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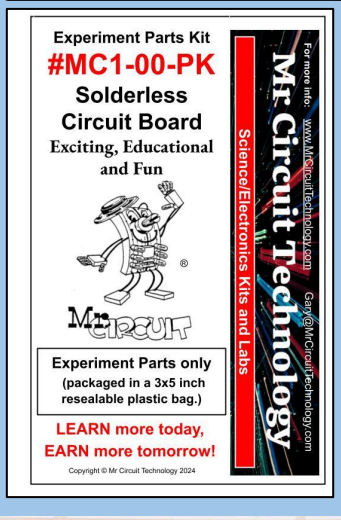
Mr Circuit Technology

Science/Electronics Experiment Kits and Labs

Exp. 26 - "AUDIBLE WATER DETECTOR CIRCUIT"



LESSON PLAN

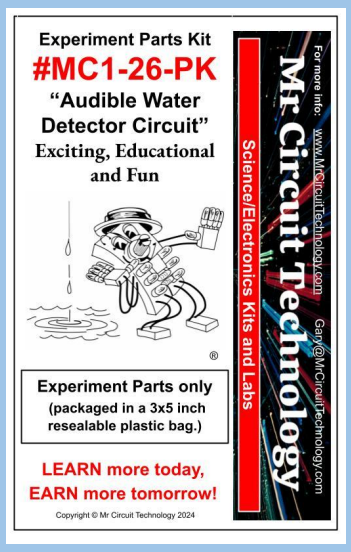
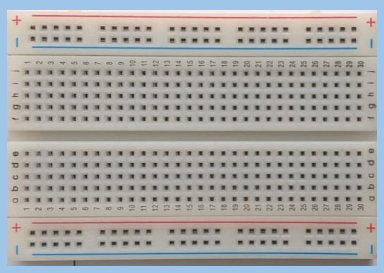
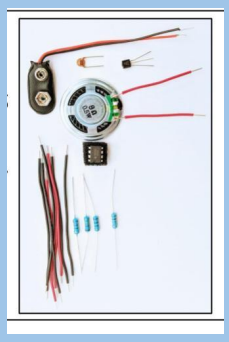


Table of Contents





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 #MC1-26-PK (that has the experiment parts) with a 9-Volt battery. Give these items to each student along with the 8 pages.

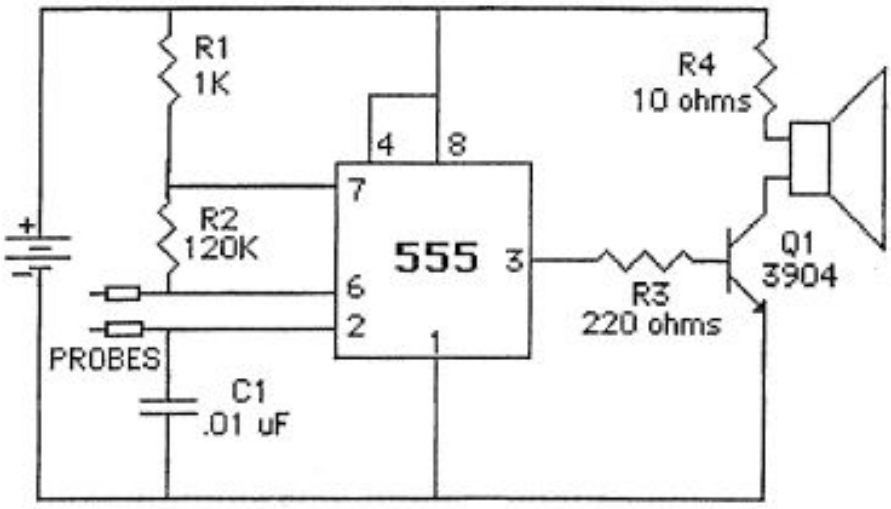
Step 3 - When your students have completed the experiment, collect all the Parts Kits and batteries for later use.

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

EXPLANATION OF EXPERIMENT part 1 of 2

*** You are going to build a AUDIBLE WATER DETECTOR circuit. Here is the SCHEMATIC DIAGRAM of the circuit you will build.



This interesting circuit was invented by engineers who wanted a circuit that sense water and put out an audible tone.

There are many situations where liquid levels need to be sensed. Many factories use these type of circuits to sense when containers are full of liquid.

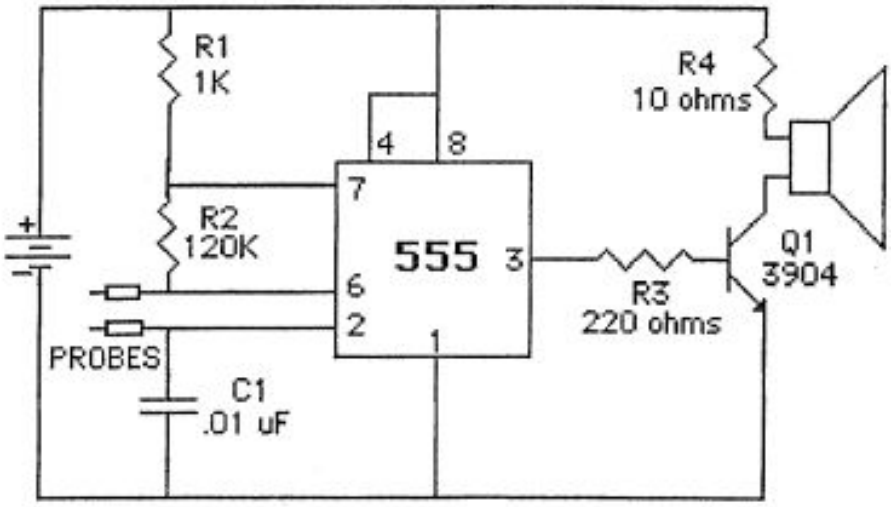
This circuit has two wires that are used as Probes to be put into the right position to sense the level of a liquid in a container.

You can experiment with this circuit with different kinds of liquids like water, juice, etc. You can use it to sense the water level in bathtubs and swimming pools.

(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 **AUDIBLE WATER DETECTOR** circuit that you will build.



This circuit uses a 555 Integrated Circuit as **CLOCK**. Pin 3 emits a **signal** to the speaker.

When the resistance between the Probes is low, it causes this circuit to emit a tone which can be heard from the speaker. The transistor in the circuit is there to **amplify** the loudness of the tone.

Once you build this circuit and power it with a fresh 9-volt battery, you can try putting the Probes into water and other liquids to hear the tone from the speaker.

You can also use this circuit as a **Nose Beeper game** by having one person hold one Probe with their fingers and have another person hold the other Probe in their fingers and then have one of them touch the nose of the other person and it should emit a tone from the speaker. It is sure to get a laugh or two.

(Continue to Page 3)

AUDIBLE WATER DETECTOR CIRCUIT

MC1-26-R-3

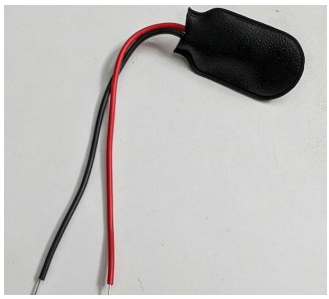
PURPOSE OF THIS EXPERIMENT

*** To build a AUDIBLE WATER DETECTOR Using a 555 Integrated Circuit.

PARTS NEEDED FOR EXPERIMENT

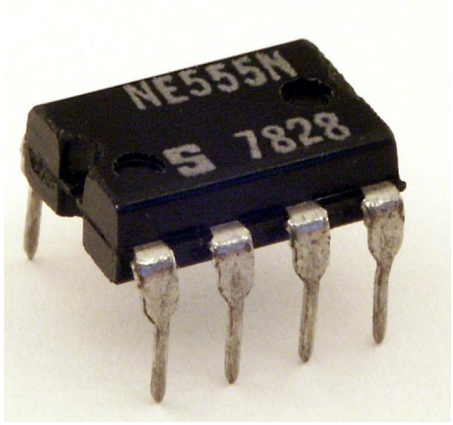
In this experiment, you will use the following items:

BATTERY SNAP



0.01 DISC CAPACITOR

555 IC



10 Ohm resistor

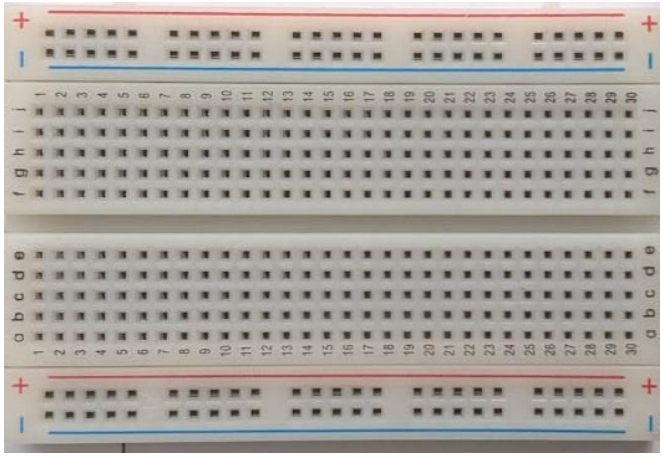
220 Ohm resistor

1000 Ohm resistor

120k Ohm resistor

7 Jumper Wires

a SOLDERLESS CIRCUIT BOARD



You will also need a good 9 Volt battery

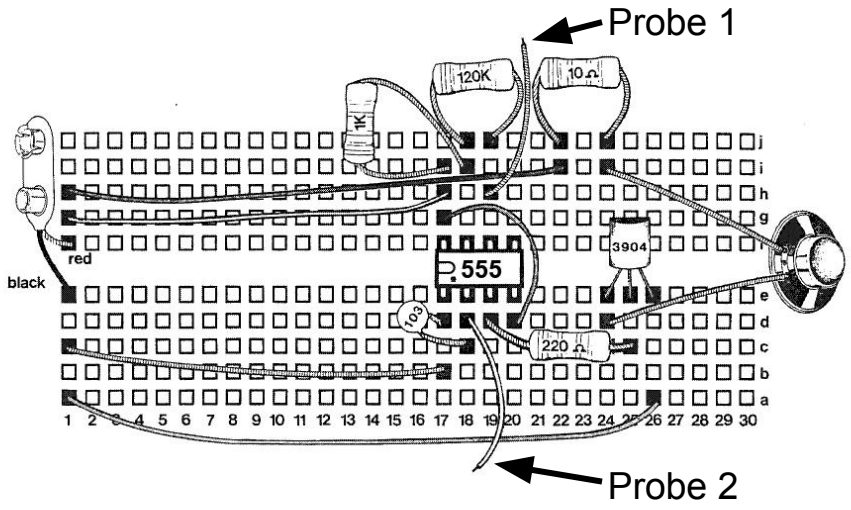
(Continue to Page 4)

MC1-26-R-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.

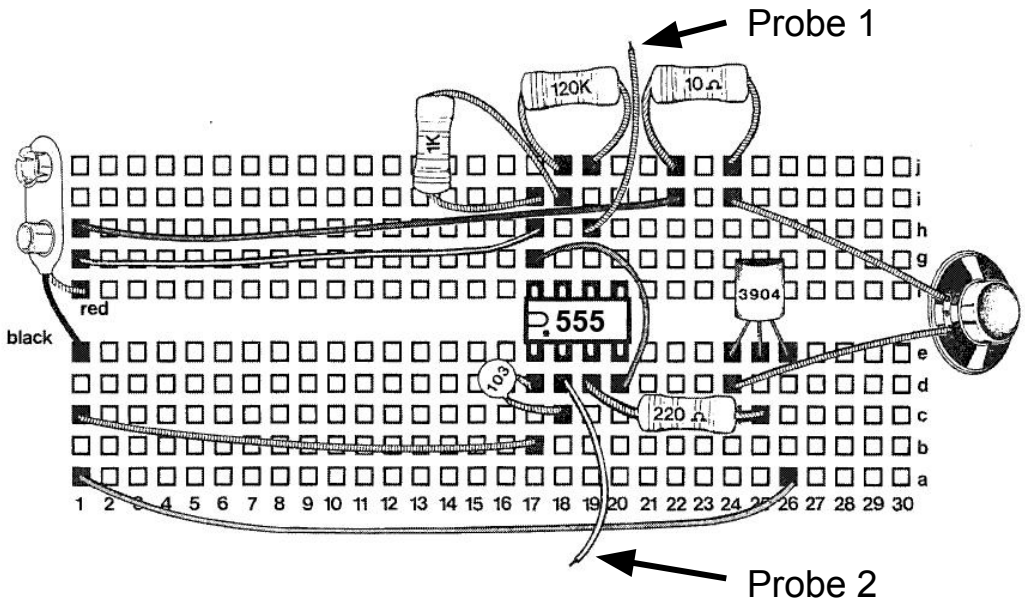


Step 2 - Install all the parts on the SCB as shown above.

- ❑ Install the 10 Ohm resistor (brown, black, black, gold) in holes 22j to 24j
- ❑ Install the 220 Ohm resistor (red, red, brown, gold) in holes 19d to 25c
- ❑ Install the 1000 (1k) Ohm resistor (brown, black, red, gold) in holes 17i to 18i
- ❑ Install the 120k Ohm resistor (brown, red, yellow, gold) in holes 18j to 19j
- ❑ Install the 555 Timer IC with Pin 1 in hole 17e as shown in pictorial
- ❑ Install a NPN 3904 Transistor -Collector in 24e, Base in 25e, Emitter in 26e
- ❑ Install a 0.01uF (103) Capacitor in holes 17d to 18c
- ❑ Install a Speaker in holes 24d to 24i
- ❑ Install Jumper Wire #1 in holes 1a to 26a
- ❑ Install Jumper Wire #2 in holes 1c to 17b
- ❑ Install Jumper Wire #3 in holes 1g to 17h
- ❑ Install Jumper Wire #4 in holes 1h to 22i
- ❑ Install Jumper Wire #5 in holes 19h to loose end
- ❑ Install Jumper Wire #6 in holes 18d to loose end
- ❑ Install Jumper Wire #7 in holes 17g to 20d
- ❑ 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. You can experiment by putting the Probes into water and hear the tone from the speaker.

You can also try using this circuit as a Nose Beeper game as explained On Page 2.

CONCLUSION: You should have observed that you can build an **AUDIBLE WATER DETECTOR** circuit with a 555 Integrated Circuit.

(End of Experiment 26)

CROSSWORD

Exp. 26 - "AUDIBLE WATER DETECTOR CIRCUIT"

Across

2. This circuit can be used as a Nose _____ game.

4. This circuit can be used to sense the water level in bathtubs and _____ .

5. Factories can use this circuit to sense the level of _____ .

7. What pin number on the 555 Integrated Circuit emits the signal to the speaker?

8. This circuit has two _____ to sense water.

10. This circuit is powered by a nine _____ battery.

Down

1. A _____ is used to amplify the tone.

3. This circuit is called an _____ Water Detector circuit.

6. In the middle of the _____ diagram for this circuit is a symbol for a 555 Integrated Circuit.

9. When this circuit senses liquid, it will emit an audible _____ .

Mr. CIRCUIT®

MC1-26-WS

WORD SEARCH

Exp. 26 - "AUDIBLE WATER DETECTOR CIRCUIT"

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

1. This circuit is an Audible Water _____ .

2. The tone emitted from this circuit comes out of the _____ .

3. This circuit has two _____ to sense water.

4. This circuit has one _____ connected to Pins 1 and 2 of the 555 Integrated Circuit.

5. The _____ is to used to amplify the tone coming from the 555 Integrated Circuit.

6. The 555 is an _____ Circuit.

7. This circuit can be used to sense the level of _____ .

8. This circuit can be used as a Nose _____ game.

9. This transistor in this circuit is used to _____ the tone coming from the 555 IC.

10. The _____ connected between pins 6 and 7 on the 555 is a 120k Ohms.

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

QUIZ for Exp 26 or STEM KIT #26
in the Mr Circuit Electronics Training Lab 1

(Page 8)

This Quiz covers the training learned by completing

"Build an Audible Water Detector Circuit" Experiment 26

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 a 555 Timer IC as _____ .

A. a variable resistor
B. a variable capacitor
C. a clock
D. a timer

A B C D

#2 R4 is connected to _____ and to the positive of the battery.

A. the speaker
B. the transistor
C. the 555 Timer IC
D. the capacitor C1

A B C D

#3 On the 555 Timer _____ .

A. only 6 pins are used
B. all but pin 4 are used
C. all 8 pins are used
D. all but pin 5 are used

A B C D

#4 The purpose of this circuit is to _____ .

A. sense the presence of water
B. sense vibrations
C. sense heat
D. sense light

A B C D

#5 What happens when this circuit is triggered?

A. you hear a tone in the speaker
B. you hear a loud cracking sound
C. an LED starts blinking
D. the capacitor gets hot

A B C D

#6 The loudness of the emitted tone _____ .

A. is fixed
B. is adjustable by the value of R1
C. is adjustable by the value of C1
D. is controlled by S1

A B C D

#7 Resistors R1 and R2 _____ .

A. are connected
B. are not connected
C. are not important in the circuit
D. control the loudness of the speaker

A B C D

#8 To make sure the circuit is working, you _____ .

A. remove resistor R4
B. short capacitor C1
C. put the probes into water
D. disconnect the battery

A B C D

#9 Pins 1 and 3 of the 555 Timer IC are _____ .

A. not connected
B. connected
C. not important
D. determine the loudness of the speaker

A B C D

#10 Capacitor C1 is connected to Pin 1 and to _____ .

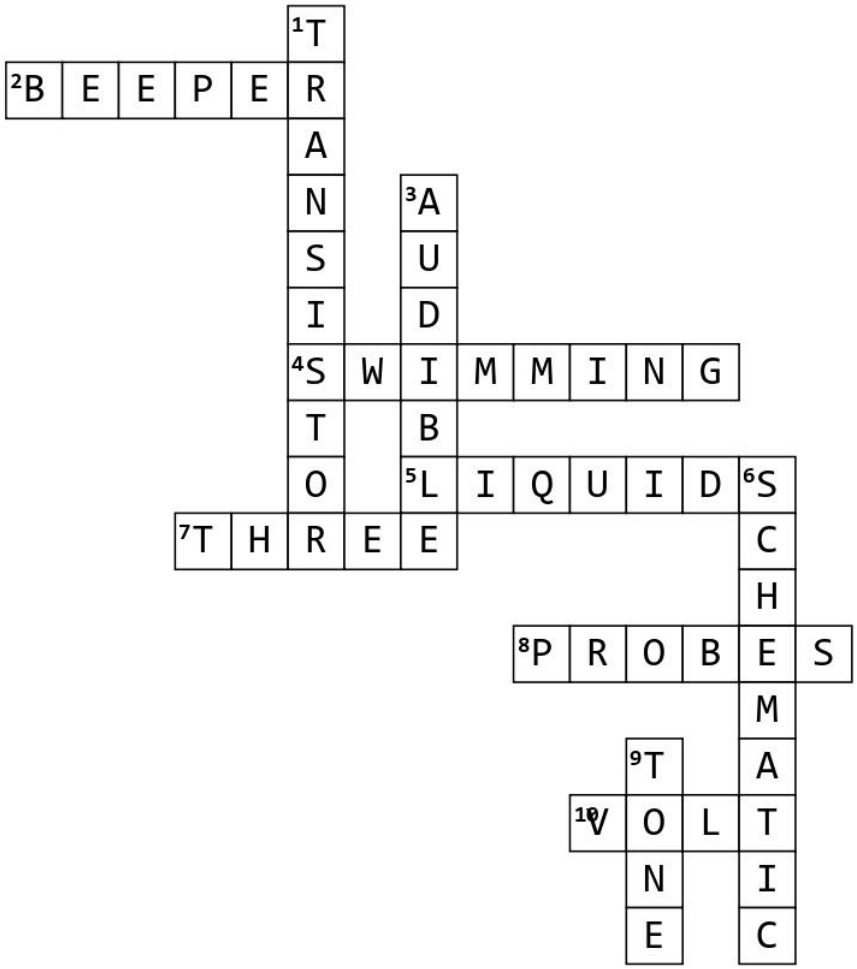
A. Pin 8
B. Pin 7
C. Pin 4
D. the Emitter of transistor Q1

(Form SQ26)

Score	

ANSWERS FOR CROSSWORD

Exp. 26 - "AUDIBLE WATER DETECTOR CIRCUIT"



Across

2. This circuit can be used as a Nose _____ game.

4. This circuit can be used to sense the water level in bathtubs and _____ .

5. Factories can use this circuit to sense the level of _____ .

7. What pin number on the 555 Integrated Circuit emits the signal to the speaker?

8. This circuit has two _____ to sense water.

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Down

1. A _____ is used to amplify the tone.

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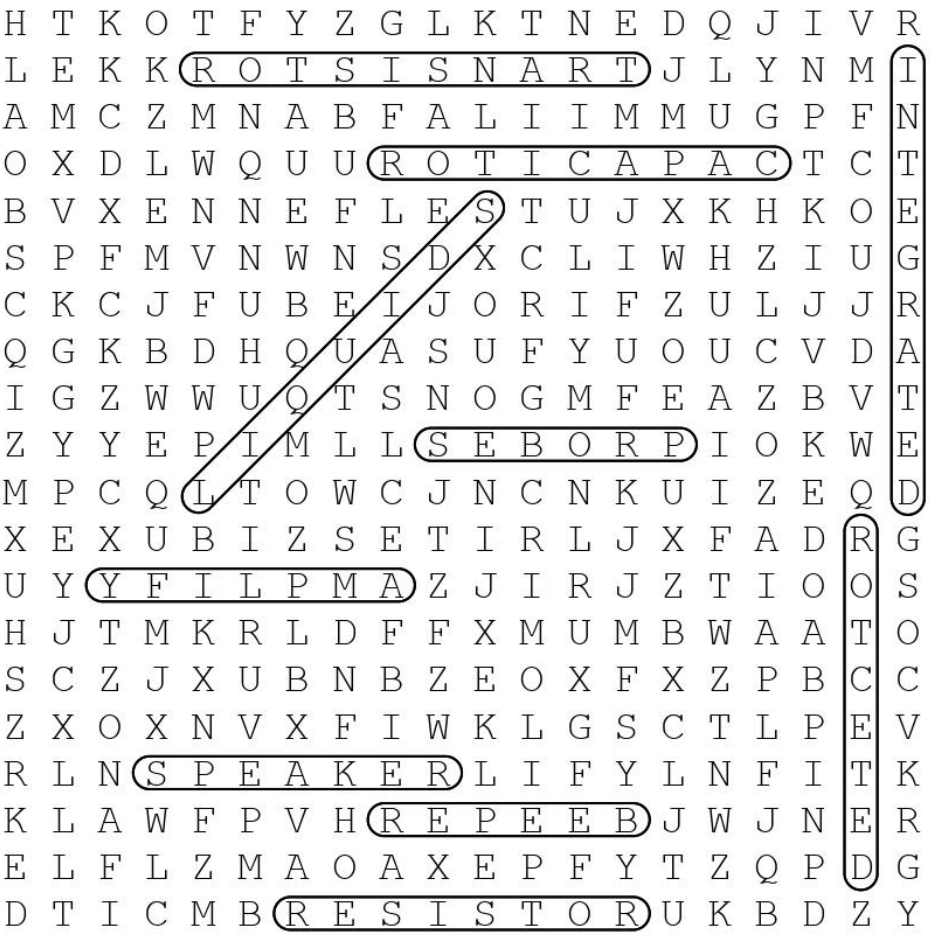
ANSWERS FOR WORD SEARCH

Exp. 26 - "AUDIBLE WATER DETECTOR CIRCUIT"



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3. This circuit has two _____ to sense water.

4. This circuit has one _____ connected to Pins 1 and 2 of the 555 Integrated Circuit.

5. The _____ is to used to amplify the tone coming from the 555 Integrated Circuit.

6. The 555 is an _____ Circuit.

7. This circuit can be used to sense the level of _____ .

8. This circuit can be used as a Nose _____ game.

9. This transistor in this circuit is used to _____ the tone coming from the 555 IC.

10. The _____ connected between pins 6 and 7 on the 555 is a 120k Ohms.

QUICK-CHECK ANSWER KEY for Experiment 26 QUIZ
for Mr Circuit Electronics Training ("Audible Water Detector")

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 a 555 Timer IC as _____ .

A. a variable resistor
B. a variable capacitor
C. a clock
D. a timer

(A) B C D

#2 R4 is connected to _____ and to the positive of the battery.

A. the speaker
B. the transistor
C. the 555 Timer IC
D. the capacitor C1

A B C (D)

#3 On the 555 Timer _____ .

A. only 6 pins are used
B. all but pin 4 are used
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D. all but pin 5 are used

(A) B C D

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A B (C) D

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A. not connected
B. connected
C. not important
D. determine the loudness of the speaker

(A) B C D

#10 Capacitor C1 is connected to Pin 1 and to _____ .

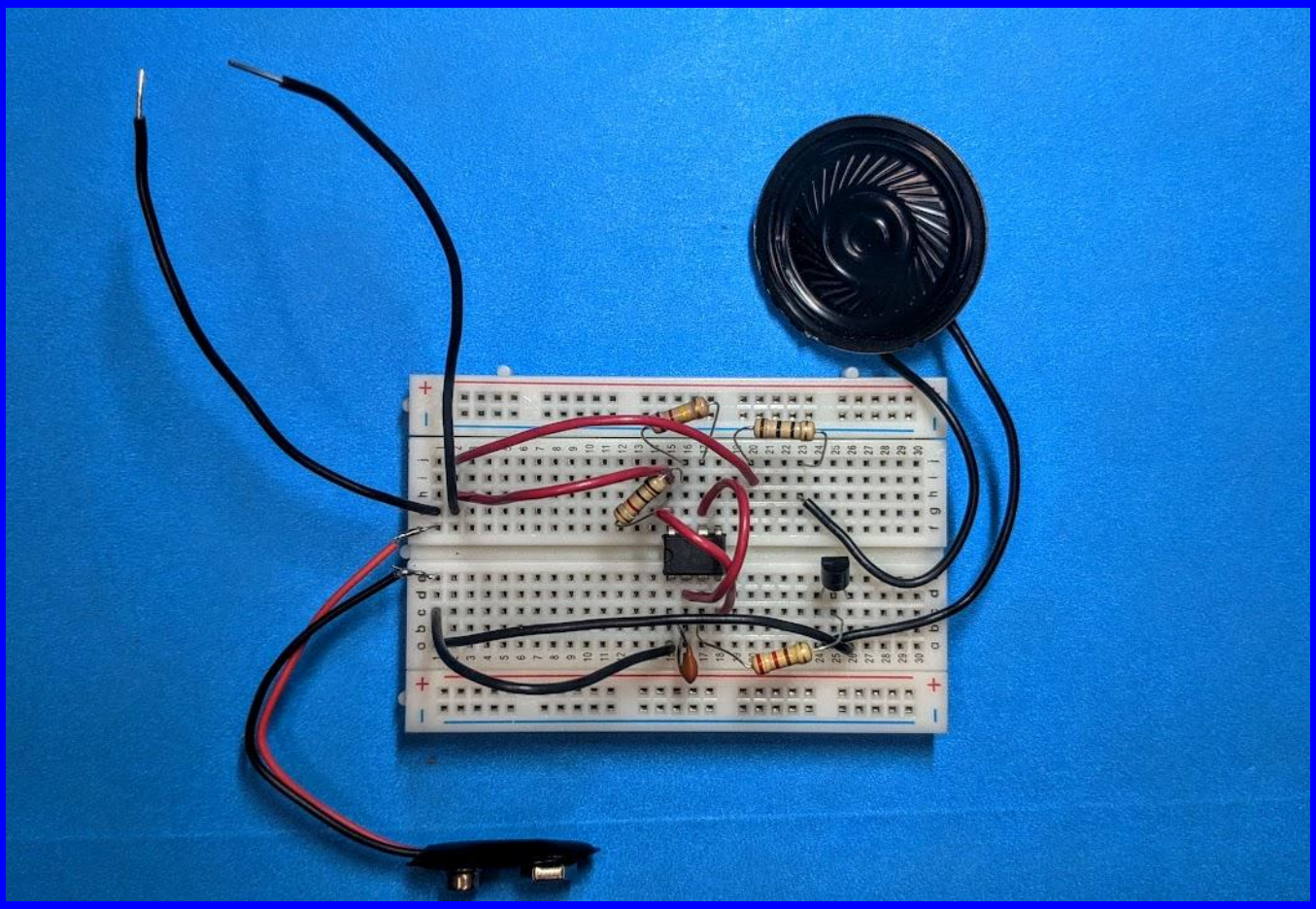
A. Pin 8
B. Pin 7
C. Pin 4
D. the Emitter of transistor Q1

A B C (D)

(Form SQAK26)

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

AUDIBLE WATER DETECTOR

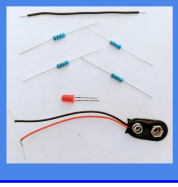


BASIC ELECTRONICS LAB 1

"AUDIBLE WATER DETECTOR CIRCUIT"

(Poster MC1-26-P01)

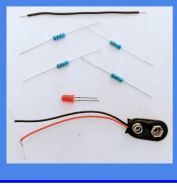
MC1-01
Electronic Parts



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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MC1-22-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-SET-PK	**Complete Set of All Series 1 Parts Kits (31 total)**	**$120.00**