復旦大學

Fundamental Physics Laboratory

Lab Report

Digital Oscilloscope

Name: _____

Student ID: _____

Lab Partner: _____

Group NO.: _____

Supervisor: _____

Date: _____

Purpose：

Principle：（Including background, theory, important formula, circuit and ray diagram）：

Content, procedures and experiment record:

Temperature: **Humidity:**

1. Auto measurement—[AUTO]

Signal to be measured: oscilloscope calibration output signal (Square wave, 1kHz, 3V).
Press "AUTO" and record the results.

Table. 1 Auto measurement results

Parameter	Results	Significance
Vpp		Peak-to-peak voltage
Mean		Average value of the signal amplitude
Prd		The amount of time it takes a wave to complete on cycle.
Freq		The number of times a signal repeats in onesecond.
Vertical sensitivity (volts/div)		The amplitude per division represented.
Horizontal sensitivity (sec/div)		The amount of time per division represented horizontally across the screen.

1) Adjust the "volts/div" knob, observe and record the value of vertical sensitivity and the change of the waveform.

2) Adjust the "sec/div" knob, observe and record the value of horizontal sensitivity and the change of the waveform.

3) Adjust the "POSITION" knob which lies in vertical control area, observe and record the change of the waveform.

4) Adjust the "POSITION" knob which lies in horizontal control area, observe and record the change of the waveform.

2. Signal storage.

Data storage:

Insert the U disk into the USB port, you will hear a beep sound after the U disk is successfully connected.

Press [SAVE/RECALL],

Press the first button to select "Type" [CSV];

Press the second button to select "data depth" [Maximum];

Press the third button to select "Para Save" [On];

Press [Save], then press [New File];

Press [Confirm] after input the file name.

Picture storage:

The process is similar with data storage, the only difference is in the choice of storage type [Picture].

3. Measuring the voltage and time by counting graticule marks.

Continue to measure the calibration output signal, adjust the volts/div, sec/div, and position knobs, let one or two waveform appear on the screen. Figure 1 and 2 show how to measure the voltage and period of a signal.

You take voltage measurement by counting the number of divisions a waveform spans on the oscilloscope's vertical scale. Adjusting the signal to cover most of the screen vertically, then taking the measurement along the center vertical graticule line having the smaller divisions, makes for the best voltage measurements. The more screen area you use, the more accurately you can read from the screen. You take time measurements using the horizontal scale of the oscilloscope. Like voltage measurements, time measurements are more accurate when you adjust the portion of the signal to be measured to cover a large area of the screen. Taking time measurement along the center horizontal graticule line, having smaller divisions, makes for the best time measurements.

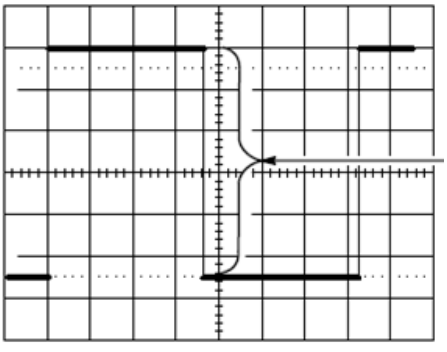

Fig. 1 Measure voltage on the center vertical graticule line

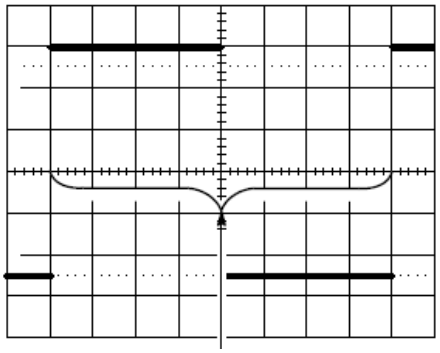

Fig.2 Measure time on the center horizontal graticule line

Formula:

Amplitude (Voltage) = the number of divisions × Vertical sensitivity (volts/div)
Time (Period) = the number of divisions × Horizontal sensitivity (sec/div)
Estimate: 1/5 minor division

1) Measuring the peak-to-peak voltage:

Divisions: volts/div: Vpp:

2) Measuring the period and calculate the frequency:

Divisions: sec/div:

Period: Frequency:

4. Measuring AC signals

Turn on the FUNCTION GENERATOR. Set it to sinusoidal wave, 6 volts, 0.1 kHz, connect the FUNCTION GENERATOR to the oscilloscope. Read the horizontal distance *L* between two nearby wave crests (troughs) (peak-to-peak voltages) on the waveform, then we can calculate the period, frequency and peak-to-peak voltage of the signal.

X axis	sec/div		Y axis	volts/div	
	Distance *L*/DIV			Height *H*/div	
	Period *T*/s			Peak-to-peak voltage	
	Frequency *f*/Hz				

5. Observation of the Lissajous figure

Using both oscilloscope inputs: CH1—sinusoidal wave, 50Hz; CH2—sinusoidal wave, 50Hz (100Hz, 150Hz).

Press [DISPLAY] enter the function menu, then press [Next Page] enter page2/3, select [XY] mode, then you can observe the Lissajous figures on the screen.

X axis frequency/Hz	50		
Y axis frequency/Hz	50	100	150
Lissajous figure			

Equipment:

Conclusion：

Comments and suggestions (Optional):

Supervisor： **Date：**