



<b>Product Name</b>	GAOTek Oscilloscope Frequency Counter
<b>Product SKU</b>	GAOTek-MSO-192
<b>Product URL</b>	<a href="https://gaotek.com/product/gaotek-oscilloscope-frequency-counter/">https://gaotek.com/product/gaotek-oscilloscope-frequency-counter/</a>

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Based in New York City & Toronto, GAO Tek Inc. is ranked as one of the top 10 global B2B technology suppliers. GAO ships overnight within the U.S. & Canada & provides top-notch support thanks to its 4 decades of experience.



## GAOTek Oscilloscope Frequency Counter

### Selection Guide

Model	2020CH 2040CH 2050CH	2020CF 2040CF 2050CF	2020CT 2040CT 2050CT	2020 2040 2050	2020FG 2040FG 2050FG	2020B 2040B	2020BF 2040BF	2100C
Max. bandwidth	20/40/50 MHz	20/40/50 MHz	20/40/50 MHz	20/40/50 MHz	20/40/50 MHz	20/40/50 MHz	20/40/50 MHz	100JMZH
Attenuator switch	√	√	√	√	√			
Vertical encoder switch						√	√	
Vertical pulse switch								√
Vertical sensitivity step	10	10	10	10	10	10	10	11
High vertical sensitivity	5mV/DIV	5mV/DIV	5mV/DIV	5mV/DIV	5mV/DIV	5mV/DIV	5mV/DIV	5mV/DIV
Low vertical sensitivity	5V/DIV	5V/DIV	5V/DIV	5V/DIV	5V/DIV	5V/DIV	5V/DIV	5V/DIV
Sweep encoder switch	√	√	√	√	√	√	√	
Sweep pulse switch								√
Sweep time base step	20	20	20	20	20	20	20	22
Fastest sweep time	0.2us	0.2us	0.2us	0.2us	0.2us	0.2us	0.2us	50ns
Slowest sweep time	0.5s	0.5s	0.5s	0.5s	0.5s	0.5s	0.5s	0.5s
Dual sweep (Dual time base)								√
Time base step auto-shift								√
Trigger signal output								√
CH1 signal output				√	√	√	√	
Z-axis input				√	√	√	√	√
Trigger level lock				√	√	√	√	
Frequency counter		√			√		√	
Cursor readout								√
Panel settings save & recall								√
CRT illumination								√
Delayed sweep								√
Component test			√					

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## GAOTek Oscilloscope Frequency Counter

Economic models

TOS-2020CH/2040CH/2050CH

TOS-2020CF/2040CF/2050CF: with built-in 6 digits frequency counter

TOS-2020CT/2040CT/2050CT: with component test function

### TOS-2020CH

#### Features

- ❖ Dual channel 20MHz/40MHz/50MHz
- ❖ 10 times sweep magnification.
- ❖ TV synchronization; X-Y mode
- ❖ High illumination internal graticule CRT
- ❖ Encoded switch, reliable and durable
- ❖ Fully sealed durable attenuation switch
- ❖ ALT triggering function, enabling simultaneous.
- ❖ observation of two independent signals



### TOS-2020CF



### TOS-2020CT



#### Specifications

Model	20MHz	40MHz	50MHz
Vertical system			
Sensitivity	5mV~5V/DIV, 10 steps in 1-2-5 sequence		
Accuracy	≤3%		
Vernier sensitivity	≤1/2.5 of panel indicated value		
Bandwidth	DC (AC 10Hz)~20MHz	DC (AC 10Hz)~40MHz	DC (AC 10Hz)~50MHz
AC coupling	<10Hz (at 100kHz, 8DIV, frequency response -3dB)		
Rise time	Approx. 17.5ns	Approx. 8.75ns	Approx. 7ns

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Input impedance	Approx. 1MΩ//Approx. 25pF
DC balance shift	5mV~5V/DIV: ±0.5DIV
Vertical mode	CH1, CH2, DUAL (ALT/CHOP), ADD, CH2 INV
Chopping repetition frequency	Approx. 250kHz
Input coupling	AC, GND, DC
Max. Input voltage	400V peak-peak, AC frequency ≤1kHz
Common mode rejection ratio	>50:1 at 50kHz sine wave (set CH1 and CH2 at same sensitivity)
CH2 INV BAL	Balanced point variation ≤1DIV (referred to graticule center)

## GAOTek Oscilloscope Frequency Counter

Horizontal system	
Sweep time	0.2us~0.5s/DIV, 20 steps in 1-2-5 sequence
Accuracy	±3%, X10MAG: ±5% (20ns~50ns/DIV uncalibrated)
Vernier sweep time control	≤1/2.5 of panel indicated value
Sweep magnification	X10 (fastest sweep time 20ns/DIV)
Position shift@X10MAG	≤2DIV at CRT screen center
Linearity	±5%, X10MAG: ±10% (0.2s~1us)

Trigger system				
Trigger mode	AUTO, NORM, TV-V, TV-H			
Trigger level	lock Provided			
Trigger source	CH1, CH2, ALT, LINE, EXT			
Trigger coupling	AC: 20Hz to full bandwidth			
Trigger slope	“+” or “-”			
<b>Sensitivity</b>	Frequency	20Hz~2MHz	2MHz~20MHz	20MHz~40MHz
	CH1, CH2	1DIV	1.5DIV	C2.5DIV
	ALT	2DIV	3DIV	
	EXT	200mV	800mV	
	TV	Sync pulse>1DIV (EXT: 1V)		
External trigger input				
Input impedance	Approx. 1MΩ//Approx. 25pF			
Max. input voltage	300V (DC+AC peak), AC frequency ≤1kHz			
X-Y mode				
Sensitivity	5mV~5V/DIV ±3%			
X-axis bandwidth	DC~500kHz (-3dB)			
Phase error	≤3° at DC~50kHz			
<b>CH1 signal output</b>	At least 20 mV/div at 50Ω terminal, frequency at least 50Hz to 50MHz			
Calibration signal output				
Waveform	Positive-going square wave			

Frequency	Approx. 1kHz
Duty ratio	<48:52
Output voltage	2V <sub>pp</sub> ±2%
Output impedance	Approx. 1kΩ
<b>Z-axis input</b>	
Bandwidth	DC~2MHz
Sensitivity	5V <sub>pp</sub>
Input impedance	Approx. 47kΩ
Max. input voltage	30V (DC+AC peak), AC frequency≤1kHz
<b>Frequency counter (only for TOS-2020BF, TOS-2040BF)</b>	
Display	6 digits LED
Accuracy	±0.01%
<b>CRT</b>	
Type	6-inch rectangular with internal graticule, 8x10DIV (1DIV=1cm)
Phosphor	P31
Accelerating voltage	Approx. 2kV (20MHz); Approx. 12kV (40MHz)
Trace rotation	Adjustable at front panel
<b>General</b>	
Power source	AC110V/220V±10%, 50/60Hz, Max. 35VA
Accessories Power	cord x1, Operation manual x1, Probe x2
Dimension (WxHxD)	310x150x455mm
Weight	Approx. 8kg

## GAOTek Oscilloscope Frequency Counter

100MHz standard model with 10 sets panel settings storage

TOS-2100C

### Features

- ❖ Dual channel 100MHz
- ❖ Time base auto-range
- ❖ Cursor readout with 7 measurements
- ❖ Panel lock function
- ❖ Buzzer alarm
- ❖ LED indicators
- ❖ TV synchronization; X-Y mode
- ❖ Z-axis modulation input; Trigger signal output
- ❖ Signal delay function, monitoring the leading edge
- ❖ Continuously adjustable screen illumination
- ❖ Delayed sweep
- ❖ 10 sets save & recall for panel settings





## Specifications

<b>Vertical system</b>	
Sensitivity	2mV~5V/DIV, 11 steps in 1-2-5 sequence
Accuracy	3%
Vernier sensitivity	Continuously variable to 1/2.5 or less of panel indicated value
Bandwidth (-3dB)	DC (AC 10Hz)~100MHz (2mV/DIV: DC~20MHz)
AC coupling	<10Hz (at 100kHz, 8DIV, frequency response -3dB)
Rise time	Approx. 3.5ns (2mV/DIV: Approx. 17.5ns)
Input impedance	Input impedance Approx. 1MΩ//Approx. 25pF
DC balance shift	DC balance shift 5mV~5V/DIV: ±0.5DIV
Vertical mode	CH1, CH2, DUAL (ALT/CHOP), ADD, CH2 INV
Chopping repetition frequency	Approx. 250kHz
Input coupling	AC, GND, DC
Max. Input voltage	400V peak-peak, AC frequency≤1kHz
Bandwidth limit	20MHz
Common mode rejection ratio	>50:1 at 50kHz sine wave (set CH1 and CH2 at same sensitivity)
Dynamic range	5DIV at 100MHz
CH2 INV BAL	Balanced point variation≤1DIV (referred to graticule center)
Signal delay	Leading edge can be monitored
<b>Horizontal system</b>	
Horizontal mode	Horizontal mode MAIN (A), ALT, DELAY (B)
A (main) sweep time	50ns~0.5s/DIV, continuously variable (UNCAL)
B (delay) sweep time	50ns~50ms/DIV
Accuracy	±3%, X10MAG: ±5%
Sweep magnification	X10 (fastest sweep time 5ns/DIV)
Hold off time	Variable
Delay time	1us~5s
Delay jitter	Better than 1:20000
Alternate separation	Variable
<b>Trigger system</b>	
Trigger mode	AUTO, NORM, TV-V, TV-H
Trigger source	CH1, CH2, LINE, EXT
Trigger coupling	AC, DC, HFR, LFR
Trigger slope	“+” or “-”



## GAOTek Oscilloscope Frequency Counter

Trigger system				
Sensitivity	Mode	Auto	Norm	TV
	Frequency	10Hz~20MHz 20MHz~100MHz	DC~20MHz 20MHz~100MHz	Sync signal
	INT	0.35DIV 1.5DIV	0.35DIV 1.5DIV	1DIV
	EXT	50mVpp 150mVpp	50mVpp 150mVpp	200mVpp
TV sync	TV-V, TV-H			
Trigger level range	INT: 4DIV or more, EXT: $\pm 0.4V$ or more			
External trigger input				
Input impedance			Approx. 1M $\Omega$ //Approx. 25pF	
Max. input voltage			400V (DC+AC peak), AC frequency $\leq$ 1kHz	
X-Y operation				
Mode			X-axis: selectable CH1, CH2, EXT ; Y-axis: selectable CH1, CH2, CH1 and CH	
Sensitivity			2mV~5V/DIV $\pm 3\%$ ; EXT: 0.1V/DIV $\pm 5\%$	
X-axis bandwidth			DC~500kHz (-3dB)	
Phase error			$\leq 3^\circ$ at DC~50kHz	
Trigger signal output				
Voltage			Approx. 25mV/DIV into 50 $\Omega$ terminal	
Frequency response			DC~10MHz	
Output impedance			Approx. 50 $\Omega$	
Calibration signal output				
Waveform			Positive-going square wave	
Frequency			Approx. 1kHz	
Duty ratio			<48:52	
Output voltage			2Vpp $\pm 2\%$	
Output impedance			Approx. 2k $\Omega$	
Z-axis input				
Coupling			DC	
Bandwidth			DC~5MHz	
Sensitivity			5V or more	
Max. input voltage			30V (DC+AC peak), AC frequency $\leq$ 1kHz	
Cursor readout				
Cursor measurement			Cursor measurement $\Delta V$ , $\Delta V\%$ , $\Delta VdB$ , $\Delta T$ , $1/\Delta T$ , $\Delta T\%$ , $\Delta\theta$	
Cursor resolution			Cursor resolution 1/25DIV	
Effective cursor range			Vertical: $\pm 3DIV$ ; Horizontal: $\pm 4DIV$	



Panel setting	Vertical: V/DIV (CH1, CH2), UNCAL, ALT/CHOP/ADD, INV, Probe factor, AC/DC/GND Horizontal: S/DIV (MTB, DTB), UNCAL, X10 MAG, delay time, HO Trigger: source, coupling, slope, level, TV-V, TV-H Others: X-Y, LOCK, Save/recall memory 0-9
Special function	Time base auto-range, Panel lock, 10 sets save & recall for panel settings
<b>CRT</b>	
Display	6-inch rectangular with internal graticule; 0%, 10%, 90% and 100% markers; 8x10DIV (1DIV=1cm)
Phosphor	P31
Accelerating voltage	Approx. 16kV
CRT illumination	Continuously adjustable
<b>General</b>	
Power source	AC110V/220V±10%, 50/60Hz, Max. 65VA
Accessories	Power cord x1, Operation manual x1, Probe x2
Dimension (WxHxD)	310x150x455mm
Weight	Approx. 8kg