SC1005 Digital Logic

Simple Guide on Digital Oscilloscope

2023

Two models of oscilloscopes used in the lab

Tektronix TDS2012C

[user manual]

Rigol DS1104Z

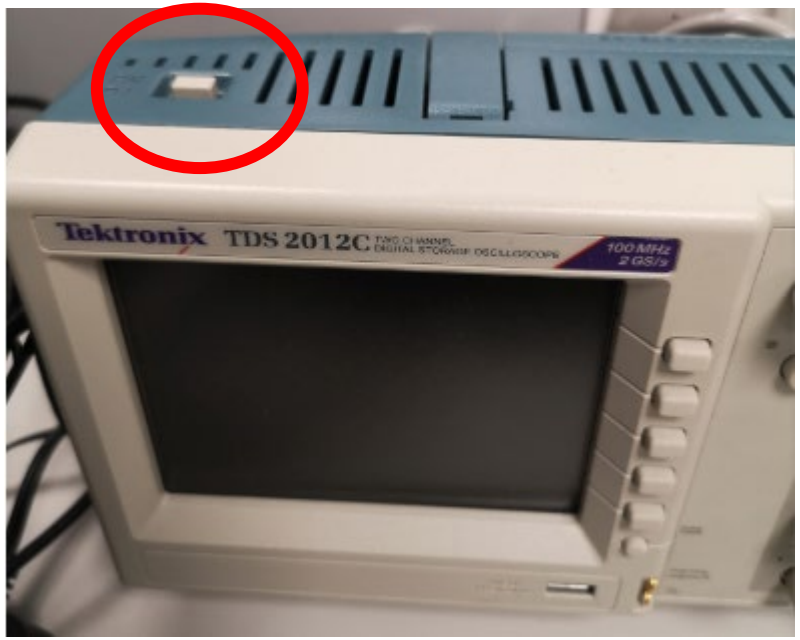
[user manual]

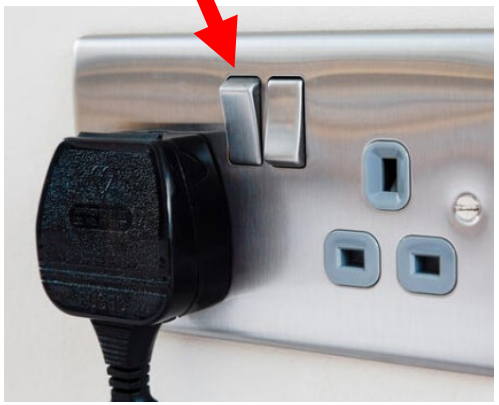
We will use the oscilloscope to

- Display 2 waveforms
- Measure the voltage of a waveform
- Measure the frequency of a waveform

1. Turn on the main power and locate the On/Off button

Tektronix TDS2012C





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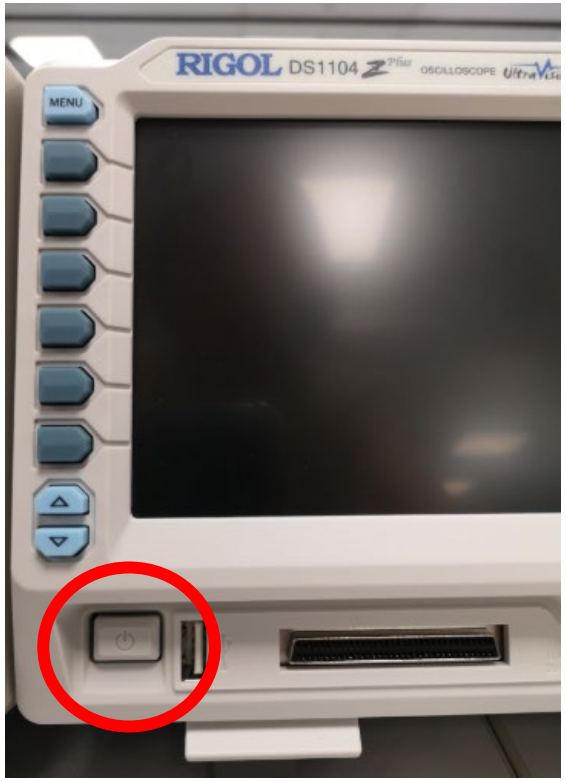

2. Press button to switch on the oscilloscope

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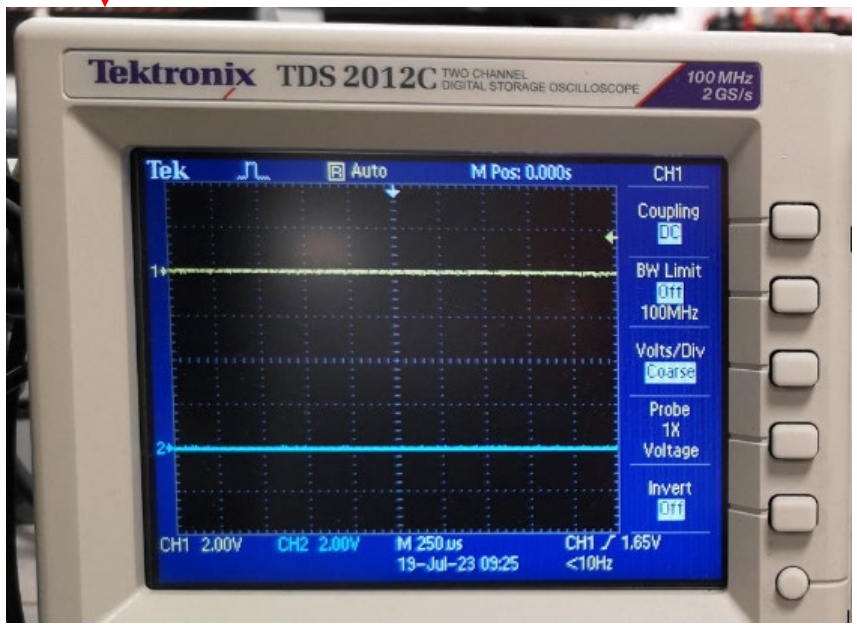
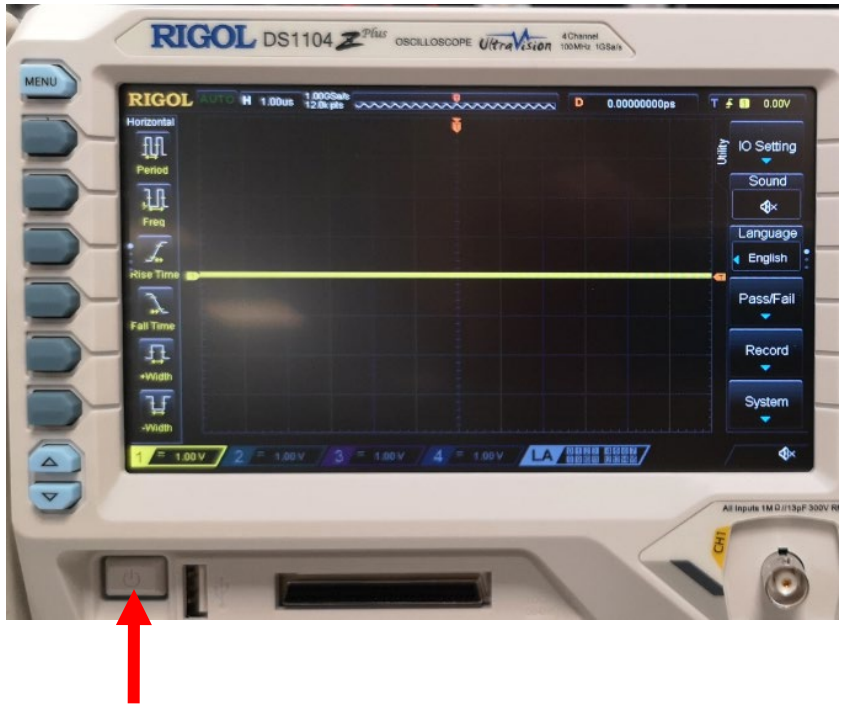


Rigol DS1104Z



3. Connect signals to the oscilloscope

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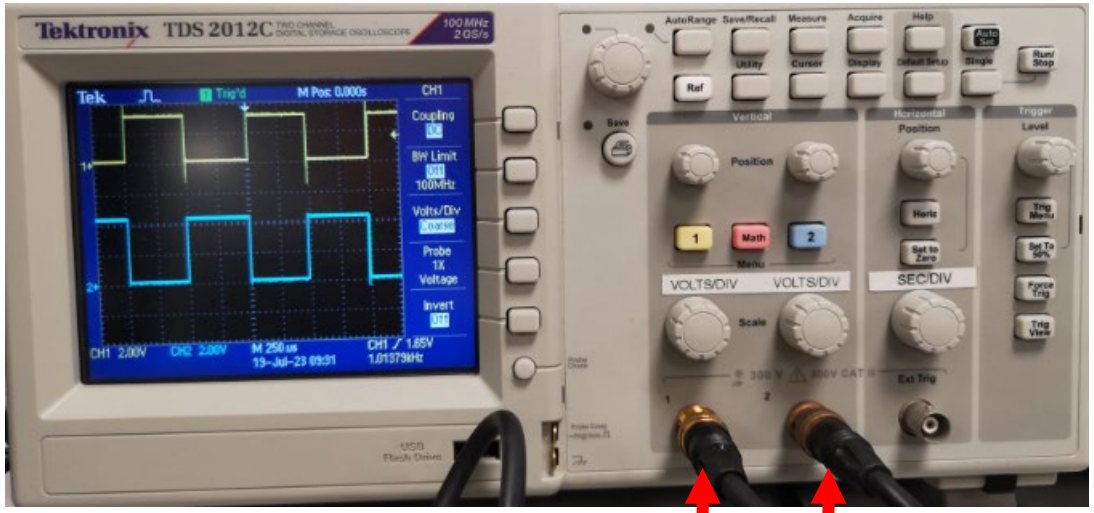

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4. Press AUTO button if no waveform is displayed on the oscilloscope

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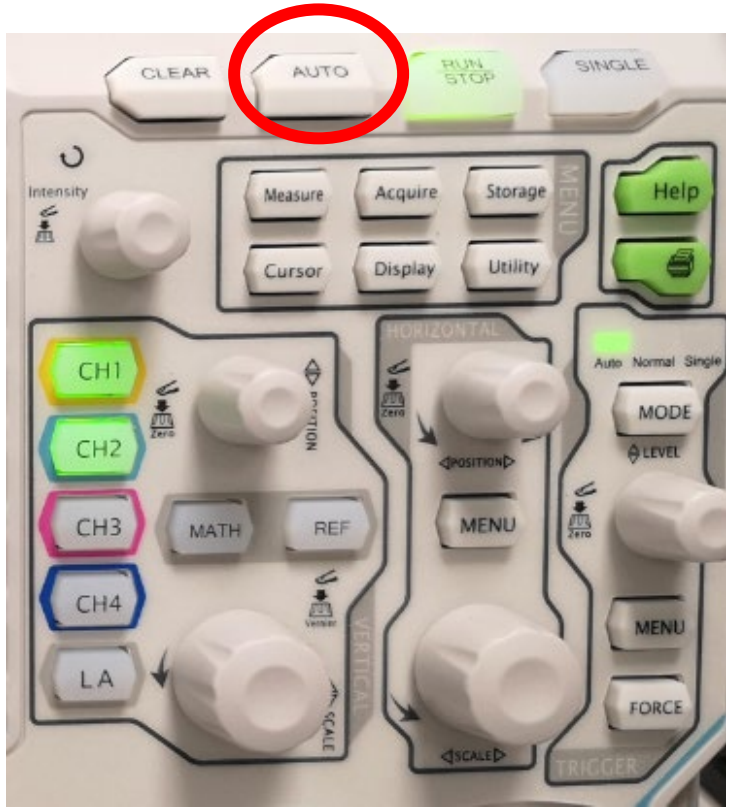

5. Set probe to 1X for CH1 & CH2

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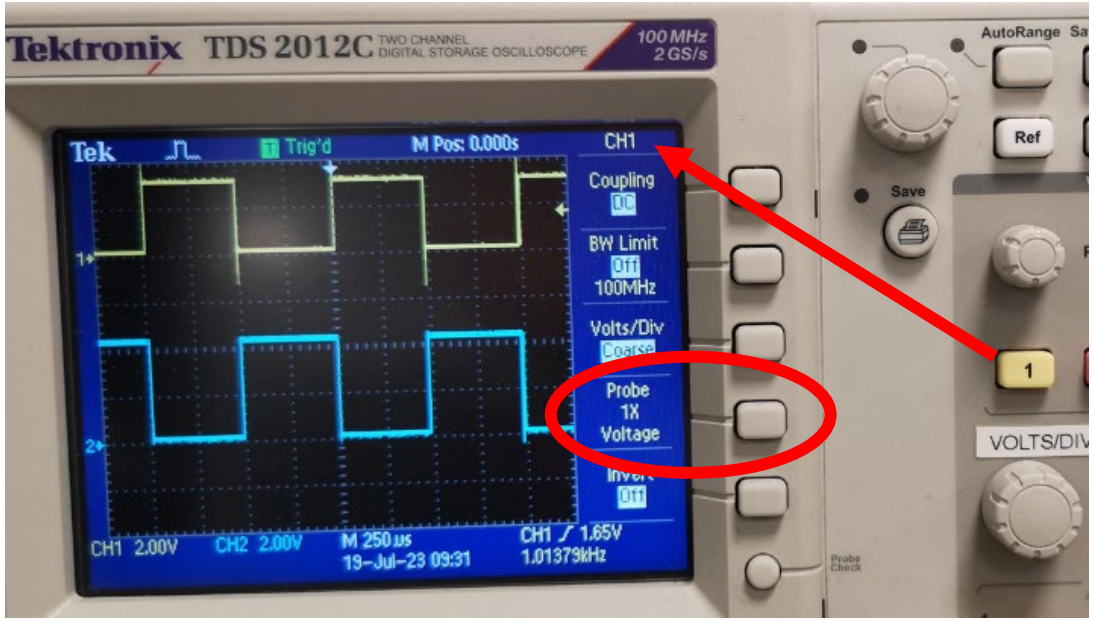
(A) Press button to select Channel



(B) Press button to select Probe 1X

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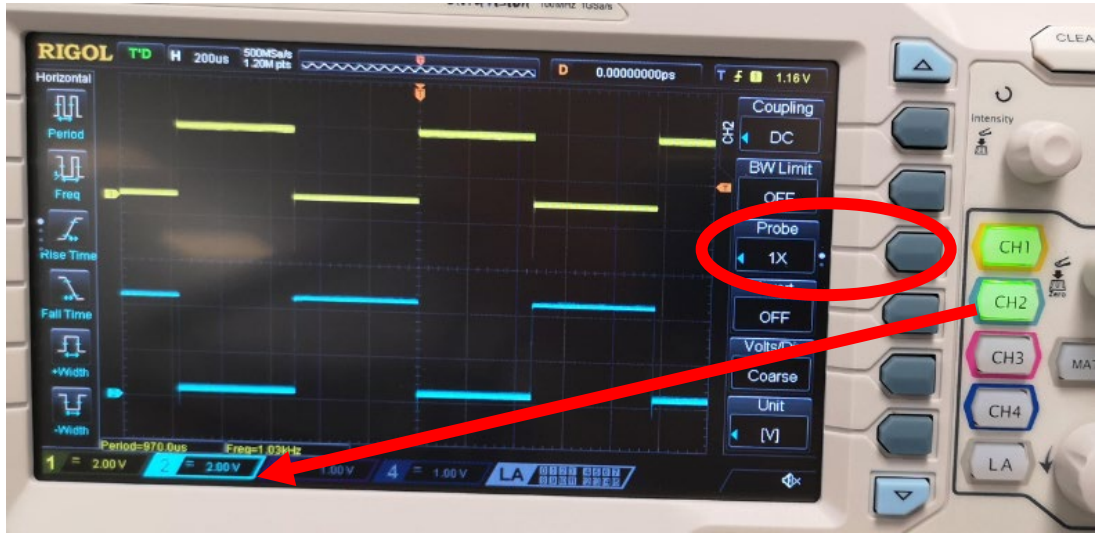
(A) Press button to select Channel



(B) Press button to select Probe 1X

6. Read voltage levels – use squares on grid

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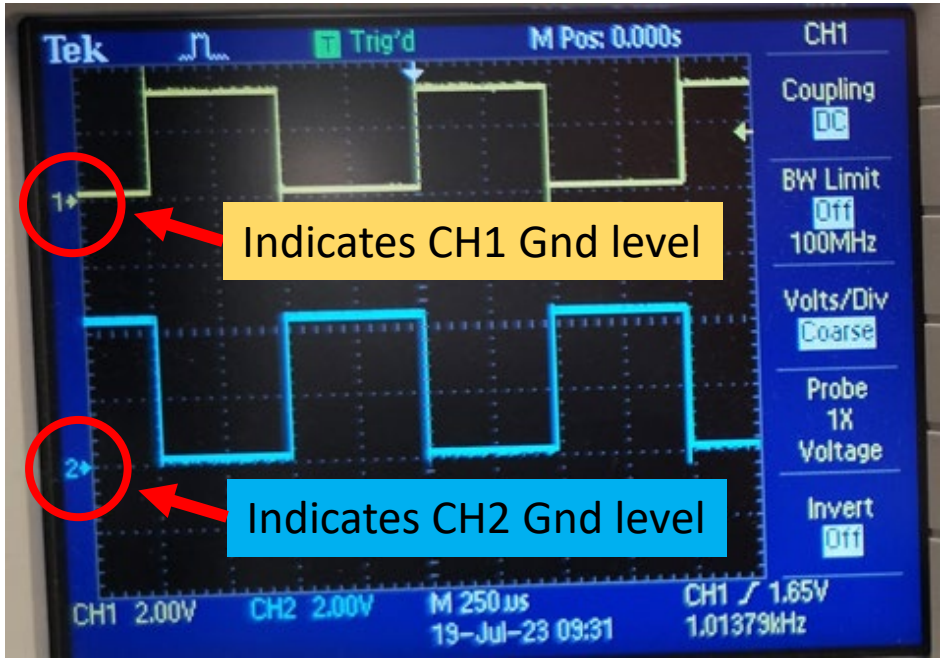
Identify the ground level of each signal



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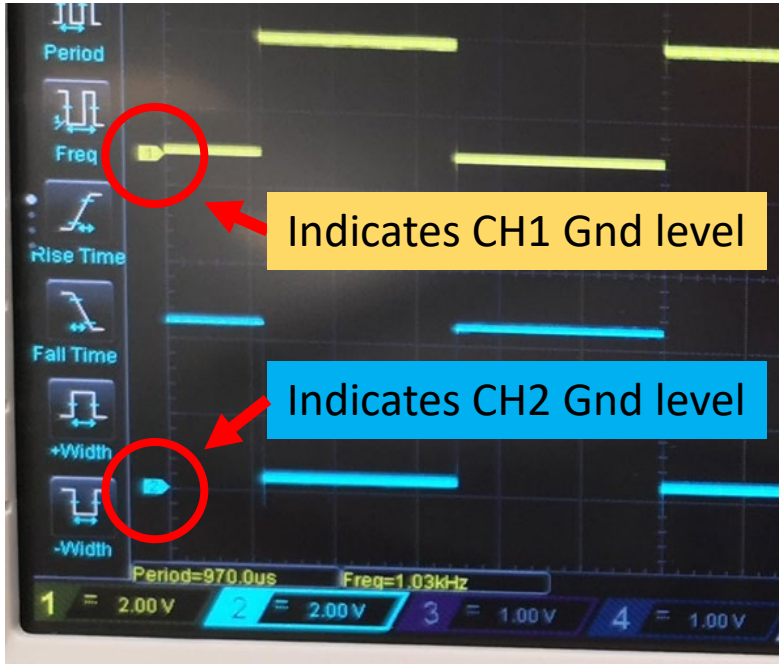
Identify the ground level of each signal



6. Read voltage levels – use squares on grid

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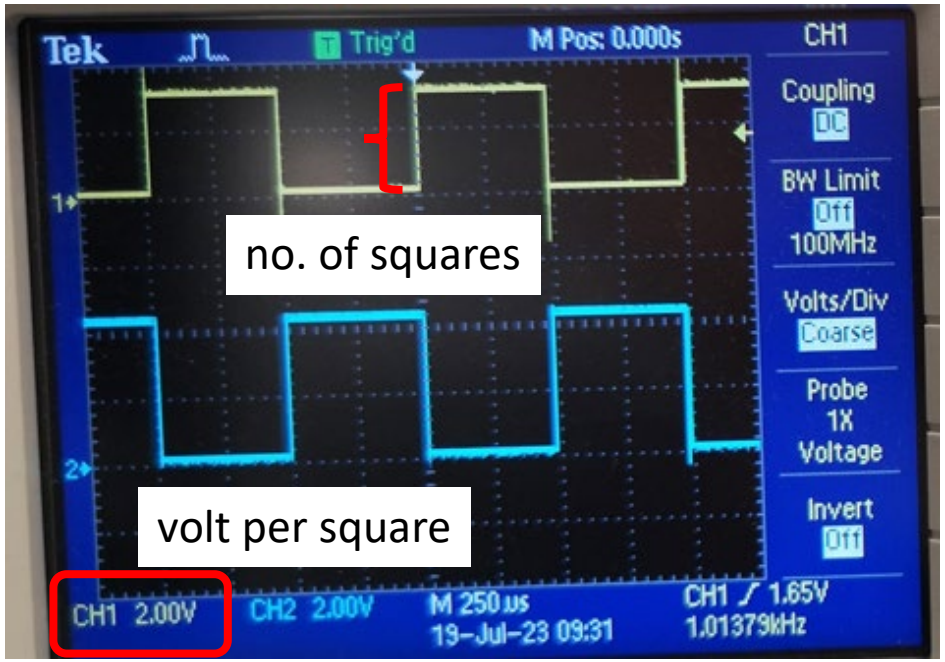
Voltage = (no. of squares) x (volt per square)



CH1 voltage (approx.) = 1.6 x 2 = 3.2V

CH2 voltage (approx.) = 2.2 x 2 = 4.4V

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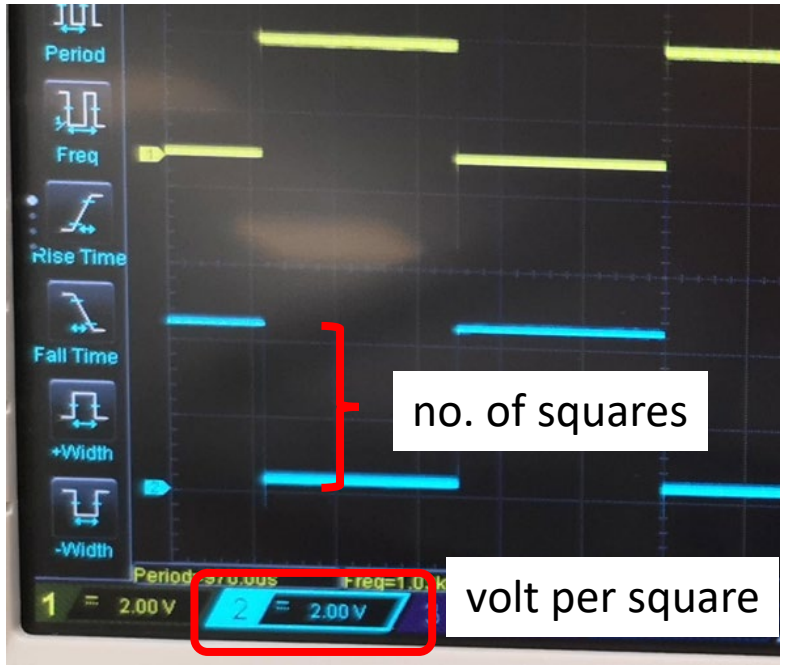
Voltage = (no. of squares) x (volt per square)



CH1 voltage (approx.) = 1.6 x 2 = 3.2V

CH2 voltage (approx.) = 2.2 x 2 = 4.4V

7. Read frequency – use squares on grid

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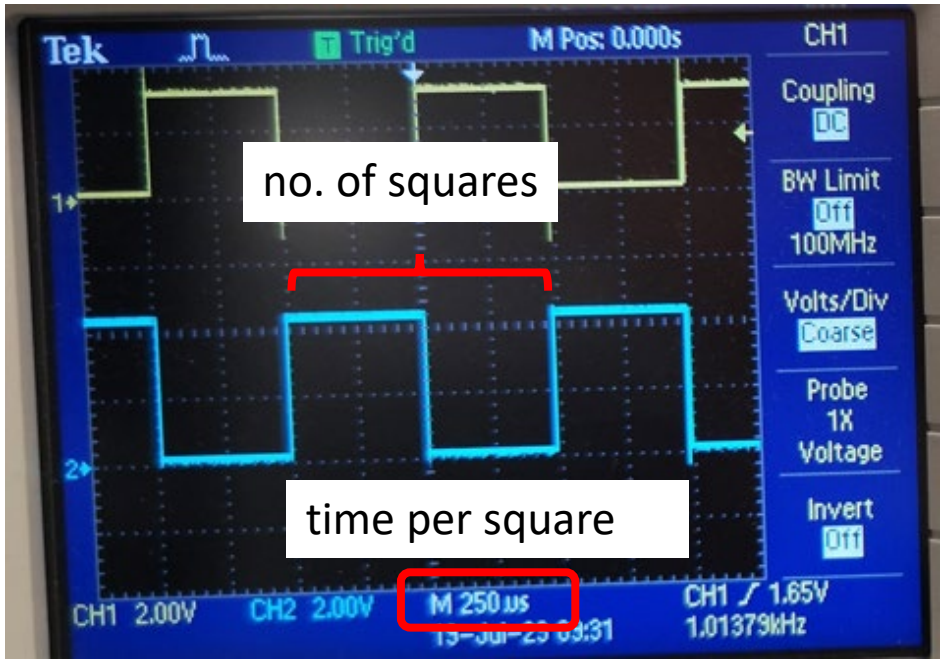
Freq = 1/[(no. of squares) x (time per square)]



CH1 & CH2 freq (approx.) = 1/(4 x 250us)
= 1/1000us = 1 kHz

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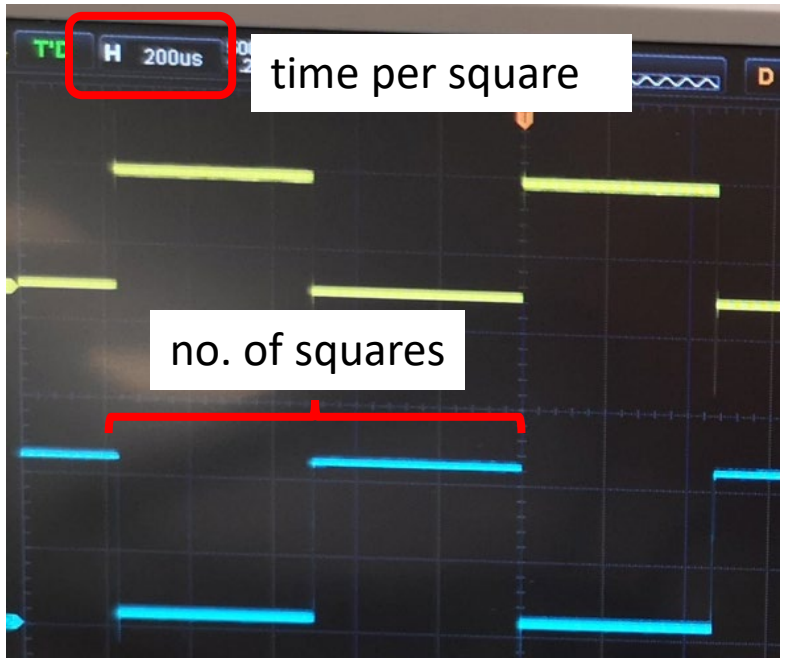
Freq = 1/[(no. of squares) x (time per square)]



CH1 & CH2 freq (approx.) = 1/(5 x 200us)
= 1/1000us = 1 kHz

8. Read frequency – from oscilloscope

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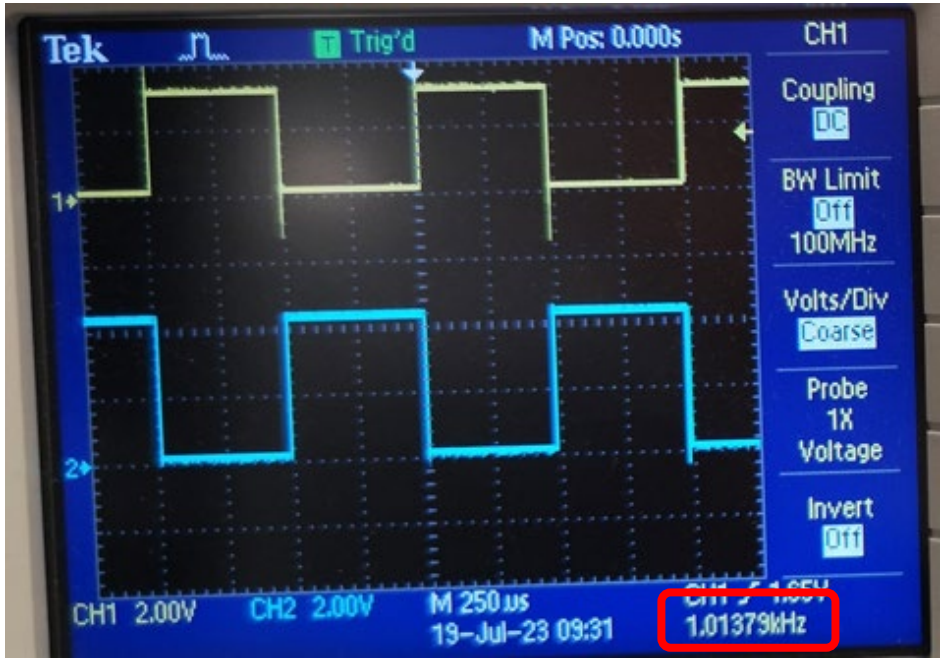
Freq = 1/[(no. of squares) x (time per square)]



CH1 & CH2 freq (approx.) = 1/(4 x 250us)
= 1/1000us = 1 kHz

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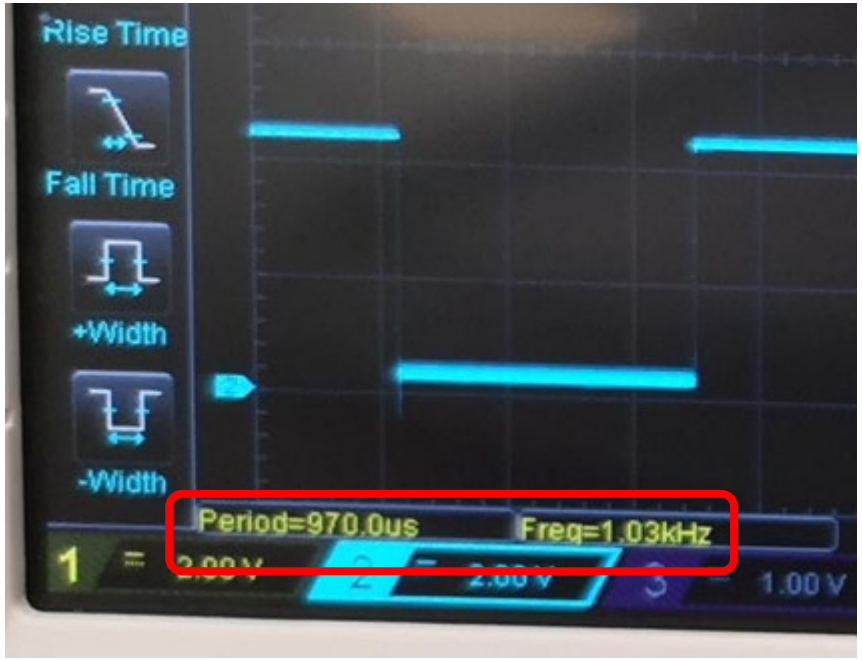
Freq = 1/[(no. of squares) x (time per square)]



CH1 & CH2 freq (approx.) = 1/(5 x 200us)
= 1/1000us = 1 kHz

9. **Optional** – adjust voltage scale

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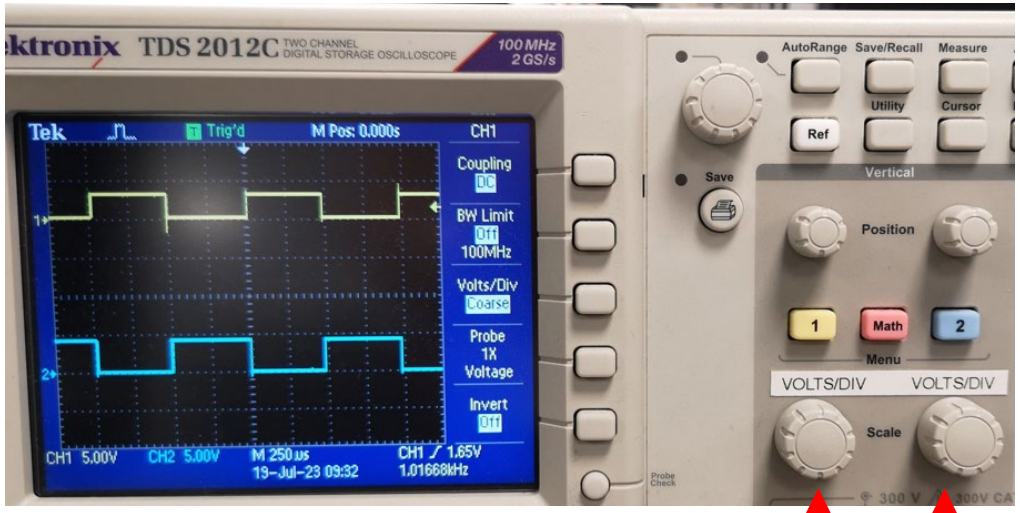

Adjust for Channel 1

Adjust for Channel 2

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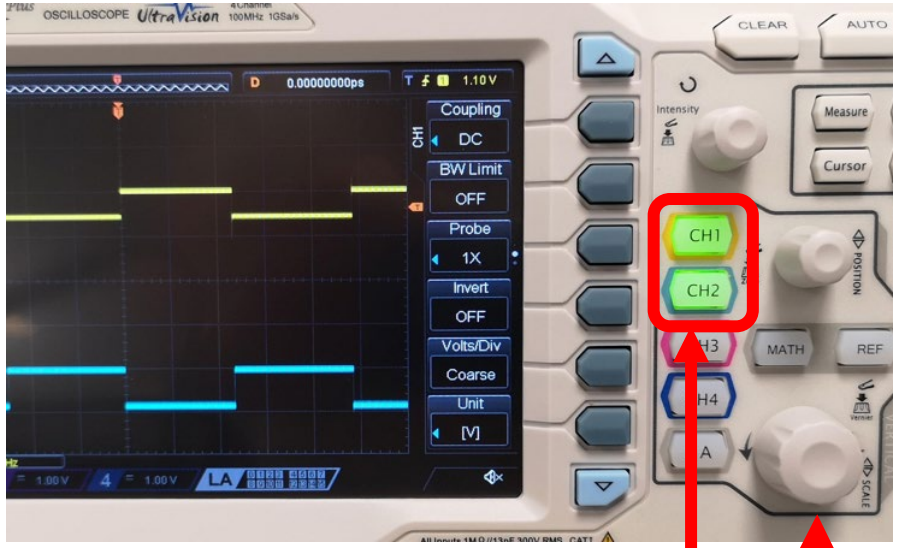

Select Channel

Adjust for selected channel

10. **Optional** – adjust time scale

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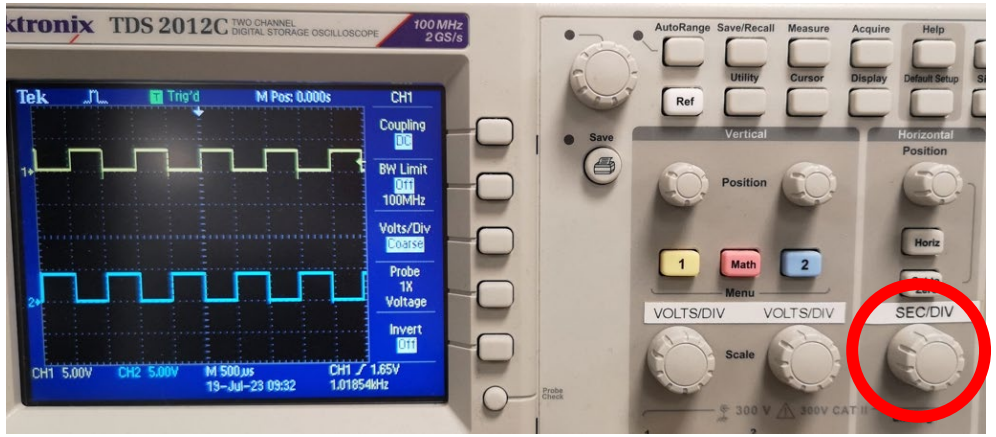

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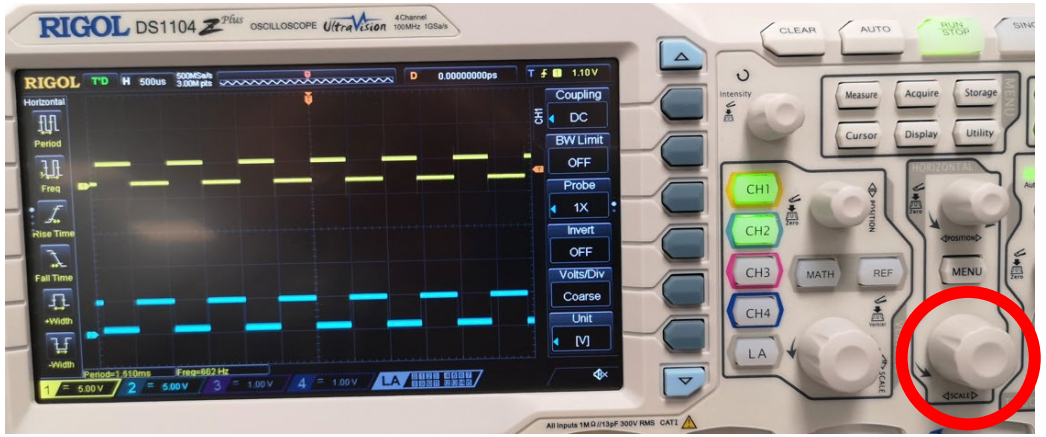

11. **Optional** – adjust vertical positions of waveforms

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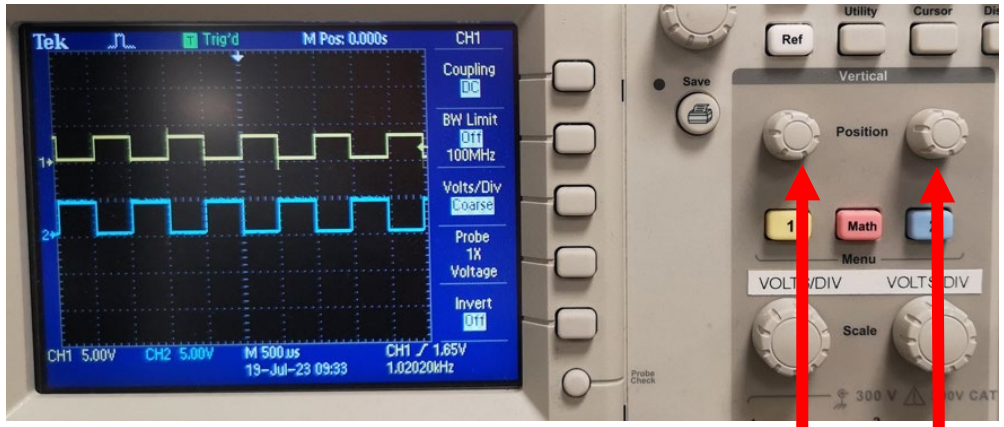

Adjust for Channel 1

Adjust for Channel 2

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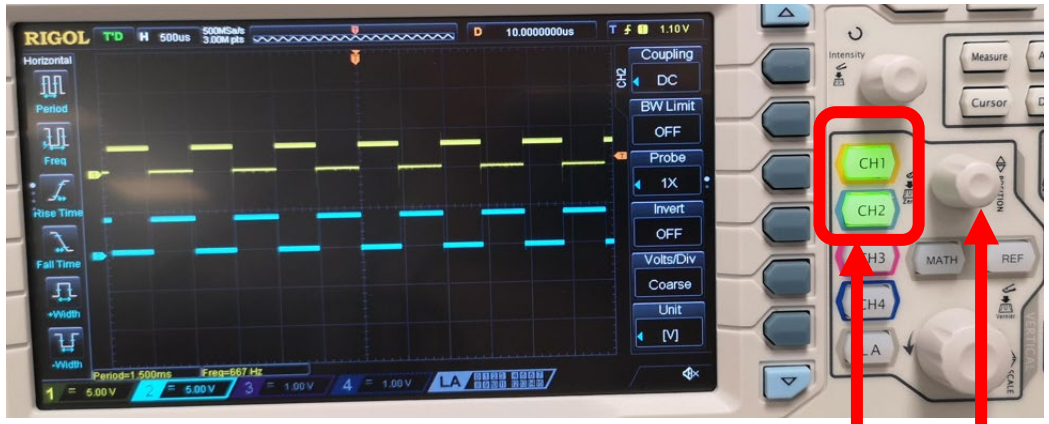

Select Channel

Adjust for selected channel

End of guide