High Quality Professional Instruments

DSO MODULE

Instruction Guide

ZEROPLUS

01.Kit Content

DSO Module

Instruction Guide

Single Channel Cable

Dual Channel Cable

Oscilloscope Probe

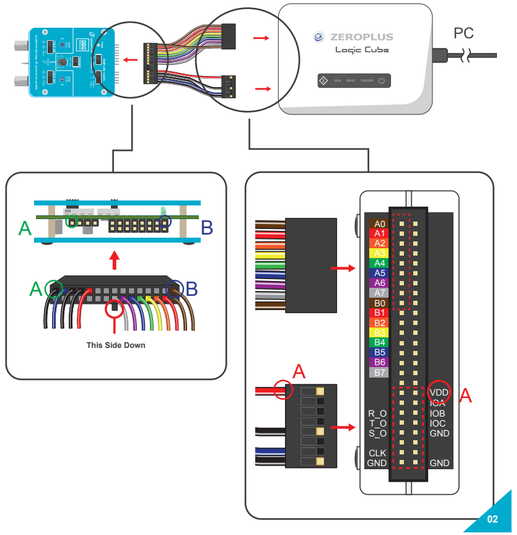
Adjustment Tool

Identification Ring

Positioning Sleeve

02.Operation Steps

1. Take one of the single-channel dedicated cable. Follow the instructions below to insert to the DSO module and logic analyzer LAP-C respectively. Please note: the connection line to the right of the LAP-C is the VDD and control lines



03.Initial setting

1. DSO module initial setting: (Please refer to Note 1: DSO module panel)

4 CH1 VOLT/DIV select 2V /200mV

7 SAMPLING CLOCK select 2.5MHz

8 TRIGGER select CH1

2. Starting software

Install software of LAP-C and start it. (See LAP-C manual, we omitted this part here, do not repeat) Please use the V3.14.03 version or newest version.

3. Software initial setting: (Please refer to Note 2: Software User Interface)

1 MSO(M) select Single channel.

4 Memory select 2K.

5 Sampling Frequency select 2.5MHz.

7 Vertical Scale select 2V / DIV.

10 Trigger Condition select Rising edge.

11 Trigger Mode select Auto.

4. Press start oscilloscope waveform display, CH1 will show a parallel line (the figure shown as below.) because at this time we did not enter the signal. If the time baseline is not on the 0V scale line, please adjust the CH1 0V ADJ with a adjustment tool to move the time baseline to 0V position.

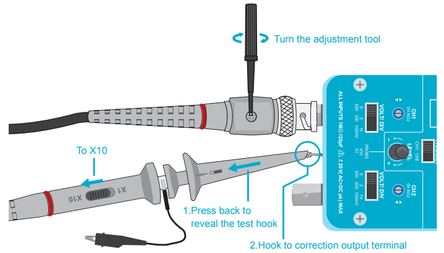
5. Probe stick compensation correction

Please connect the oscilloscope probe to CH1, kindly adjust the switch of 1 X1 / X10 that in front of the probe to be X10, and hook the test hook to correction output terminal.A square wave of more than one cycle is displayed, as shown in the following figure.

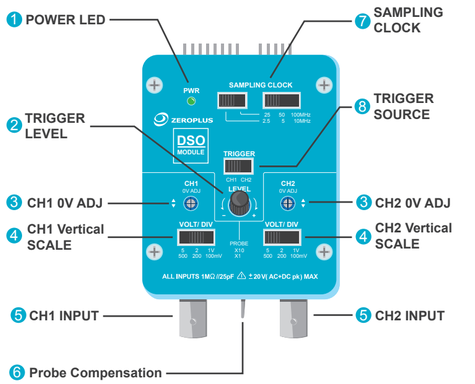
Probe stick compensation correction

If the square wave is not very square, it may be phenomenon that a probe has been overcompensated or undercompensated. This will affect the oscilloscope measurement waveform error. Please use the adjustment tool to adjust the square wave to the most square.

Overcompensated | Compensated correctly | Undercompensated



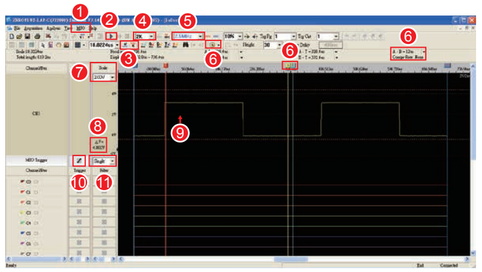
Note 1: DSO module panel



1. POWER LED	After connecting the DSO module and LAP-C, connect LAP-C with your computer, the power indicator (PWR) on the DSO module will be illuminated.

2. TRIGGER LEVEL	By manually adjusting the trigger level knob, you can change the trigger start point position of the displayed waveform. To "+" direction of rotation, the trigger point will move to the positive voltage position. To "-" direction of rotation, the trigger point will move to the negative voltage position.
3. CH1 /2 0V ADJ	When the vertical 0V position of CH1 or CH2 is offset, you must adjust the knob with a adjustment tool to align it with the 0V scale line on the display screen.
4. CH1 /2 Vertical SCALE	This switch can be set to CH1 or CH2 vertical scale. Its stalls are "VOLT/DIV" for the vertical scale factor. When the probe is (X10), the vertical scale is with 5V / DIV, 2V / DIV, 1V / DIV for choice. When the probe is (X1), the vertical scale has 500mV / DIV, 200mV / DIV, 100mV / DIV for choice. In general measurement of TTL or CMOS digital signals, usually vertical scale is set at 2V / DIV (probe X10) is more appropriate. Please kindly note that the setting of this switch must also be consistent with the vertical scale display on the software UI.
5. CH1 /2 INPUT	Input the connector for the display waveform.
6. Prob Compensation	The probe compensation outputs a square wave of about 2 kHz, 3.3 Vpp which is used to adjust the compensation of the probe to match the input circuit of the oscilloscope.
7. SAMPLING CLOCK	This switch can select the oscilloscope sampling frequency including 100MHz, 50MHz, 25MHz, 10MHz, 5MHz, 2.5MHz, total of 6 for choice, each frequency can be in accordance with the test object of high frequency or low frequency signal to appropriately select higher sampling frequency or lower sampling frequency. Please note that the setting of this switch must also be consistent with the sampling frequency on the software UI.
8. TRIGGER Source	This switch can select CH1 or CH2 as the trigger signal for the oscilloscope.

Note 2: Software User Interface

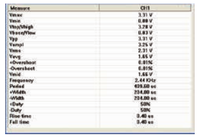


1. Scope Mode

Click this MSO (M) to enter the oscilloscope mode. And it will display the waveforms of the DSO and LA logical channels simultaneously in real time.

According to LAP-C different number of channels of model number, below lists are the maximum number of DSO channels and LA channels can be provided.

MSO (M)	LAP-C 32xxx series	LAP-C 16xxx series
Oscilloscope single channel	DSO 1ch + LA 23ch	DSO 1ch + LA 7ch
Oscilloscope dual channel	DSO 2ch + LA 16ch	DSO 2ch



If the waveform sampling is stopped, click the "Waveform Measurement" function in MSO (M).Then the 19 waveforms of CH1 or CH2 are displayed as below.

2. Run/ Stop — Press can capture the waveform continuously. Press stop capturing.

3. Zoom In/Out — Press can zoom in the waveform. Press can zoom out the waveform.

Waveform zoom, is refer to the center of the window to zoom in or out, and can be operated when the waveform is sampling or paused.

4. Memory Depth

There are several kinds of memory depth:The depth of the size will affect the waveform display update rate, if select 2K- the fastest, if select 32K- relatively slow, the general recommended memory depth is 16K.

5. Sampling Clock

This switch can select the oscilloscope sampling frequency including 100MHz, 50MHz, 25MHz, 10MHz, 5MHz and 2.5MHz, total of 6 for choice. Each frequency can be in accordance with the test object of high frequency or low frequency signal to appropriately select higher sampling frequency or lower sampling frequency.
Please note that the setting of this Sampling Clock must also be consistent with the sampling frequency on the DSO module.

6. Time Cursor

Move the A-bar and B-bar pairs of cursors, you can read the displayed time value to measure.There are three numerical modes that can be selected: time, sampling point, and frequency.

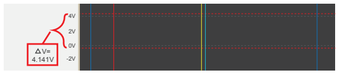
7. Vertical Scale

This switch can be set to CH1 or CH2 vertical scale. Its stalls are "volts / per grid" for the vertical scale factor.

When the probe is (X10), the vertical scale is with 5V / DIV, 2V / DIV and 1V / DIV for choice.
When the probe is (X1), the vertical scale has 500mV / DIV, 200mV / DIV and 100mV / D for choice.

In general measurement of TTL or CMOS digital signals, usually vertical scale is set at 2V / DIV (probe X10) is more appropriate. Please kindly note that this setting must also be consistent with the vertical scale display on DSO.

8. Voltage Cursor — CH1 and CH2 respectively have a pair of horizontal axis cursor (two red dotted lines as shown in below). You could move this cursor to read the displayed voltage parameters for measurement. Such as measuring the peak-to-peak or DC voltage of the waveform.



9. Trigger Level — By manually adjusting the trigger level knob, you can change the trigger start point position of the displayed waveform.
To "+" direction of rotation, the trigger point will move to the positive voltage position,
To "-" direction of rotation, the trigger point will move to the negative voltage position.
The left side of the trigger point is the pre-trigger signal.

10. Trigger Condition

Any signal	Mining all signal period, it won't do any signal triggering decision.	Rising edge	Trigger on the rising edge of the waveform.
High level	Trigger on the high level of the waveform.	Falling edge	Trigger on the falling edge of the waveform.
Low level	Trigger on the low level of the waveform.	Any edge	Trigger on the rising or falling edge of the waveform.

11. Trigger Mode

Auto : The oscilloscope will automatically capture the signal regardless of whether the trigger condition.
Normal : The oscilloscope will capture the signal which is satisfied the rigger condition.
Single : The oscilloscope will capture the signal which is satisfied the rigger condition, but it only captures one time.

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High Quality Professional Instruments

DSO MODULE
數位儲存示波器模組

Instruction Guide
簡易操作手冊

ZEROPLUS

01.配件


數位儲存
示波器模組


簡易操作手冊


單通道排線


雙通道排線


示波器探棒

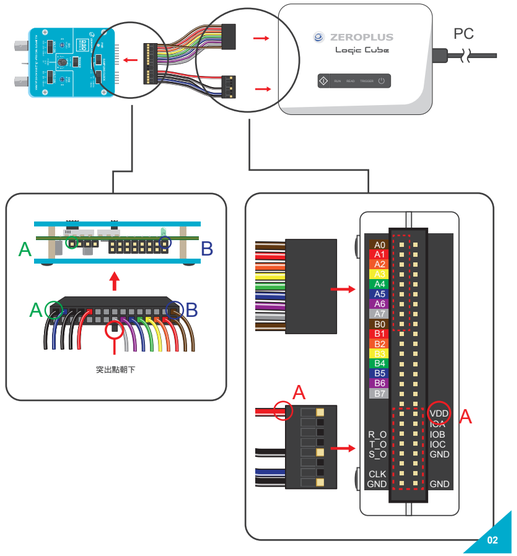
調試棒


標示環

定位套

02.硬體安裝

1. 將單通道排線插入DSO模組與邏輯分析儀LAP-C



03. 初始設定

DSO模組初始設定，請依照下列步驟將DSO面板與軟體介面調整

步驟1　調整DSO面板（操作位置參考 DSO介面說明 ）

④ CH1 垂直刻度選擇 2V /200mV
↓
⑦ 取樣頻率選擇 2.5MHz
↓
⑧ 觸發來源選擇 CH1

步驟2　啟動軟體

安裝LAP-C standard並啟動軟體
（請參見LAP-C使用手冊，請使用V3.14.03或更新之版本。）

步驟3　調整軟體設定（參考 軟體介面說明 ）

① MSO(M)選擇示波器單通道。
↓
④ 記憶體選擇2K。
↓
⑤ 取樣頻率選擇2.5MHz。

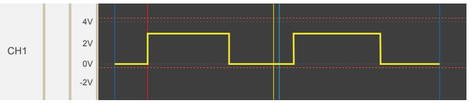
⑦ 垂直刻度選擇2V / DIV。
↓
⑩ 觸發條件選擇 上升緣
↓
⑪ 觸發模式選擇 Auto

步驟4　按下工具列上的 ▶▶ 啟動示波器波形顯示

此時未輸入信號，CH1會呈現一平行直線（如下圖所示），如果時基線未在0V刻度線上，請用調棒調整 (DSO介面CH1 0V位置) 讓軟體時基線移至0V位置。

步驟5　探棒補償校正

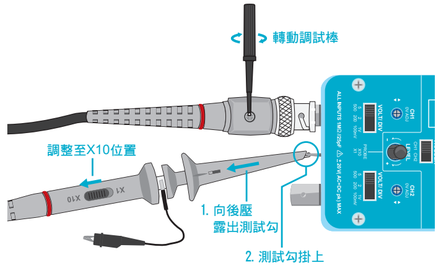
示波器探棒接到CH1，探棒前握處有X1/X10，請切至X10，測試勾掛於校正輸出端子，此時會顯示一個週期以上的方波。



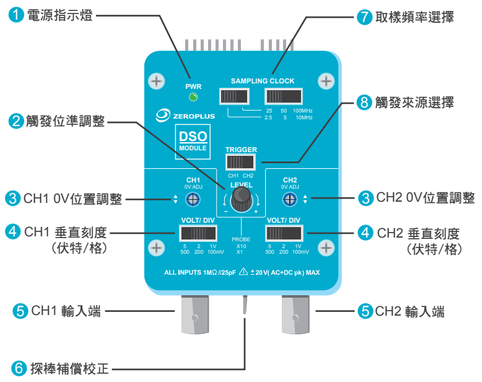
探棒補償校正

當方波不為方正時，探棒有過度補償或欠缺補償的現象，這會影響到示波器量測波形上的誤差，請用調試棒將方波調至方正。


過度補償　正常補償　欠缺補償

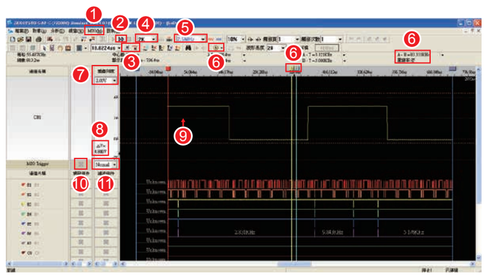


DSO介面說明



1. 電源指示燈	啟動後，燈號亮起
2. 觸發位準調整	可以改變顯示波形的觸發起始點位置。往"+"方向旋轉, 觸發點會往正電壓移動位置，往"-"方向旋轉，觸發點則會往負電壓移動位置。
3. CH1 /2 0V 位置調整	當CH1或CH2的垂直0V位置有偏移時，則必須用調試棒去調整此旋鈕與顯示屏幕上的0V刻度線對齊。
4. CH1 /2 垂直刻度	設定CH1或CH2的垂直刻度，其檔位是以 "伏特/每格" 為垂直比例係數，當探棒 (X10) 時，垂直刻度有 5V/DIV、2V/DIV及1V/DIV，當探棒 (X1) 時，垂直刻度有500mV/DIV、200mV/DIV及100mV/DIV。 在一般量測TTL或CMOS數位信號，通常垂直刻度是設定在2V/DIV（探棒X10）比較恰當，請注意此開關的設定，也必須與軟體UI上的垂直刻度顯示一致。
5. CH1 /2 輸入端	輸入顯示波形的輸入接頭。
6. 探棒補償校正	探棒補償輸出一個約2kHz 3.3Vpp的校正方波，是用來調整探棒的補償藉此來符合示波器的輸入電路。
7. 取樣頻率選擇	選取示波器的取樣頻率，包括：100MHz、50MHz、25MHz、10MHz、5MHz及2.5MHz共計6項，可依待測物為高頻或低頻信號，適當選擇示波器為較高取樣頻率或較低取樣頻率。請注意此開關的設定，也必須與軟體UI上的取樣頻率顯示一致。
8. 觸發來源選擇	選取CH1或CH2來作為示波器的觸發訊號。

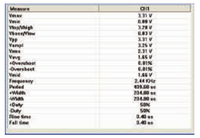
軟體介面說明



1. 示波器模式　點選MSO(M)可以進入示波器模式，並且可即時 (real time) 同時顯示DSO與LA邏輯通道的波形。

依不同的LAP-C通道數機型，可提供以下DSO通道與LA通道的最大數量。

MSO (M)	LAP-C 32xxx 系列	LAP-C 16xxx 系列
示波器單通道	DSO 1ch + LA 23ch	DSO 1ch + LA 7ch
示波器雙通道	DSO 2ch + LA 16ch	DSO 2ch



如果波形暫停取樣，此時點選MSO (M)中的"波形測量"功能，則會顯示CH1或CH2的19項波形參數。

2. 啟動/暫停　按下 ▶▶ 可以連續擷取波形。　按下 ■ 可停止擷取。

3. 水平縮放　按下 可以放大波形。　按下 可以縮小波形。

波形的縮放，是以視窗的中心點局部放大或縮小，並且可以在波形即時取樣時或暫停時運作。

4. 記憶體深度

有多種記憶體深度：記憶體深度的大小會影響到波形的顯示更新率，2K時最快，32K時較慢，一般建議設定記憶體深度為16K。

5. 取樣頻率

取樣頻率有100MHz、50MHz、25MHz、10MHz、5MHz及2.5MHz共計6項，可依待測物為高頻或低頻信號，選擇適當示的取樣頻率。請注意此設定也必須與DSO模組上的取樣頻率選擇開關設定一致。

6. 時間游標

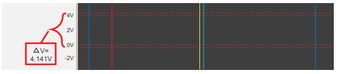
移動 A-bar 與 B-bar 成對出現的游標，可以讀取顯示的時間數值來進行測量，有三種數值的模式可提供選擇：時間、取樣點及頻率。

7. 垂直刻度　設定CH1或CH2的垂直刻度，其檔位是以 "伏特/每格" 為垂直比例係數

當探棒(X10)時，垂直刻度有5V / DIV、2V / DIV及1V / DIV
當探棒 (X1) 時，垂直刻度有500mV / DIV、200mV / DIV及100mV / DIV

在一般量測TTL或CMOS數位信號，通常垂直刻度是設定在2V / DIV（探棒X10) 比較恰當，請注意此設定，必須與DSO模組上的垂直刻度選擇開關設定一致。

8. 振幅游標　CH1與CH2分別有一成對出現的橫軸游標（如下圖之紅色虛線），移動此游標可以讀取顯示的電壓參數來進行測量，例如測量波形的峰峰值或直流電壓。



9. 觸發準位　當手調DSO模組上的觸發位準旋鈕，可以改變顯示波形的觸發起始點位置。往"+"方向旋轉時，觸發點會往正電壓移動位置，往"-"方向旋轉時，觸發點則會往負電壓移動位置，觸發點的左側波形為觸發前訊號 (Pre-Trigger)。

10. 觸發條件

- 任一信號：整個週期內採集信號，不做任何信號的觸發判定。
- 上升緣：在波形的上升緣觸發。
- 高準位：波形為高準位時觸發。
- 下降緣：在波形的下降緣觸發。
- 低準位：波形為低準位時觸發。
- 任一邊緣：在波形的任一邊緣觸發。

11. 觸發模式

Auto：不管是否有滿足觸發條件，示波器會自動擷取信號。
Normal：當滿足觸發條件後進行信號擷取。
Single：當滿足觸發條件後進行信號擷取，但觸發一次只掃描一次。

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