

## Measure Resistance by a USB Sound Card Cost Only 3 Dollar

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**Abstract:** To develop to computer-line-in sensor means to find a stable relationship between the value of environment, temperature, for an example and the the value that computer can read, x of mouse,etc. This workshop will show this process that to measure a resistance using an usb sound card and a light resistance which costs only 3 dollars in China. Connect an light resistand with a value-known resistance to the record hole of usb sound card, and We found if we change the resistance of the value-known resistance , we have different volume of sound-the relationship is stable. Using Excel to find the relationship and using this relationship, we can measure the resistance of other kinds of sensor ,temp-resistance, press-resistance , etc. In this experiment we choose Scratch to prgraming the software to do experiment to collect data. After that, we can make a software to measure resistance. In addition, we can also develop funny games-The color changing with the temputer of water, etc.

**Keywords:** keyword 1, keyword 2, keyword 3, keyword 4, keyword 5

### 1. Introduction

I am a teacher of physics and IT in Beijing Jingshan School. I teach programing in 6th, 8th, and 10th Grade. I have a master degree of Education in Beijing Normal University. Now my research area is STEM education, and course design in STEM area. I disgen a course-Digital Science in Beijing Jingshan School Which using computer sensor as a tool to do sicientific experiment in 6th and 8th grade. In this class, student learn to design, develop sensor and use these sensor to inquire some stable relationship. The aim of this course is to develop an ability which can design a scientific research in any interested subject using information technology. Now I am a Co-founder of Maker@EDU which is an NGO helps some maker in hackerspace to convernt their inventions to an creative course. In 2012 I and my 7th student are invited in Scratch@MIT 2012 and we have done two works shop in the conference. This workshop is similar in Scratch@MIT 2012.

### 2. How to do

To develop to computer-line-in sensor means to find a stable relationship between the value of environment, temperature, for an example and the the value that computer can read, x of mouse,etc. This workshop will show this process that to measure a resistance using an usb sound card and a light resistance which costs only 3 dollars in China. Connect an light resistand with a value-known resistance to the record hole of usb sound card, and We found if we change the resistance of the value-known resistance , we have different volume of sound-the relationship is stable. Using Excel to find the relationship and using this relationship, we can measure the resistance of other kinds of sensor ,temp-resistance, press-resistance , etc. In this experiment we choose Scratch to prgraming the software to do experiment to collect data. After that, we can make a software to measure resistance. In addition, we can also develop funny games-The color changing with the temputer of water, etc.

### 3. Time line

- The works shop will last for 1 hour
- Introduction of Scratch and sound sensor
- Using a wasted head-phone line to counting number
- Using usb sound card and a light resistance to measure resistance
- Do an experiment to measure temperature using usb-sound card
- Chatting about the future of low-cost senser

#### **4. Costs**

- The works shop is free
- If you want to buy the the full experiment instrument It cost 30 RMB
- There will be some disk of the digital science curriculum , and the recording of IT class using sensors to teach

STEM area, per disk costs 5RMB.

- Take your own laptop