

Unit 1 : Oscilloscope 101 基本示波器操作與量測

Conversation 1 Introduction to an oscilloscope 示波器介紹

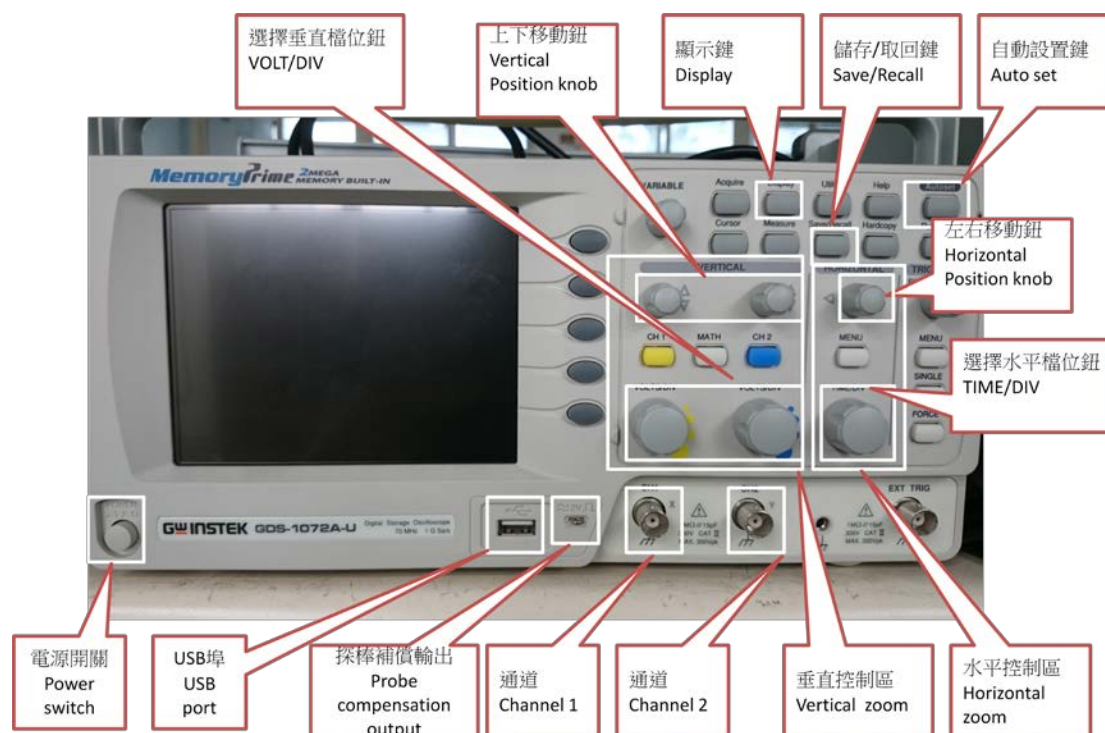
Teacher: Students, do you know which **electronic equipment**¹ is most widely used and multi-functional in **electronic experiments**²?

Students: Mmm... we have no idea.

Teacher: It is the **oscilloscope**².

Students: What exactly is it?

Teacher: An oscilloscope is mainly used to **observe**³ and **measure**⁴ the changes in **amplitude**⁵ and **waveforms**⁶ of the electrical signals. The picture below shows the oscilloscope that we will be using in our experiment. In order to **operate**⁷ it **smoothly**⁸, please **concentrate on**⁹ the most-frequently used **buttons**¹⁰.



Vocabulary

1. **equipment** [r`kwɪpmənt] (n.) 設備

This lab offers the most advanced equipment for your medical research.

2. **oscilloscope** [ɑ`sɪləˌskop] (n.) 示波器

During our first workshop session, the teacher taught us how to operate an oscilloscope.

3. **observe** [əb`zɜ:v] (vt.) 觀察

A space telescope can be used to observe stars in the sky.

4. **measure** [ˈmeɪʒə] (vt.) 測量

After we measured our living room, we had no choice but to give up this sofa set because it couldn't fit in the space.

5. **amplitude** [ˈæmplɪ,tʃud] (n.) 振幅

The amplitude of the ocean tells you how big a wave can be.

6. **waveform** [ˈweɪv,fɔrm] (n.) 波形

A waveform tells you how frequent the wave is and how big the wave can be.

7. **operate** [ˈɒpə,ret] (vi.) 操作

Users must follow the instructions on the manual when operating the machine.

8. **smoothly** [smuðli] (adv.) 順利地

The airplane landed smoothly though one of the turbine engines had a failure.

9. **concentrate on** [ˈkɒnsən,tret ən] (vt.) 專心於

His whole attention was concentrated on the experiment.

10. **button** [ˈbʌtn] (n.) 按鍵

The "Backspace" button on the keyboard allows you to delete the things you just keyed in.

Idioms & Phrases

1. **electronic equipment** 電子儀器

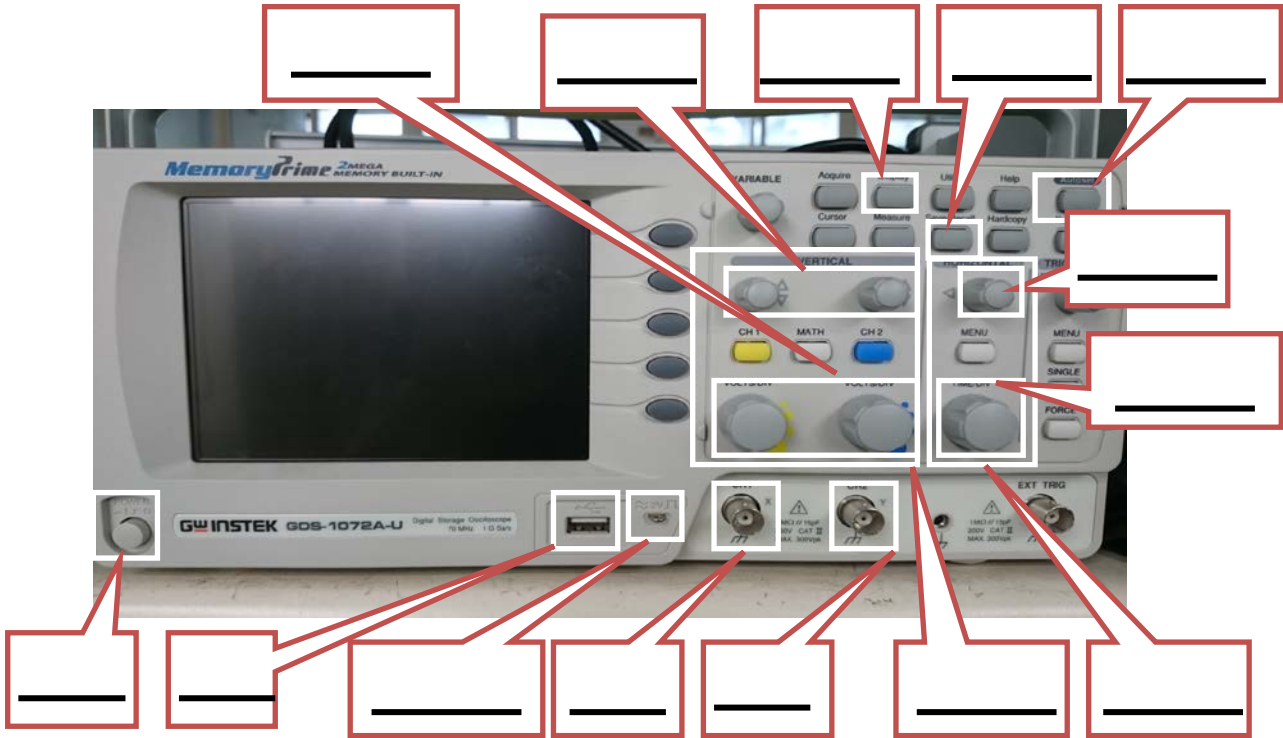
For students majoring in electronics, a basic of knowledge of commonly-used electronic equipment is required.

2. **electronic experiment** 電子實驗

In this workshop, we are going to explore the world of electronics through many electronic experiments.

Activity Time—Find by Yourself

Here is a picture of an oscilloscope. Please write the correct Chinese term for each word.



Conversation 2

Calibrate an oscilloscope 校正示波器

Teacher: Students, I am going to introduce how to correctly **calibrate**¹ an oscilloscope. Please pay attention because it is a **necessary**² **step**³ every time before we use an oscilloscope. The purpose is to **ensure**⁴ that the equipment is accurate.

Step 1: **Connect**⁵ to power.

Step 2: Press the power button.

Step 3: Press the "Save/Recall" button to **recover**⁶ the machine to **default**⁷.

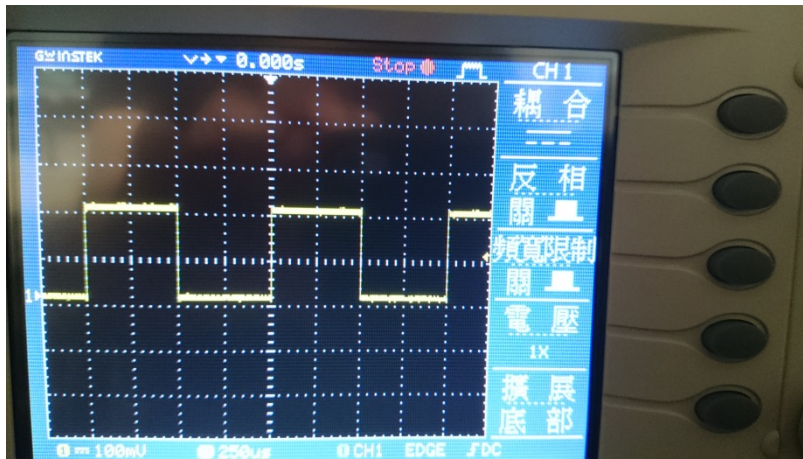
Step 4: Use the **probe**⁸ to connect the **input**⁹ pole of **channel**¹⁰ one with the output pole of the probe **compensation**¹¹ signal.

Step 5: **Attenuate**¹² the voltage of the probe by ten times.

Step 6: Press the "**Auto Set1**" button so that the waveforms can display on the center of the screen.

Step 7: Press the "Display" button, and choose function waveform types.

Step 8: Rotate the adjustment point of the probe to **flatten**¹³ the **edge**¹⁴ of a **square wave**², as shown below.



Step 9: The calibration is done.

Vocabulary

1. **calibrate** [ˈkæləˌbreɪ]

(vt.) 校正

All of the electronic devices, especially those used for medical purposes, should be calibrated some time to time.

2. **necessary** [ˈnesəˌsəri]

(adv.) 必要的

To conserve water resource, it is necessary to plant more trees.

3. **step** [stɛp] (n.) 步驟
We followed the chef's instructions step by step and finally baked a cake.
4. **ensure** [ɪn`ʃʊr] (vt.) 確保
The drinking fountains on campus are inspected every month to ensure their safety.
5. **connect**[kə`nɛkt] (v.) 連接
If you cannot access the webpage, make sure your device is connected to the Internet.
6. **recover**[rɪ`kʌvə] (v.) 回復
My WORD just shut down, but luckily my document was recovered.
7. **default** [di`fɔlt] (n.) 預設值
The recovery system will set the computers to default setting every time they are shut down.
8. **probe** [prɒb] (n.) 探棒
The surgeon used a probe to explore the wound before she treated it.
9. **input** [ˈɪn,pʊt] (n.) 輸入端
To speak through this amplifier, you need to insert your microphone cord into the input pole.
10. **channel** [ˈtʃænl] (n.) 頻道
Please switch your intercom to channel 3 to keep contact.
11. **compensation** [ˌkɒmpən`seɪən] (n.) 補償
A constant voltage device works as a compensation for low or high voltage in an electrical circuit, keeping its output the same within a given range of input.
12. **attenuate** [ə`tɛnjʊ,et] (v.) 衰減
An attenuator is used to attenuate the power of a signal without distorting its waveform.
13. **flatten** [ˈflætɪn] (vi) 使平滑
The blacksmith flattens a piece of metal by punching on it with a hammer.
14. **edge** [ɛdʒ] (n.) 邊緣
3-D printing is a cutting-edge technology.

Idioms & Phrases

1. **Auto set** 自動設置
You can test the waveform with the oscilloscope by just connecting the positive and the negative poles correctly to the equipment and then press the AUTOSSET button.
2. **square wave** 方波
Square waves usually make an electric guitar sound hollow.

Activity Time—Find by Yourself

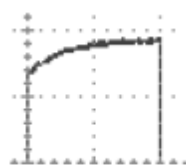
How do we know waveforms need calibration?我們怎麼知道波形需要校正？

Case 1:

If the following waveform is shown on an oscilloscope, it is known as "over compensation." In this case, rotate the adjustment point of the probe to flatten the edge of the square wave before proceeding.

第一種情形:

若示波器顯示波形出現下圖，則為過補償情形。此種情形必須旋轉探棒可調點，平滑方波邊緣，才能繼續操作下去。



Over
Compensation

Case 2:

If the following waveform is shown on an oscilloscope, it is normal. Proceed the rest procedures.

第二種情形:

若示波器顯示波形出現下圖，則為正常情形。此種情形可以直接繼續操作。



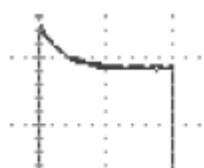
Normal

Case 3:

If the following waveform is shown on an oscilloscope, it suggests "under compensation." In this case, rotate the adjustment point of the probe to flatten the edge of the square wave before proceeding.

第三種情形:

若示波器顯示波形出現下圖，則為補償不足情形。此種情形必須旋轉探棒可調點，平滑方波邊緣，才能繼續操作下去。



Under
Compensation

Now, it is your turn. Find an oscilloscope and apply the procedures to check the oscilloscope.

Conversation 3

Measure the waveform 測量波形

Teacher: Students, after we finished calibrating the oscilloscope, we may start to measure the waveform. Please follow the steps to make your measurement.

- Step 1: Use a **function generator**¹, and adjust its **output**² signal to be a sine wave signal at 1k Hz with a 0.5 voltage peak-to-peak value.
- Step 2: Connect the input pole of channel 1 of the oscilloscope with the output pole of the function wave generator.
- Step 3: Press the AUTOSET button.
- Step 4: **Record**³ the waveform shown on the screen of the oscilloscope on the workbook.

老師：同學們，當示波器校正完成後，我們就可以測量波形了。請依照以下步驟完成測量。

- 步驟 1. 使用一臺函數波產生器調整輸出信號為 1k 赫茲，峰對峰值為 0.5 伏特的正弦波信號。
- 步驟 2. 將示波器 CH1 信號輸入端連接到函數波產生器輸出端。
- 步驟 3. 按下自動設置鍵。
- 步驟 4. 記錄示波器螢幕顯示的波形於實驗本中。

Vocabulary

1. **function generator** [ˈfʌŋkʃən] [ˈdʒɛnəˌreɪtə] 函數波產生器

A function generator can produce common waveforms such as sine, square, triangular and saw tooth shapes.

2. **output** [ˈaʊtˌpʊt] (n.)輸出

Since the factory improved its assembly line, the output of cars has increased 30 percent.

3. **record** [rɪˈkɔrd] (v.)記錄

This application can record the time and distance that you have run.

Activity Time—Find by Yourself

According to the above procedure, adjust the output signal of the function generator to be a rectangular wave signal at 1k Hz with a 1 voltage peak-to-peak value. Display the waveform on your oscilloscope.

請依照上述課文的步驟，調整函數波產生器出信號為 2k 赫茲，峰對峰值為 1 伏

特的三角波信號並顯示在示波器螢幕中。

教師手冊

Unit 1 : Oscilloscope 101 基本示波器操作與量測

Conversation 1

Introduction to an oscilloscope 示波器介紹

Teacher: Students, do you know which electronic equipment is most widely used and multi-functional in electronic experiments?

老師：同學們，知道哪一項設備是電子實驗中用途最廣、功能最強的電子儀器嗎？

Students: Mmm... we have no idea.

學生們：不知道！

Teacher: It is the oscilloscope.

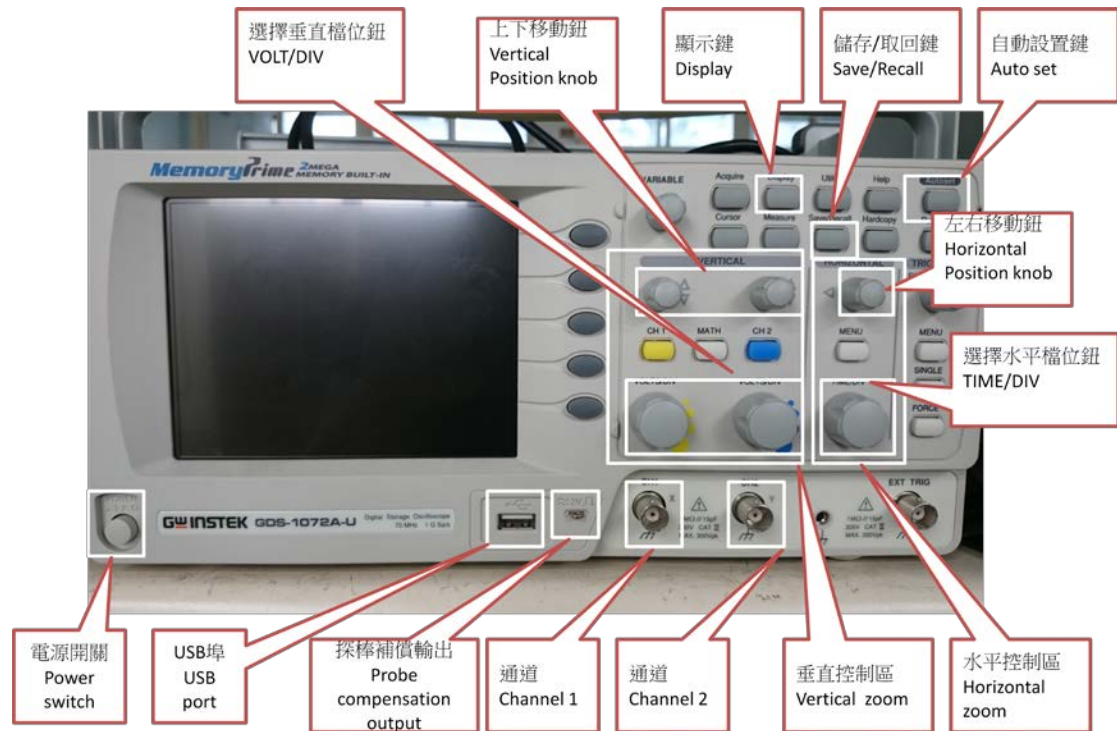
老師：答案是示波器。

Students: What exactly is it?

學生們：示波器具什麼功能呢？

Teacher: An oscilloscope is mainly used to observe and measure the changes in amplitude and waveforms of the electrical signals. The picture below shows the oscilloscope that we will be using in our experiment. In order to operate it smoothly, please concentrate on the most-frequently used buttons.

老師：示波器主要的功能是觀察及測量電器信號振幅或波形的變化。下圖是本次實習所使用的示波器。為了要能夠順利操作，請同學們專心認識常用按鍵名稱。



Vocabulary

1. **equipment** [i'kwɪpmənt] (n.) 設備
This lab offers the most advanced equipment for your medical research.
這間實驗室提供你最先進的儀器來進行醫學研究。
2. **oscilloscope** [ə'sɪləskop] (n.) 示波器
During our first workshop session, the teacher taught us how to operate an oscilloscope.
在第一節實習課，老師教我們使用示波器。
3. **observe** [əb'zɜ:v] (vt.) 觀察
A space telescope can be used to observe stars in the sky.
天文望遠鏡可以用來觀察天空中的星星。
4. **measure** ['meɪʒə] (vt.) 測量
After we measured our living room, we had no choice but to give up this sofa set because it couldn't fit in the space.
我們測量過客廳的大小之後不得不放棄這套沙發，因為它無法放進這個空間。
5. **amplitude** [ˈæmplɪtjud] (n.) 振幅
The amplitude of the ocean tells you how big a wave can be.
海洋的振幅可以告訴你一個浪能有多大。
6. **waveform** ['wev,fɔ:rm] (n.) 波形
A waveform tells you how frequent the wave is and how big the wave can be.
波形會告訴我們一個波的頻率和強度。
7. **operate** [ˈɒpə'ret] (vi.) 操作

Users must follow the instructions on the manual when operating the machine.
使用者在操作時必須依照操作手冊中的指示。

8. **smoothly** [smuðli] (adv.)順利地

The airplane landed smoothly though one of the turbine engines had a failure.
雖然一個渦輪引擎失效，飛機仍然順利地降落了。

9. **concentrate on** [ˈkɒnsən,treɪ ɒn] (vt.) 專心於

His whole attention was concentrated on the experiment.
他的注意力完全集中在實驗上。

10. **button** [ˈbʌtn] (n.) 按鍵

The "Backspace" button on the keyboard allows you to delete the things you just keyed in.

鍵盤上的 Backspace 鍵可以讓你刪除已輸入的資料。

Idioms & Phrases

1. **electronic equipment** 電子儀器

For students majoring in electronics, a basic of knowledge of commonly-used electronic equipment is required.

對主修電子學的學生來說，對常使用的電子儀器有基礎的了解是必備的。

2. **electronic experiment** 電子實驗

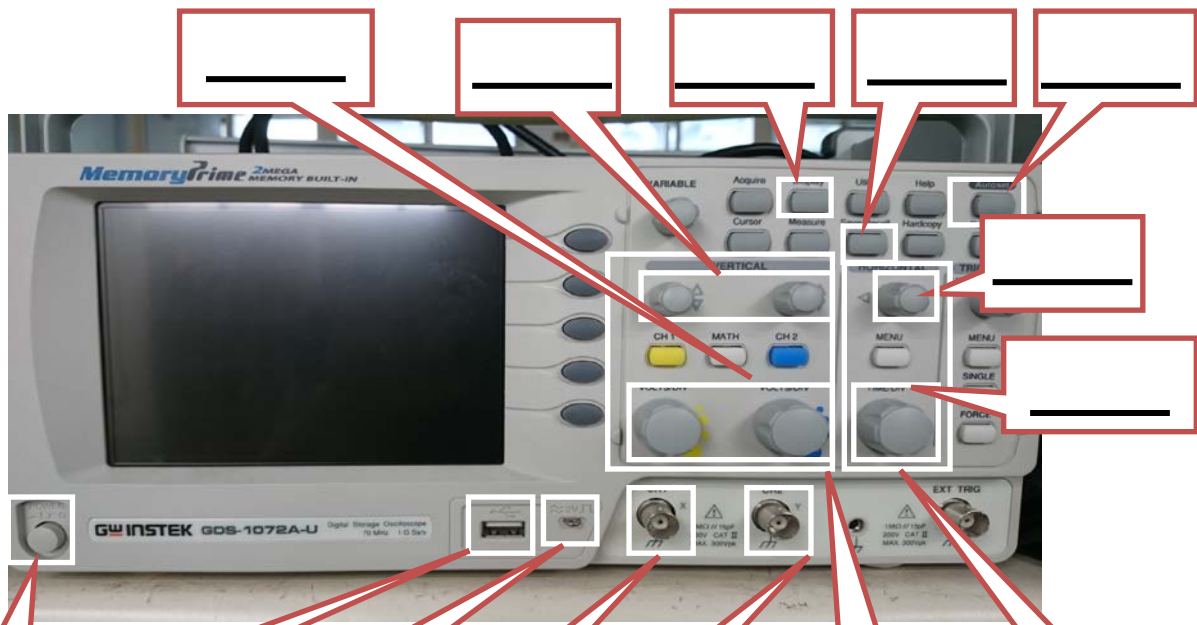
In this workshop, we are going to explore the world of electronics through many electronic experiments.

在這門實習課中，我們將藉由很多電子實驗探究電子學的領域。

Activity Time—Find by Yourself

Here is a picture of an oscilloscope. Please write the correct Chinese term for each word.

以下是一台示波器的照片。請用中文標出每個欄位。



Conversation 2

Calibrate an oscilloscope 校正示波器

Teacher: Students, I am going to introduce how to correctly calibrate an oscilloscope. Please pay attention because it is a necessary step every time before we use an oscilloscope. The purpose is to ensure that the equipment is accurate.

老師：同學們，以下介紹如何正確校正示波器。請注意，這是每次要操作示波器之前的必要步驟，目的是為了要確保示波器功能正常。

Step 1: Connect to power.

步驟 1. 連接電源。

Step 2: Press the power button.

步驟 2. 按下電源按鈕。

Step 3: Press the "Save/Recall" button to recover the machine to default.

步驟 3. 按下 Save/Recall 鍵，使示波器回復預設值。

Step 4: Use the probe to connect the input pole of channel one with the output pole of the probe compensation signal.

步驟 4. 使用探棒與頻道 1 輸入端和探棒補償信號輸出端相接。

Step 5: Attenuate the voltage of the probe by ten times.

步驟 5. 設置探棒衰減 10 倍電壓。

Step 6: Press the "Auto Set" button so that the waveforms can display on the center of the screen.

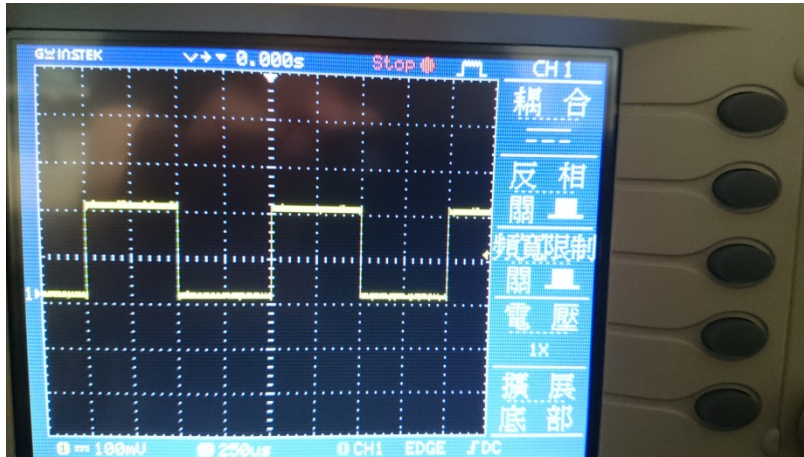
步驟 6. 按下自動設置鍵。讓方波顯示在螢幕的中心位置。

Step 7: Press the "Display" button, and choose the function waveform type.

步驟 7. 按下顯示鍵，選擇 Type 向量波形類型。

Step 8: Rotate the adjustment point of the probe to flatten the edge of a square wave, as shown below.

步驟 8. 旋轉探棒可調點，平滑方波邊緣，如下圖所示。



Step 9: The calibration is done.

步驟 9. 示波器校正完成。

Vocabulary

1. **calibrate** [ˈkæləˌbreɪt]

(vt.) 校正

All of the electronic devices, especially those used for medical purposes, should be calibrated some time to time.

全部的電子儀器，尤其是拿來用作醫療用途的儀器，都經常需要校正。

2. **necessary** [ˈnesəˌsəri]

(adv.) 必要的

To conserve water resource, it is necessary to plant more trees.

為了保存水資源，多種樹是必要的。

3. **step** [step]

(n.) 步驟

We followed the chef's instructions step by step and finally baked a cake.

我們依照大廚的指令，一個步驟接著一個步驟烤好了一個蛋糕。

4. **ensure** [ɪnˈʃʊr]

(vt.) 確保

The drinking fountains on campus are inspected every month to ensure their safety.

學校的飲水機每個月都會檢查以維持安全。

5. **connect** [kəˈnɛkt]

(v.) 連接

If you cannot access the webpage, make sure your device is connected to the Internet.

如果你無法連上網頁，先確認你的機器是否連上了網際網路。

6. **recover** [rɪˈkʌvə]

(v.) 回復

My WORD just shut down, but luckily my document was recovered.

我的 WORD 剛剛掛掉，但幸好文件有回復回來。

7. **default** [dɪˈfɔlt]

(n.) 預設值

The recovery system will set the computers to default setting every time they are shut down.

每次關機時，還原系統會將電腦設回預設值。

8. **probe** [prɒb] (n.) 探棒
The surgeon used a probe to explore the wound before she treated it.
在治療傷口前，醫生先用探棒檢查傷口。
9. **input** [ˈɪn.pʊt] (n.) 輸入端
To speak through this amplifier, you need to insert your microphone cord into the input pole.
要用這台擴大機講話，請先將你的麥克風線插進輸入端。
10. **channel** [ˈtʃænl] (n.) 頻道
Please switch your intercom to channel 3 to keep contact.
請將對講機調到第 3 頻道來保持聯繫。
11. **compensation** [ˌkɒmpənˈseɪʃən] (n.) 補償
A constant voltage device works as a compensation for low or high voltage in an electrical circuit, keeping its output the same within a given range of input.
一台恆壓裝置可以補償電路中過高或過低的電壓，使其輸出維持在一定的範圍內。
12. **attenuate** [əˈtɛnjʊ,et] (v.) 衰減
An attenuator is used to attenuate the power of a signal without distorting its waveform.
一台衰減器可以用來衰減信號的強度卻不會使其失真。
13. **flatten** [ˈflætɪn] (vi) 使平滑
The blacksmith flattens a piece of metal by punching on it with a hammer.
鐵匠用鐵鎚將金屬邊緣敲平。
14. **edge** [ɛdʒ] (n.) 邊緣
3-D printing is a cutting-edge technology.
3D 列印是領先的科技。

Idioms & Phrases

1. **Autoset** 自動設置
You can test the waveform with the oscilloscope by just connecting the positive and the negative poles correctly to the equipment and then press the AUTOSSET button.
用示波器測試波型時只要將正負極接好後按 AUTOSSET 鍵即可。
2. **square wave** 方波
Square waves usually make an electric guitar sound hollow.
方波通常會使電吉他的聲音聽起來較空洞。

Activity Time—Find by Yourself

How do we know waveforms need calibration?

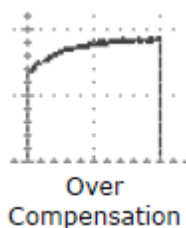
我們怎麼知道波形需要校正？

Case 1:

If the following waveform is shown on an oscilloscope, it is known as "over compensation." In this case, rotate the adjustment point of the probe to flatten the edge of the square wave before proceeding.

第一種情形:

若示波器顯示波形出現下圖，則為過補償情形。此種情形必須旋轉探棒可調點，平滑方波邊緣，才能繼續操作下去。

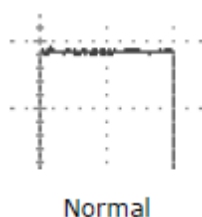


Case 2:

If the following waveform is shown on an oscilloscope, it is normal. Proceed the rest procedures.

第二種情形:

若示波器顯示波形出現下圖，則為正常情形。此種情形可以直接繼續操作。

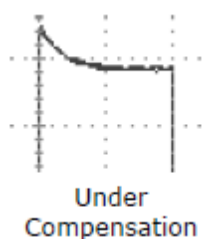


Case 3:

If the following waveform is shown on an oscilloscope, it suggests "under compensation." In this case, rotate the adjustment point of the probe to flatten the edge of the square wave before proceeding.

第三種情形:

若示波器顯示波形出現下圖，則為補償不足情形。此種情形必須旋轉探棒可調點，平滑方波邊緣，才能繼續操作下去。



Now, it is your turn. Find an oscilloscope and apply the procedures to calibrate it.

換你做做看。請動手校正一台示波器。

Conversation 3

Measure the waveform 測量波形

Teacher: Students, after we finished calibrating the oscilloscope, we may start to measure the waveform. Please follow the steps to make your measurement.

老師：同學們，當示波器校正完成後，我們就可以測量波形了。請依照以下步驟完成測量。

Step 1: Use a function generator, and adjust its output signal to be a sine wave signal at 1k Hz with a 0.5 voltage peak-to-peak value.

步驟 1. 使用一臺函數波產生器調整輸出信號為 1k 赫茲，峰對峰值為 0.5 伏特的正弦波信號。

Step 2: Connect the input pole of channel 1 of the oscilloscope with the output pole of the function wave generator.

步驟 2. 將示波器 CH1 信號輸入端連接到函數波產生器輸出端。

Step 3: Press the AUTOSSET button.

步驟 3. 按下自動設置鍵。

Step 4: Record the waveform shown on the screen of the oscilloscope on the workbook.

步驟 4. 記錄示波器螢幕顯示的波形於實驗本中。

Vocabulary

1. **function generator** [ˈfʌŋkʃən] [ˈdʒɛnəˌretə] 函數波產生器

A function generator can produce common waveforms such as sine, square, triangular and saw tooth shapes.

函數波產生器可以產生常見的波形，例如正弦波、方波、三角波和鋸齒波。

2. **output** [ˈaʊt.pʊt] (n.)輸出

Since the factory improved its assembly line, the output of cars has increased 30 percent.

自從工廠改善了組裝線，車輛產出量增加了百分之三十。

3. **record** [rɪˈkɔrd] (v.)記錄

This application can record the time and distance that you have run.

這個應用程式可以紀錄你跑步的時間和距離。

Activity Time—Find by Yourself

According to the above procedure, adjust the output signal of the function generator to be a rectangular wave signal at 1k Hz with a 1 voltage peak-to-peak value. Display

the waveform on your oscilloscope.

請依照上述課文的步驟，調整函數波產生器出信號為 2k 赫茲，峰對峰值為 1 伏特的三角波信號並顯示在示波器螢幕中。

作業解答

一、單字練習（請在中文的口內填寫正確的英文編號）

- | | |
|------------------------|-------------------------------------|
| 1. attenuate | 3. <input type="checkbox"/> 示波器 |
| 2. channel | 2. <input type="checkbox"/> 頻道 |
| 3. oscilloscope | 1. <input type="checkbox"/> 減弱 |
| 4. default | 5. <input type="checkbox"/> 輸入 |
| 5. input | 4. <input type="checkbox"/> 預設值 |
| 6. waveform | 10. <input type="checkbox"/> 函數波產生器 |
| 7. compensation | 6. <input type="checkbox"/> 波型 |
| 8. square wave | 9. <input type="checkbox"/> 按鍵 |
| 9. button | 11. <input type="checkbox"/> 振幅 |
| 10. function generator | 7. <input type="checkbox"/> 補償 |
| 11. amplitude | 14. <input type="checkbox"/> 記錄 |
| 12. probe | 13. <input type="checkbox"/> 輸出 |
| 13. output | 12. <input type="checkbox"/> 探棒 |
| 14. record | 8. <input type="checkbox"/> 方波 |

二、選擇題

1. According to conversation 1, which of the following is NOT a function of an oscilloscope?
 - A. To measure the shape of a waveform.
 - B. To measure the amplitude of a waveform.
 - C. To observe variations of a waveform.
 - D. To generate all types of waveforms.
2. According to conversation 1, which of the following procedures is FALSE if a square wave is over-compensated?
 - A. Rotate the adjustment point of the probe to flatten the edges of the square wave.
 - B. Keep measuring regardless of the situation.
 - C. Both of the above.
 - D. None of the above.
3. If a sine wave signal, with 3k Hz and peak-to-peak value=2 voltage, is to be generated by a function generator, it should be done in which of the following procedures?
 1. Connect the oscilloscope.
 2. Use a function generator.
 3. Press the AUTOSET button.
 4. Adjust its output signal to be a sine wave signal at 3k Hz with a 2 voltage Peak-to-peak value.

A. 1234 B. 1423 C. 2413 D. 4123

Answer: DAC

三、填充式翻譯

1. 校正是確保電子儀器正確性的必要步驟。

Calibration is a _____ to _____ the accuracy of an electronic device.

2. 請將電腦還原到原始預設值。

Please _____ the computer to its _____ setting.

3. 當操作這個電子儀器時你可以參考說明書。

You can read the user's manual when you _____ the _____.

4. 在電子學實驗中，留意訊號波形的變化。

During the _____, pay attention to the changes in the _____ of the signals.

- Answer:** 1. necessary, step, ensure
2. recover, default
3. operate, electronic, equipment
4. electronic, experiment, waveform

英語教學教案

單元名稱	Unit 1 : Oscilloscope 101 基本示波器操作與量測	教材來源	電子學實習
教學日期	月 日	教學時間	100 分鐘
教學年級	一年級	教學設計者	林漢璿、王韻婷
教材研究分析	<p>(1)以示波器為主題，配合電子學所學之知識，用對話的方式來說明，並配合學生程度及實用性。</p> <p>(2)以主詞第一、二人稱為主，減少文法上的複雜性。</p>		
學生學習經驗分析	<p>(1)對字母 A~Z 有大致的認識</p> <p>(2)學過電子學</p> <p>(3)能了解一般的問候語和上課用語</p>		
教學資源	<p>1.設備：黑板、粉筆、磁鐵</p> <p>2.教具：示波器、函數波產生器、探棒</p> <p>3.場所：利用電子學實習工場教室，而教室則必須有廣播設備</p>		
教學目標	單元目標	具體目標（能力指標）	
	<p>【認知】</p> <p>1.能熟記本單元英語單字</p> <p>2.能學會本單元對話</p> <p>3.能了解本單元對話。</p> <p>【情意】</p> <p>1.樂於積極參與教室活動。</p> <p>2.欣賞並學習表現好的同學。</p> <p>3.與同學完成活動，表現自信。</p> <p>【技能】</p> <p>1.能聽說讀寫出本單元的對話。</p> <p>2.能依對話內容操作示波器。</p> <p>3.能校正示波器。</p>	<p>【聽】</p> <p>1-1.能聽辨課堂中所學習的字彙。</p> <p>1-2.能聽懂簡單的對話句子。</p> <p>1-3.能聽懂電子學相關對話。</p> <p>1-4.能聽懂教師所詢問的問題內容。</p> <p>【說】</p> <p>2-1.能說出課文中所學習的詞彙。</p> <p>2-2.能以正確的語調說出對話。</p> <p>2-3.能學習用提問、回答和敘述方式對話。</p> <p>【讀】</p> <p>3-1.能完整了解對話的句子。</p> <p>3-2.能將對話的句子以中文翻譯出來。</p> <p>3-3.用其他的單字或片語替換對話內容。</p> <p>【寫】</p> <p>4-1.能書寫印刷體大小的對話句子。</p> <p>4-2.能臨摹抄寫課文中所學習句子。</p> <p>4-3.能臨摹替換文字，並形成句子。</p>	

教 學 流 程		教 學 活 動	教 學 資 源	時 間	形 成 性 評 量
		壹、準備活動			
		暖身 / Warm-up & 複習 / Review			
		【暖身】			
		1.和學生相問候。		1'	
		2.今天以兩人為一組，表現優異者可獲得加分卡哦！			
		【複習】			
1-1		1.首先，老師帶領學生複習上週學習單元的單字及對話。	單字卡	3'	能說出正確的字母
2-1		2.老師利用英文單字，由同學搶答，答對的組別每一位同學得加分卡一張，如果沒有同學舉手，就以抽籤筒抽出同學回答。	抽籤筒		
2-2		3.由各組主動舉手在同學面前練習對話，表現好的同學，該組同學都可得一張加分卡。	加分卡		
3-1					
		貳、發展活動			
		Conversation 1			
1-1		What exactly is N.?		5'	能了解句型的意義並唸出。
1-2		What does it do?			
2-1		到底...是什麼東西？它是作什麼用的？			
2-2		此句常用於日常生活，以詢問物品的性質或用途。可用不同名詞給學生練習來熟悉此句型。			
3-1		例：What exactly is a vacuum cleaner?吸塵器是什麼東西？What does it do?它有什麼用途？			能了解句型的意義並配合單字加以運用。
		呈現 / Presentation			
		【呈現單字】			
1-1		1.老師講解並帶著學生朗讀各個單字，使學生了解其意義和字音。	單字卡	3'	能了解各個單字的意義並唸出其字音。
2-1		2.任意選單字卡，以抽籤或自願方式選取學生來說出其單字中文名稱。	報紙		
		3.以圖片方式讓學生了解示波器功能，並知道各按鍵的功能。	抽籤筒 加分卡 示波器		

	練習 / Practice			
1-1	【對話練習】			3'
2-1	1.老師示範讀出每個對話，並加以說明。 ※老師請充滿表情，對師生角色對換。 2.老師抽出一組同學練習，完成者給予2張加分卡。 3.每組同學相互練習，互相扮演學生及老師。 4.老師詢問同學，哪一句可以應用在生活中，請同學發表及用英文說出，表現優異同學發一張加分卡。	報紙 抽籤筒 加分卡		能辨別並唸出老師所指的單字。
	活動 Activity			
1-1	1. 先以圖片解釋示波器按鍵。			
2-1	2. 在活動中請學生以自己動手寫的方式，熟悉示波器的結構。	示波器		10'
	Conversation 2			
1-2	練習祈使句 V. + O.			
1-3	此句為日常生活中表達命令、給與指示、講解順序常用到的句型，可以搭配 before, after, when...	單字卡		5'
2-2	等連接詞來加強練習解說順序的對話。例如：	抽籤筒		
3-1	Connect to the Internet and open the browser.	加分卡		
3-2				
	呈現 / Presentation			
1-1	【呈現單字】	單字卡		3'
2-1	1.以單字卡及示波器帶出單字。 2.老師講解並帶著學生朗讀各個單字，使學生了解其意義和字音。 3.任意選單字卡，以抽籤或自願方式選取學生來說出其單字。	示波器 抽籤筒 加分卡		能了解各個單字的意義並唸出其字音。
	練習 / Practice			
1-1	【遊戲 1—搶單字及圖片】			3'
2-1	1.學生分兩大組，各組排隊，每組一次出一人出來競賽，老師必須唸出單字，學生跑到黑板前去搶單字卡，搶到者該組加一分。 2.最後總計分，得分最高的一組，每人發一張加分卡。	示波器 抽籤筒 加分卡		能辨別並唸出老師所指的單字。
	【對話練習】			2'

1-1	1.老師示範讀出每個對話，並加以說明。			的意義並唸出。
2-1	※老師請充滿表情，對左右角色對換，如果能用師生不同語調檢對話更佳。			能了解句型的意義並配合單字加以運用。
	2.老師抽出一組同學練習，完成者各給予一張加分卡。			
	3.每組同學相互練習，互相扮演學生與老師。			
	4.老師詢問同學，哪一句可以應用在生活中，請同學發表及用英文說出，表現優異同學發一張加分卡。			
	活動 Activity	示波器		
1-1	1.讓學生有校正電子儀器的相關知識，並知如何操作。	單字卡	20	能了解如何校正示波器
2-1	2.讓學生去收集相關知識，並帶學生討論電子儀器不校正的可怕後果。	加分卡		
	Conversation 3			
1-2	持續練習祈使句及說明一個流程。		5'	能了解句型的意義並唸出。
1-3	句型： V. O., and then V. O.			
2-2	先...然後再...。			能了解句型的意義並配合單字加以運用。
3-1	用於向他人解釋一個工作流程的日常對話，可以			
3-2	讓學生多練習並用於日常生活中。			
	呈現 / Presentation	抽籤筒		
	【呈現單字】	加分卡	3'	能了解各個單字的意義並唸出其字音。
1-1	1.以單字卡及圖片帶出單字。			
2-1	2.老師講解並帶著學生朗讀各個單字，使學生了解其意義和字音。			
	3.任意選出單字卡，以抽籤或自願方式選取學生來說出其單字。			
	練習 / Practice	抽籤筒		
	【遊戲 1】	加分卡	5'	能辨別並唸出同學所形容的流程。
1-1	1.由老師先做好 10~20 個籤，每個籤是一個任務，例如「打一杯木瓜牛奶」、「用電鍋煮五碗米」、「去上網搜尋最近的捷運站」，任務必須是學生這個年齡有的生活經驗，避免因單字太難而無法表達。			
2-1	2.請同學自願上台抽籤，再用英文解釋這個工作流程後，由台下同學舉手猜出這個任務。例如抽籤同學說：First, peel the fruit and take out its seeds. Slice the fruit into pieces and then put them into the			

<p>1-2</p> <p>1-3</p> <p>2-2</p> <p>3-1</p> <p>3-2</p> <p>4-1</p> <p>4-2</p> <p>4-3</p>	<p>machine. Add some milk and water. Turn the machine on and blend for 30 seconds. 台下同學可就猜出來這個是「打木瓜牛奶」。</p> <p>【對話練習】</p> <p>1.老師示範讀出每個對話，並加以說明。</p> <p>※老師請充滿表情，對左右角色對換，如果能用師生不同語調檢對話更佳。</p> <p>2.老師抽出一組同學練習，完成者給予一張加分卡。</p> <p>3.每組同學相互練習，互相扮演學生及老師。</p> <p>4.老師詢問同學，哪一句可以應用在生活中，請同學發表及用英文說出，表現優異同學發一張加分卡。</p> <p>活動 Activity</p> <p>1. 讓學生學習如何測量波型。</p> <p style="text-align: center;">參、綜合活動</p> <p>結尾 / Wrap-up</p> <p>1.將今天所學複習一遍。</p> <p>2.計算今天每個人所得的分數。</p> <p>3.交代功課(作業單)。</p> <p>4.Say “Goodbye” to everyone!</p>	<p>示波器</p> <p>學習單</p>	<p>2'</p> <p>20'</p> <p>5'</p> <p>2'</p>	<p>能了解句型的意義並唸出。</p> <p>能了解句型的意義並配合單字加以運用。</p> <p>能觀察波型</p> <p>能了解句型的意義並唸出。</p> <p>能了解句型的意義並配合單字加以運用。</p>
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參考資料：

GDS-1000A-U Series 數位儲存示波器操作手冊，固緯電子實業股份有限公司，2011年4月

班級_____ 學號_____ 姓名_____

一、寫出下列單字的中文：

- 1. oscilloscope
- 2. waveform
- 3. attenuate
- 4. compensation
- 5. calibrate

二、重組

- 1. It is/ an electronic device/ a necessary step/ before operating/ it/ to calibrate

- 2. By setting the system/ you may/ lose the data/ to its default/ you have had

- 3. You/ need to/ insert/ to the output pole/ the earphone/ of your computer

三、問答題

Provide common functions of an oscilloscope. You may search for more information on the Internet.

- 1. _____

- 2. _____

- 3. _____

作業單

班級_____ 學號_____ 姓名_____

一、單字練習（請在中文的□內填寫正確的英文編號）

- | | |
|------------------------|---------------------------------|
| 1. attenuate | <input type="checkbox"/> 示波器 |
| 2. channel | <input type="checkbox"/> 頻道 |
| 3. oscilloscope | <input type="checkbox"/> 減弱 |
| 4. default | <input type="checkbox"/> 輸入 |
| 5. input | <input type="checkbox"/> 預設值 |
| 6. waveform | <input type="checkbox"/> 函數波產生器 |
| 7. compensation | <input type="checkbox"/> 波型 |
| 8. square wave | <input type="checkbox"/> 按鍵 |
| 9. button | <input type="checkbox"/> 振幅 |
| 10. function generator | <input type="checkbox"/> 補償 |
| 11. amplitude | <input type="checkbox"/> 記錄 |
| 12. probe | <input type="checkbox"/> 輸出 |
| 13. output | <input type="checkbox"/> 探棒 |
| 14. record | <input type="checkbox"/> 方波 |

二、選擇題

1. According to conversation 1, which of the following is NOT a function of an oscilloscope?
 - A. To measure the shape of a waveform.
 - B. To measure the amplitude of a waveform.
 - C. To observe variations of a waveform.
 - D. To generate all types of waveforms.
2. According to conversation 1, which of the following procedures is FALSE if a square wave is over-compensated?
 - A. Rotate the adjustment point of the probe to flatten the edges of the square wave.
 - B. Keep measuring regardless of the situation.
 - C. Both of the above.
 - D. None of the above.
3. If a sine wave signal, with 3k Hz and peak-to-peak value=2 voltage, is to be generated by a function generator, it should be done in which of the following procedures?
 1. Connect the oscilloscope.
 2. Use a function generator.
 3. Press the AUTOSSET button.
 4. Adjust its output signal to be a sine wave signal at 3k Hz with a 2 voltage Peak-to-peak value.

A. 1234 B. 1423 C. 2413 D. 4123

三、填充式翻譯

1. 校正是確保電子儀器正確性的必要步驟。

Calibration is a _____ to _____ the accuracy of an electronic device.

2. 請將電腦還原到原始預設值。

Please _____ the computer to its _____ setting.

3. 當操作這個電子儀器時你可以參考說明書。

You can read the user's manual when you _____ the _____.

4. 在電子學實驗中，留意訊號波形的變化。

During the _____, pay attention to the changes in the _____ of the signals.