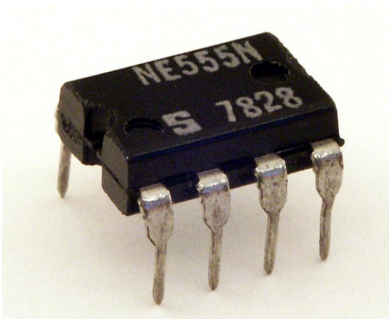
PARTS NEEDED FOR EXPERIMENT

In this experiment, you will use the following:

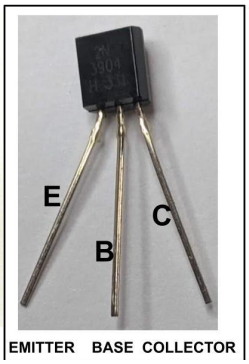
9-Volt Snap



555 IC



NPN

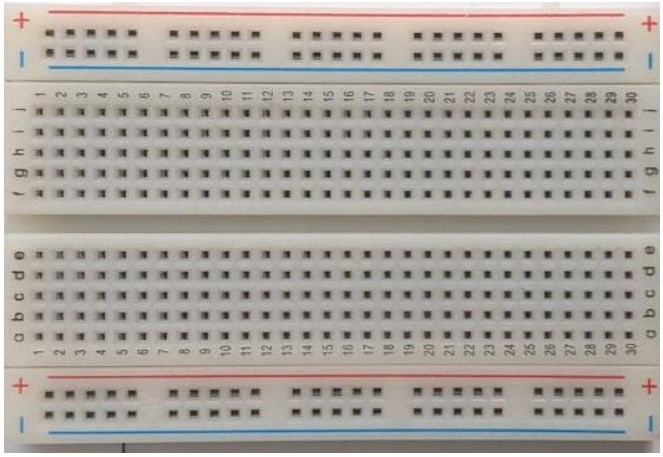


Speaker

4 fixed Resistors

8 Jumper Wires

Solderless Circuit Board



9-V Battery

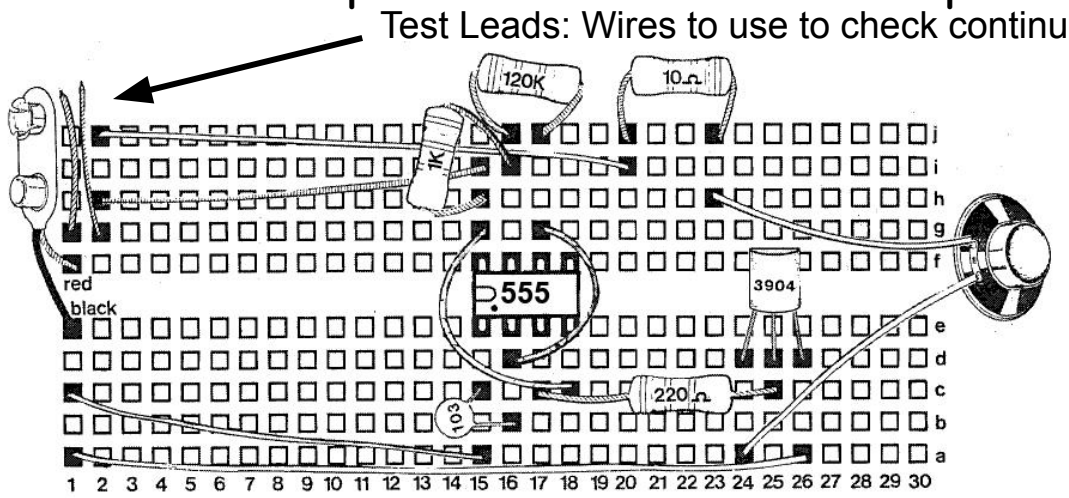
Disc Capacitor

(Continue to Page 4)

DO THE EXPERIMENT (part 1 of 2)

Now you are going to build the circuit on a Solderless CB.

Step 1 - Take out all the parts needed for this experiment.

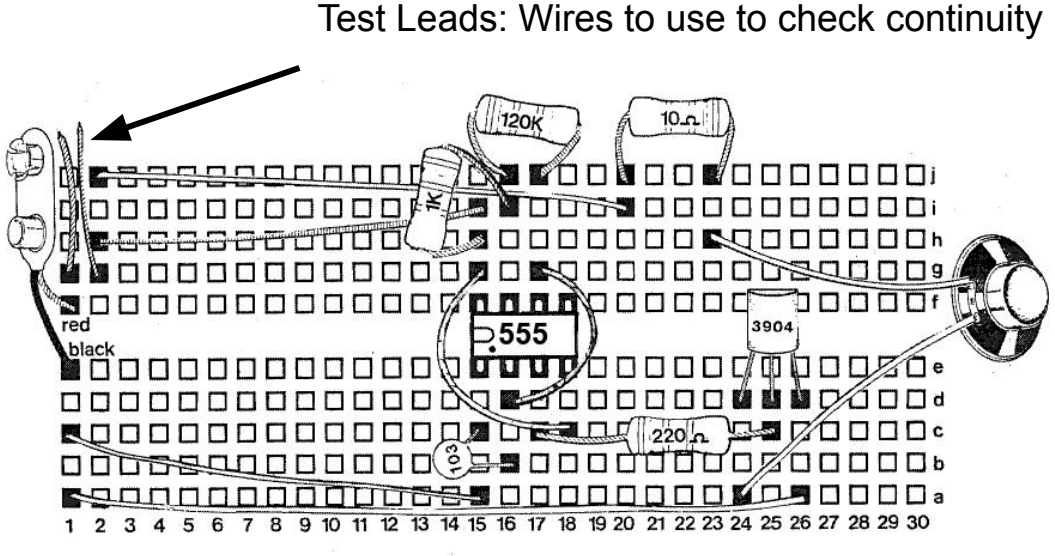


Step 2 - Install all the parts on the SCB as shown above.

- ❑ Install the 10 Ohm resistor (brown, black, black, gold) in holes 20j to 23j
- ❑ Install the 220 Ohm resistor (red, red, brown, gold) in holes 17c to 25c
- ❑ Install the 1000 (1k) Ohm resistor (brown, black, red, gold) in holes 15h to 16i
- ❑ Install the 120k Ohm resistor (brown, red, yellow, gold) in holes 16j to 17j
- ❑ Install the 555 Timer IC with Pin 1 in hole 15e as shown in pictorial
- ❑ Install one 0.01uF (103) disc Capacitor in holes 15c to 16b
- ❑ Install one NPN 3904 Transistor -Collector in 24d, Base in 25d, Emitter in 26d
- ❑ Install Jumper Wire #1 in holes 1a to 26a
- ❑ Install Jumper Wire #2 in holes 1c to 15a
- ❑ Install Jumper Wire #3 in holes 1g to loose end
- ❑ Install Jumper Wire #4 in holes 2g to loose end
- ❑ Install Jumper Wire #5 in holes 2j to 20i
- ❑ Install Jumper Wire #6 in holes 2h to 15i
- ❑ Install Jumper Wire #7 in holes 15g to 18c
- ❑ Install Jumper Wire #8 in holes 16d to 17g
- ❑ Install the Battery Snap, Black lead in hole 1e and Red Lead in hole 1f

(Continue to Page 5)

DO THE EXPERIMENT (part 2 of 2)



Step 3 - Connect the battery to the Battery Snap. The wires that are in holes 1g and 2g are used to check for continuity. Touch these wires to both ends of a fuse and if you hear a tone from the speaker, then the fuse is good.

CONCLUSION

You should have observed that you can build a
CONTINUITY CHECKER circuit
with a
555 Integrated Circuit.

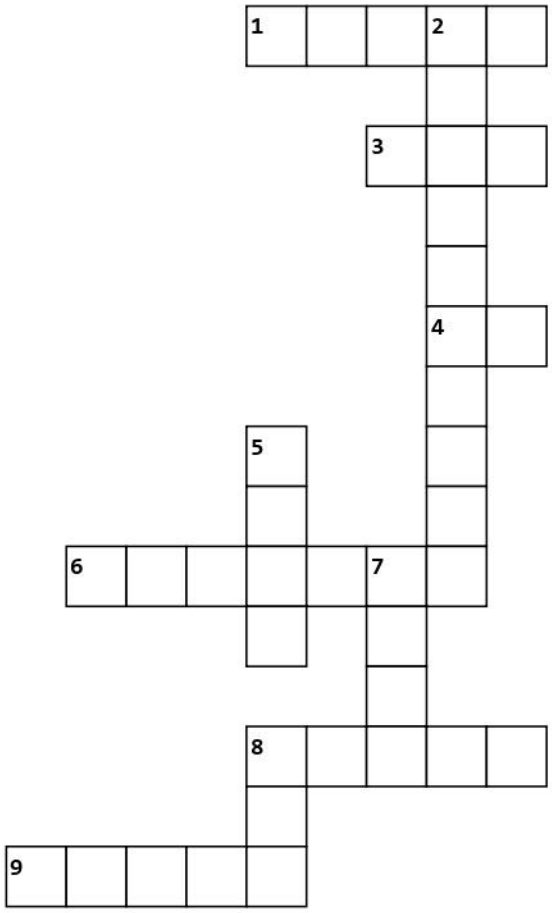
(End of Experiment 11)

Mr. CIRCUIT®

CROSSWORD

MC1-19-CW

Exp. 19 - "CONTINUITY TESTER CIRCUIT"



Across

1. The 555 in this circuit is working as a _____ .

3. How many capacitors does this circuit use?

4. Can this circuit be used to check LEDs?

6. The purpose of the transistor in this circuit is to _____ the loudness of the tone.

8. The tone in this circuit is emitted from Pin _____ of the 555 IC.

9. When there is continuity, the circuit will emit an _____ tone.

Down

2. When you check a fuse, you are checking for ELECTRICAL _____ .

5. You can use this circuit to test continuity in an incandescent light _____ .

7. How many fixed resistors are in this circuit?

8. How many probes are used to check for continuity?

WORD SEARCH

MC1-19-WS

Exp. 19 - "CONTINUITY TESTER CIRCUIT"

T D M M B R U W P Z Z S X M Z O X G S A
L V F V V U Y C N E T B B L P S W X D I
Q F P T U W D T P Q D P S C U R J R B X
B F P G Q M T E S B O M B M L N S A X B
T F Q E X E H S I M I B Y L S N S Z F E
U Y M K E B C T T Y S G A R E R L J V J
A T Y P C F P Q U P P I U U S B L M J Q
P F J W A M P N O X P H D D F N D Y Z N
T Z C B A Y I K C T P V I P A I E S R P
P B V K P C T U S B D T O I L Y Y H A I
E X J C A R T S N F V D B I T P C F L C
F N Q N O A V X J Z X E E T H R X A S T
D C U J S C H E M A T I C S K T I W Q O
C H X G X B Y V R C C I C V U C V M I R
T P L G P U K S P E W Z X W D F O F Q I
C D T Q Y L X L P R B U H Y T V Y L C A
Z P C U U B D Z W F Q M F E L L M D C L
F F K Q L O F H B A M P L I F Y L G L U
Z Q I O W Z Z J O U L R Q K G O Z O R Q
Y G J X V O L T S M F C W N F D B X P D

1. The diagram that shows the symbols for all the components in a circuit is called a _____ .

2. The diagram that shows a drawing of all the parts on a solderless circuit board is called a _____ .

3. This circuit is powered by nine _____ .

4. The 555 IC in this circuit is used as a _____ .

5. To check for continuity, use the two _____ LEADS.

6. The 555 IC generates an _____ signal.

7. The _____ from the 555 IC are sent to the transistor.

8. The transistor is used to _____ the audio signal.

9. You can use this circuit to test a _____ .

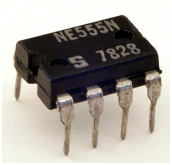
10. You can use this to test an incandescent _____ .

(Student Name) (Period/Student Number) (Date)

QUIZ for Exp 19 or STEM KIT #19
in the Mr Circuit Electronics Training Lab 1

(Page 8)

This Quiz covers the training learned by completing



"Build a Continuity Tester Circuit" Experiment 19

Circle the letter for your answer to each question and then hand this quiz in to your teacher.

A B C D

#1 This circuit uses 555 Timer IC working as a _____ .

A. an amplifier
B. a timer
C. a clock
D. a light generator

A B C D

#2 The loudness of the tone is _____ .

A. adjustable
B. fixed
C. controlled by Resistor R1
D. controlled by Capacitor C1

A B C D

#3 The speaker in this circuit is connected to the _____ of transistor Q1.

A. Gate
B. Emitter
C. Collector
D. Base

A B C D

#4 What is the value of the capacitor connected to Pin 2 of the 555 Timer IC in this circuit?

A. 0.01uF
B. 330uF
C. 33uF
D. 10uF

A B C D

#5 If we reverse the polarity of the battery snap on the circuit, what will happen?

A. you might destroy the 555 Timer IC
B. the LED will burn out
C. it will work just fine
D. the LED will self-destruct

A B C D

#6 Resistor R3 is connected to _____ of the 555 Timer IC.

A. Pin 3
B. Pin 4
C. Pin 1
D. Pin 6

A B C D

#7 When this circuit is working, the speaker will _____ when there is continuity.

A. remain silent
B. self-destruct
C. emit a tone
D. get hot

A B C D

#8 When you touch the two probes together, the speaker will _____ .

A. remain silent
B. self-destruct
C. get hot
D. emit a tone

A B C D

#9 One probe is connected to R1 and the other one is connected _____ .

A. to the negative of the battery
B. to the speaker
C. to the 0.01uF capacitor
D. to the positive of the battery

A B C D

#10 This circuit emits _____ signal.

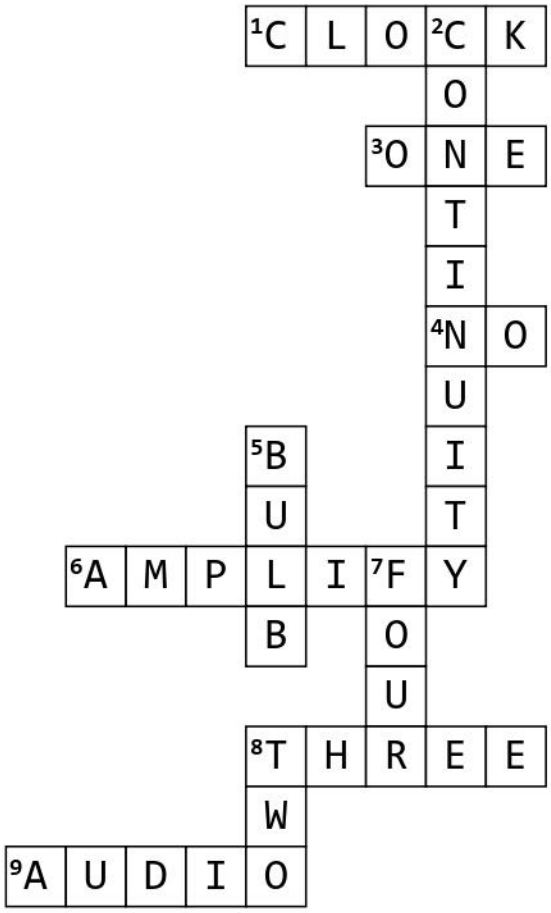
A. an inaudible
B. an rf
C. an ultrasonic
D. an audio

(Form SQ19)

Score	

ANSWERS FOR CROSSWORD

Exp. 19 - "CONTINUITY TESTER CIRCUIT"



Across

1. The 555 in this circuit is working as a _____ .

3. How many capacitors does this circuit use?

4. Can this circuit be used to check LEDs?

6. The purpose of the transistor in this circuit is to _____ the loudness of the tone.

8. The tone in this circuit is emitted from Pin _____ of the 555 IC.

9. When there is continuity, the circuit will emit an _____ tone.

Down

2. When you check a fuse, you are checking for ELECTRICAL _____ .

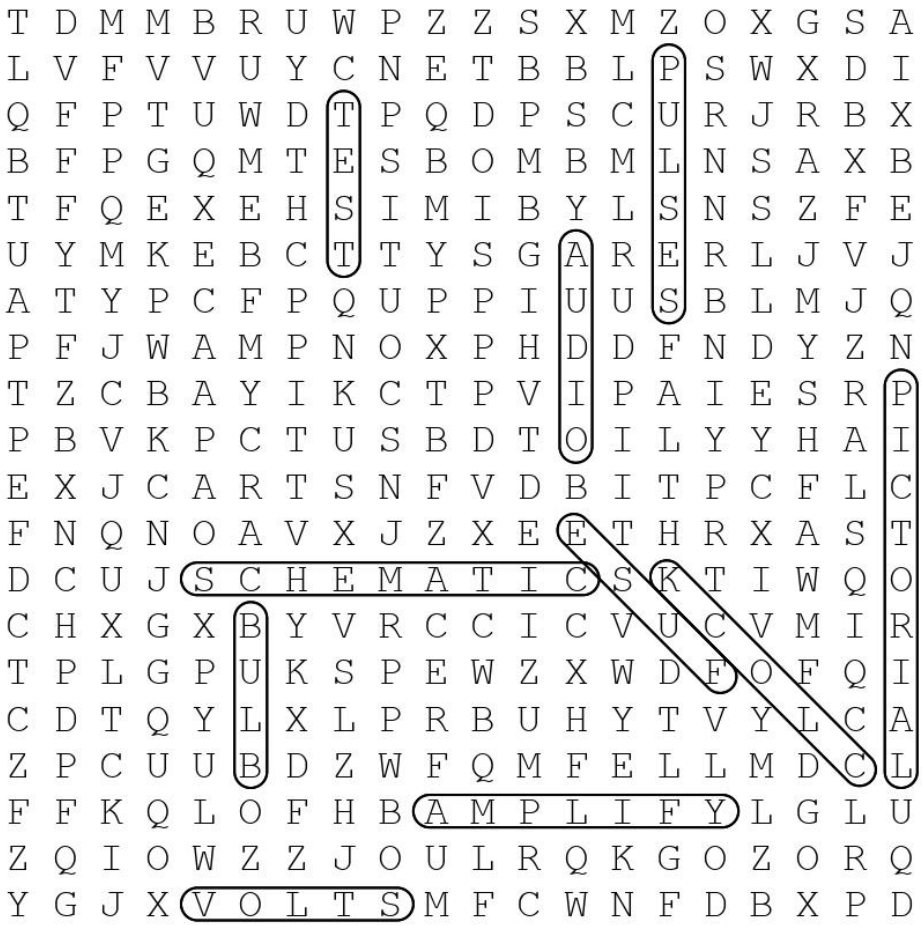
5. You can use this circuit to test continuity in an incandescent light _____ .

7. How many fixed resistors are in this circuit?

8. How many probes are used to check for continuity?

ANSWERS FOR WORD SEARCH

Exp. 19 - "CONTINUITY TESTER CIRCUIT"



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2. The diagram that shows a drawing of all the parts on a solderless circuit board is called a _____ .

3. This circuit is powered by nine _____ .

4. The 555 IC in this circuit is used as a _____ .

5. To check for continuity, use the two _____ LEADS.

6. The 555 IC generates an _____ signal.

7. The _____ from the 555 IC are sent to the transistor.

8. The transistor is used to _____ the audio signal.

9. You can use this circuit to test a _____ .

10. You can use this to test an incandescent _____ .

QUICK-CHECK ANSWER KEY for Experiment 19 QUIZ
for Mr Circuit Electronics Training ("Continuity Tester")

Place this sheet over top of the STUDENT QUIZ (offset a little to the left and then offset to the right) to compare the answers on this sheet to the answers that the student marked. Put an 'X' for each wrong answer.

Count the right answers and record the score of right answers in your grade book.

A
B
C
D

#1 This circuit uses 555 Timer IC working as a _____ .

A. an amplifier
B. a timer
C. a clock
D. a light generator

#6 Resistor R3 is connected to _____ of the 555 Timer IC.

A. Pin 3
B. Pin 4
C. Pin 1
D. Pin 6

A
B
C
D

A
B
C
D

#2 The loudness of the tone is _____ .

A. adjustable
B. fixed
C. controlled by Resistor R1
D. controlled by Capacitor C1

#7 When this circuit is working, the speaker will _____ when there is continuity.

A. remain silent
B. self-destruct
C. emit a tone
D. get hot

A
B
C
D

A
B
C
D

#3 The speaker in this circuit is connected to the _____ of transistor Q1.

A. Gate
B. Emitter
C. Collector
D. Base

#8 When you touch the two probes together, the speaker will _____ .

A. remain silent
B. self-destruct
C. get hot
D. emit a tone

A
B
C
D

A
B
C
D

#4 What is the value of the capacitor connected to Pin 2 of the 555 Timer IC in this circuit?

A. 0.01uF
B. 330uF
C. 33uF
D. 10uF

#9 One probe is connected to R1 and the other one is connected _____ .

A. to the negative of the battery
B. to the speaker
C. to the 0.01uF capacitor
D. to the positive of the battery

A
B
C
D

A
B
C
D

#5 If we reverse the polarity of the battery snap on the circuit, what will happen?

A. you might destroy the 555 Timer IC
B. the LED will burn out
C. it will work just fine
D. the LED will self-destruct

#10 This circuit emits _____ signal.

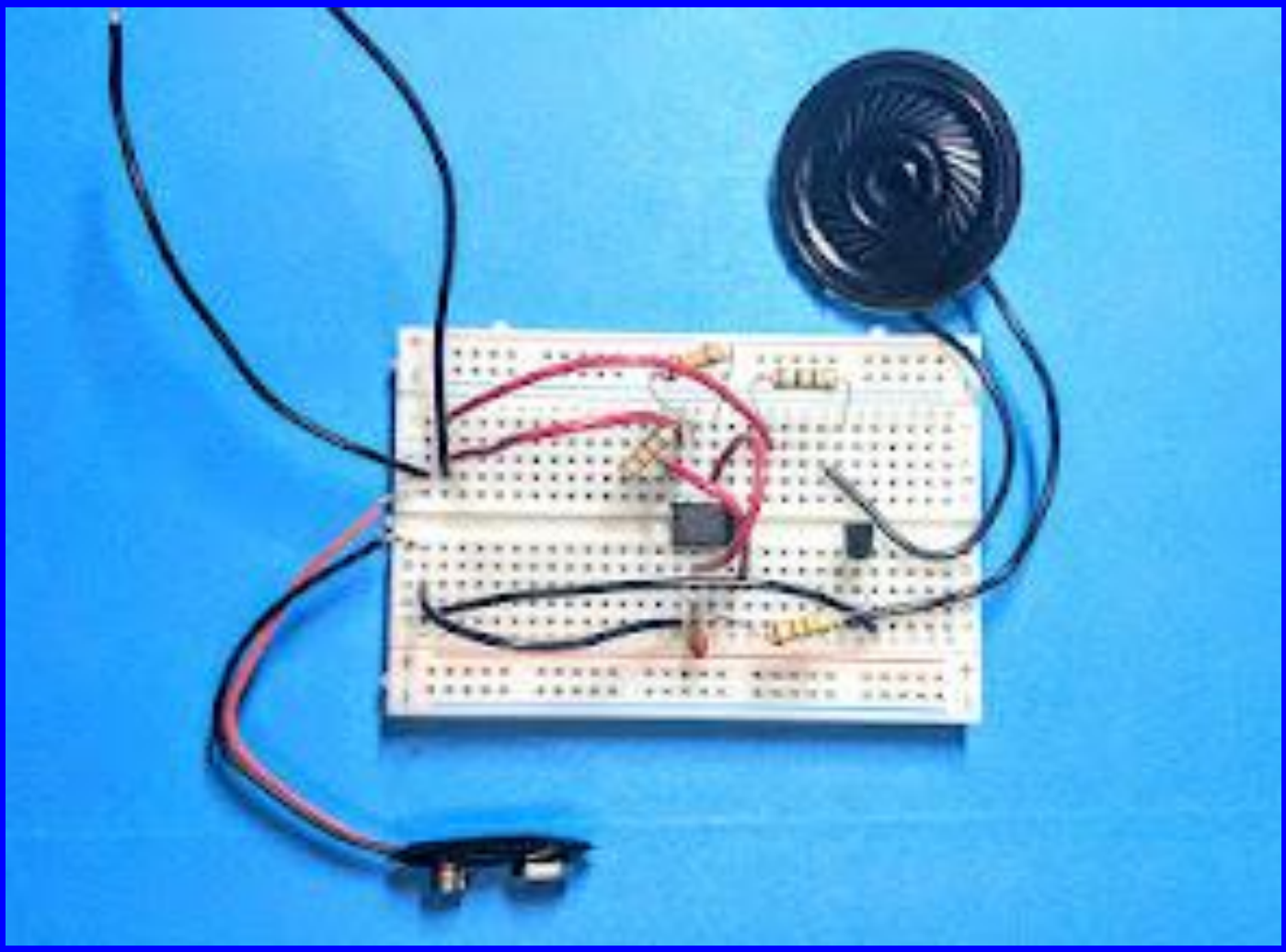
A. an inaudible
B. an rf
C. an ultrasonic
D. an audio

A
B
C
D

(Form SQAK19)

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

CONTINUITY TESTER

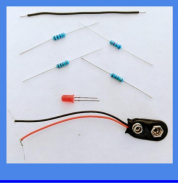


BASIC ELECTRONICS LAB 1

"CONTINUITY TESTER CIRCUIT"

(Poster MC1-19-P01)

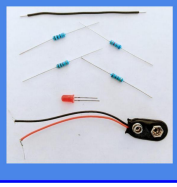
MC1-01
Electronic Parts



For more info: www.MrCircuitTechnology.com MrCircuit23@gmail.com

Mr Circuit Technology

MC1-01
Electronic Parts



PRICE LIST

PRICE LIST

PARTS KIT Number	Mr Circuit Series 1 PARTS KITS FOR "LESSON PLANS"	Price Each
MC1-00-PK	Solderless Circuit Board to build kits	$3.95
MC1-01-PK	Parts Kit for "How a Resistor Works	$1.95
MC1-02-PK	Parts Kit for "How a Potentiometer Works	$2.95
MC1-03-PK	Parts Kit for "How a Photocell Works	$1.95
MC1-04-PK	Parts Kit for "How a Capacitor Works	$2.95
MC1-05-PK	Parts Kit for "How a Speaker Works	$2.95
MC1-06-PK	Parts Kit for "How a Diode Works	$1.95
MC1-07-PK	Parts Kit for "How an SCR Works	$3.95
MC1-08-PK	Parts Kit for "How an NPN Transistor Works	$2.95
MC1-09-PK	Parts Kit for "How a PNP Transistor Works	$2.95
MC1-10-PK	Parts Kit for "How a Transistor Oscillator Works	$3.95
MC1-11-PK	Parts Kit for "How a 555 Timer IC Works	$2.95
MC1-12-PK	Parts Kit for "Burglar Alarm circuit	$3.95
MC1-13-PK	Parts Kit for "Solar-Activated Night Light circuit	$3.95
MC1-14-PK	Parts Kit for "0 TO 9V DC Power Supply circuit	$2.95
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MC1-16-PK	Parts Kit for "Electronic Motorcycle circuit	$3.95
MC1-17-PK	Parts Kit for "Railroad Lights circuit	$2.95
MC1-18-PK	Parts Kit for "Variable Speed Lights circuit	$3.95
MC1-19-PK	Parts Kit for "Continuity Tester circuit	$4.95
MC1-20-PK	Parts Kit for "Audio Generator circuit	$5.95
MC1-21-PK	Parts Kit for "Electronic Police Siren circuit	$4.95
MC1-22-PK	Parts Kit for "Solar-Activated Wake-Up Alarm circuit	$3.95
MC1-23-PK	Parts Kit for "Variable Timer circuit	$3.95
MC1-24-PK	Parts Kit for "Moisture Detector circuit	$2.95
MC1-25-PK	Parts Kit for "Code Oscillator circuit	$4.95
MC1-26-PK	Parts Kit for "Audible Water Detector circuit	$4.95
MC1-27-PK	Parts Kit for "English Police Siren circuit	$4.95
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MC1-29-PK	Parts Kit for "fantasy Space Machine Gun circuit	$5.95
MC1-30-PK	Parts Kit for "Ultrasonic Pest Repeller circuit	$5.95
MC1-SET-PK	**Complete Set of All Series 1 Parts Kits (31 total)**	**$120.00**