

SR620 **universal** **time interval** **counter.**

\$3850.

- 4 ps single-shot resolution
- 25 ps rms time interval jitter
- 1.3 GHz maximum frequency
- 10^{-9} Hz frequency resolution
- 0.001° phase resolution
- Statistical analysis: mean, min, max, std dev, and Allan variance
- Sample sizes from 1 to 1 million
- Graphic histogram and time variation plots on X-Y oscilloscope
- Hardcopy to printers and plotters
- GPIB and RS-232 interfaces
- Optional oven timebase

Introducing the SR620.
The affordable
Universal Time Interval
Counter from SRS.

It's about time.

The SR620 measures time interval, frequency, period, pulse width, phase, as well as rise and fall times. Built-in statistical functions are provided in all modes—including mean, max, min, standard deviation, and Allan variance. And an easy-to-read 16 digit LED display shows any of these parameters on sample sizes from 1 to 1 million.

It's about accuracy.

The SR620 is a reciprocal interpolating counter. The standard timebase is a 10.000 MHz temperature compensated oscillator with 3×10^{-9} aging per day. An optional oven oscillator provides even greater accuracy with 5×10^{-10} per day aging. For more demanding applications, a rear panel input makes it easy for you to supply your own 5 or 10 MHz timebase.



It's about versatility.

Measure virtually any signal with a variety of arming and gating modes.

The SR620 measures intervals up to 1000 seconds in \pm TIME, +TIME, or EXTERNAL (with or without holdoff) arming modes.

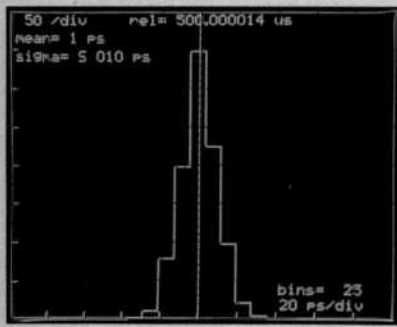
It measures frequency over 12 orders of magnitude. The frequency range extends from 0.001 Hz to 1.3 GHz. Preprogrammed frequency measurement gates include 1 PERIOD, 0.01, 0.1, and 1.0 second, or EXTERNAL. With an external trigger, you can program your own gates from 1 μ sec to 10 msec.

START/STOP inputs range from -5 to +5 Volts and may be terminated in 1M Ω or 50 Ω . Regardless of signal shape, duty cycle, or amplitude, the SR620's AUTO-threshold feature lets you set up measurements fast.



Draw your own conclusions.

The SR620 adds graphics to any measurement by displaying histograms and time variation plots on any X-Y oscilloscope. Complete with front panel Autoscale, Zoom, and Cursor functions.



When you have the graph you need, attach any HP-GL plotter. And plot it. Or print it out on a dot matrix printer. All without a computer. **When you need a computer...**

The SR620 provides GPIB and RS-232 interfaces (both standard) for ATE and other

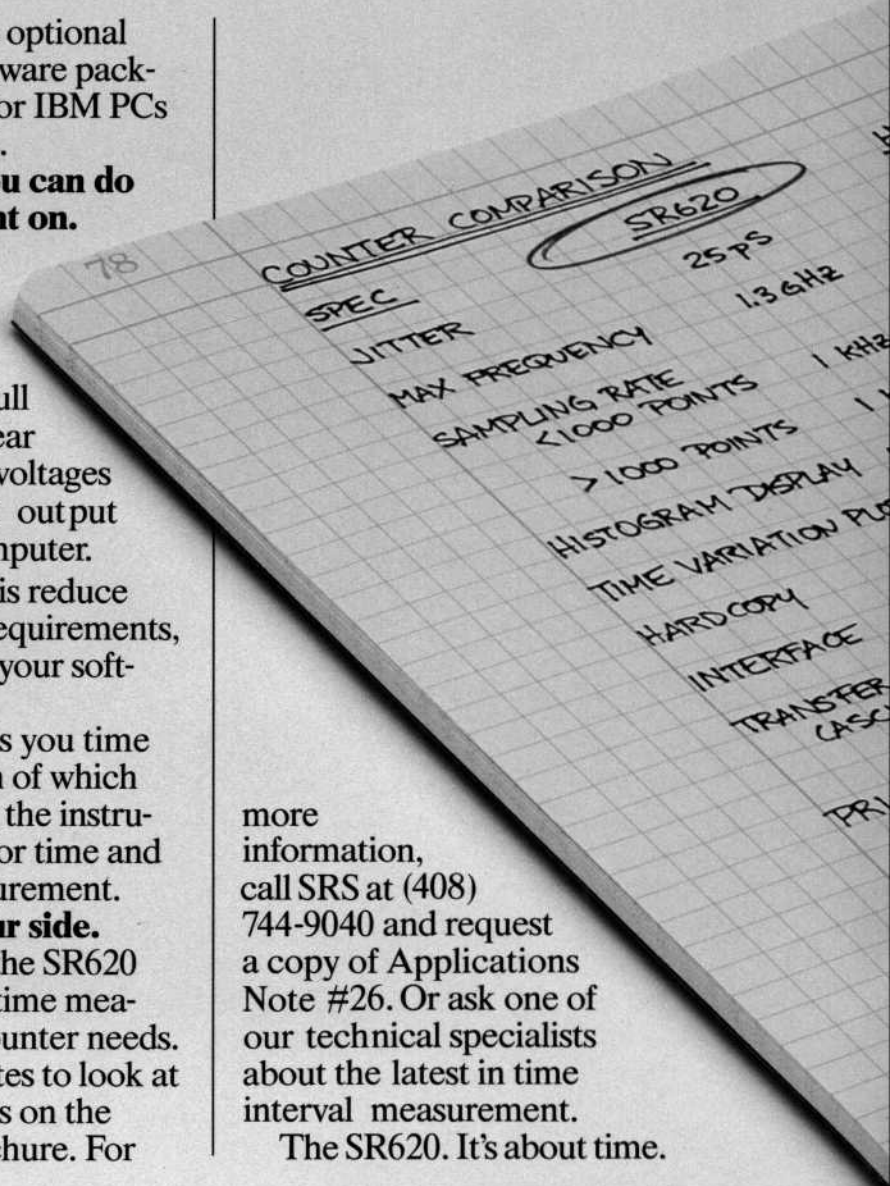
applications. An optional applications software package is available for IBM PCs and compatibles.

The counter you can do more than count on.

Two DVM inputs ($\pm 2V$ or $\pm 20V$ full scale) and two D/A outputs ($\pm 10V$ full scale) on the rear panel allow DC voltages to be input and output by your host computer. Not only does this reduce your hardware requirements, it also simplifies your software needs.

And that saves you time and money. Both of which make the SR620 the instrument of choice for time and frequency measurement. **Put time on your side.**

Find out how the SR620 can satisfy your time measurement and counter needs. Take a few minutes to look at the specifications on the back of this brochure. For



more information, call SRS at (408) 744-9040 and request a copy of Applications Note #26. Or ask one of our technical specialists about the latest in time interval measurement. **The SR620. It's about time.**

Specifications

Functions	Time Interval, Pulse Width, Rise and Fall Times, Frequency, Period, Phase, and Event Counting. Measurement statistics (mean, min, max, standard deviation or Allan variance) and graphics are available in all modes of operation.
Time Interval	(Time, Width, Rise and Fall Times)
Range	-1000 to +1000 s in +/- TIME mode; -1 ns to +1000 s in all other modes
Trigger Rate	0 to 100 MHz
Resolution	4 ps single sample, 1 ps with averaging
Jitter	(25 ps typ [50 ps max] + 0.2 ppb x Interval) rms (25 ps typ [50 ps max] + 0.05 ppb x Interval) rms (Opt 01) The jitter of the mean is reduced by \sqrt{N} where N=sample size.
Error	$<\pm(1 \text{ ns} + \text{Timebase Error} \times \text{Interval})$ $<\pm(50 \text{ ps} + \text{Timebase Error} \times \text{Interval}) \text{ (REL)}$
Arming Modes	+TIME Stop is armed by Start +TIME EXT Ext arms Start +TIME EXT HOFF Leading EXT edge arms Start, trailing EXT edge arms Stop
	$\pm \text{TIME}$ Armed by Start/Stop pair $\pm \text{TIME CMPL}$ Armed by Stop/Start pair $\pm \text{TIME EXT}$ Armed by EXT input edge
	EXT arming may be internally delayed or scanned with respect to the EXT input in variable steps. The step size may be set in a 1,2,5 sequence from 1 μ s to 10 ms. The maximum delay is 50,000 steps.
Display Sample Rate	16 digit fixed point with 1 ps LSD For a sample size of N, the total sample time is $N \times (750 \mu\text{s} + \text{measured time interval}) + \text{Calculation time}$. The calculation time occurs only after N measurements are completed and varies from 0 μ s (N=1, no graphics, binary responses) to 3 ms (N=1, no graphics) to 10 ms (display mean or std dev) to 60 ms (display histogram).
Frequency	
Range	0.001 Hz to 200 MHz via comparator inputs. 100 MHz to 1.3 GHz via internal UHF prescalers. RATIO A/B range: 10^{-9} to 10^3
Error Gates	$<\pm(100 \text{ ps/Gate} + \text{Timebase Error}) \times \text{Frequency}$ External, 1 period, 0.01, 0.1, or 1 second. 1 period, 0.01, 0.1, 1 s gates may be externally triggered with no delay. Internal gates from 1 μ s to 10 ms may be externally triggered. The delay from trigger may be set from 1 to 50,000 gate widths.
Display	16 digit fixed point with LSD=Freq x 4ps/Gate. 1 μ Hz max. resolution (1 nHz with x1000 for frequencies ≤ 1 MHz)
Period	
Range	0 to 1000 seconds. RATIO A/B range: 10^{-9} to 10^3
Error	$<\pm(100 \text{ ps/Gate} + \text{Timebase Error}) \times \text{Period}$
Gates	Same as frequency
Display	16 digit fixed point with LSD = 1 ps (1 fs with x1000 for periods ≤ 1 s)
Phase	
Range	Phase = $360 \times (T_b - T_a) / \text{Period A}$ -180 to +180 degrees (0 to 100 MHz frequency)
Resolution	(4 ps x Frequency x 360 + 0.001) degree
Gate	0.01 seconds (1 period min.) for period measurement and 1 sample for time interval measurement. Period may also be measured using externally triggered internal gates as in frequency mode.
Error	$<\pm(1 \text{ ns} \times \text{Frequency} \times 360 + 0.001) \text{ degree}$
Events	
Range	10^{12} . RATIO A/B range: 10^{-9} to 10^3
Count Rate	0 to 200 MHz
Gates	Same as frequency
Display	12 digits

Timebase	Standard	Option/01
Frequency	10.000 MHz	10.000 MHz
Type	TCVCXO	Ovenized VCXO
Aging/day	3×10^{-9}	5×10^{-10}
Allan Variance	$2 \times 10^{-10}/\text{s}$	$5 \times 10^{-11}/\text{s}$
Stability 0-50°C	1 ppm	0.005 ppm
Settability	0.01 ppm	0.001 ppm
External	User may supply 5 or 10 MHz timebase. 1 Volt nominal.	

Inputs	A, B, and EXTERNAL
Threshold	-5.00 to +5.00 VDC with 10 mV resolution
Sensitivity	35 mV rms
Autolevel (A&B)	Threshold set between peak input excursions
Slope	Rising or falling edge
Impedance	(1 M Ohm + 27 pf) or 50 Ohms
Coupling	AC or DC. Ext is always DC coupled.
Bandwidth	300 MHz BW provides 1.2 ns risetime
Prescaler (A&B)	10 mV rms sensitivity for frequencies to 1.3 GHz
Protection	100 V. 50 Ohm terminator is released if input exceeds ± 5 V.

REF Output	Calibration and Trigger source
Frequency	1.00 KHz (Accuracy same as timebase)
Rise/Fall	2 ns
Amplitude	TTL: 0 to 4 V (2 V into 50 Ohms) ECL: -1.8 to -0.8 V into 50 Ohms

DVM Inputs	Two rear panel DVM inputs
Full Scale	± 1.999 or ± 19.99 VDC
Type	Sample & hold with successive approximation converter
Impedance	1 M Ohm
Accuracy	0.25% of full scale
Speed	Formatted response in approximately 5 ms.

D/A Outputs	Two rear panel outputs
Full Scale	± 10.00 VDC
Resolution	5mV
Impedance	<1 Ohm
Default	Voltage proportional to Mean & Deviation

Graphics	Two rear panel outputs to drive x-y scope
Scope	Histograms and strip charts of mean & deviation
Displays	-5 to +5 V for 10 division deflection
X-axis	-4 to +4 V for 8 division deflection
Y-axis	250 (H) x 200 (V) pixels
Resolution	Via Centronics port to dot matrix printers.
Hardcopy	RS-232, IEEE-488 to HP-GL compatible Digital Plotters

Interfaces	
RS-232C	300 to 19.2 KBaud. All instrument functions may be controlled. PC compatible serial cable.
GPIB	IEEE-488 compatible interface. All instrument functions may be controlled.
Speed	Approximately 300 ASCII formatted responses per second. 1400 binary responses per second.

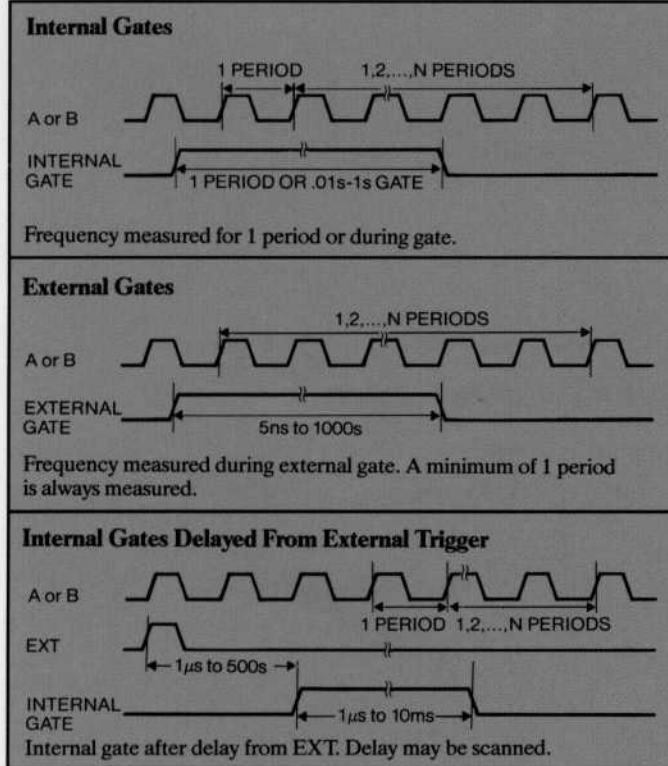
General	
Operating	0 to 50°C
Power	100, 120, 220 or 240 VAC +5% -10%. 70 Watts.
Dimensions	14" x 14" x 3.5" Rack mounting hardware included.
Weight	11 lbs.



Timing is everything.

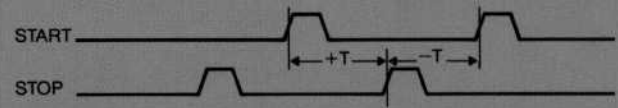
The SR620 measures time interval and frequency/period in a number of different modes. *Time interval* modes include +Time and \pm Time. The measurement is armed by the START or STOP input. *External arming* allows measurements to be synchronized with an external trigger (with adjustable holdoff or delay). *Frequency/period* measurements can be internally gated. *Internal gates* may be triggered externally (with adjustable delay). *External gates* may also be used.

Frequency and period modes



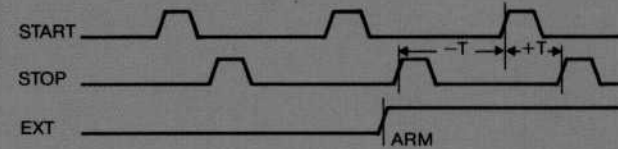
Time interval modes

+Time and \pm Time



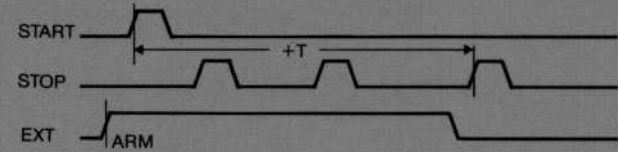
+Time: Arm on STOP, next START-STOP pair measured.
 -Time: Arm on START, next STOP-START pair measured.

External Arming (+Time or \pm Time)



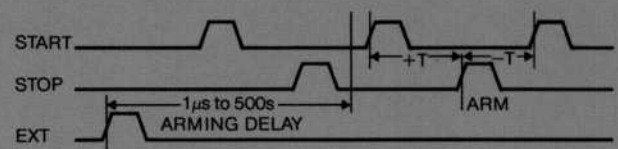
Arm on EXT input with both +Time and \pm Time modes.

External Arming with STOP Holdoff



Arm on EXT. Time from next START to 1st STOP after holdoff.

External Arming with Scanning Delay (+Time or \pm Time)



Arm after delay from EXT. Delay may be scanned.

Ordering Information

SR620	Universal Time Interval Counter with Time Interval, Frequency, Period, Phase, Pulse Width, Rise and Fall Time, and Event Counting modes. GPIB and RS-232 interfaces, 1 ppm standard timebase, scope display and printer/plotter interface included.	\$3850
Option/01	High stability oven timebase	\$950
SR626	IBM PC application software	\$350



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