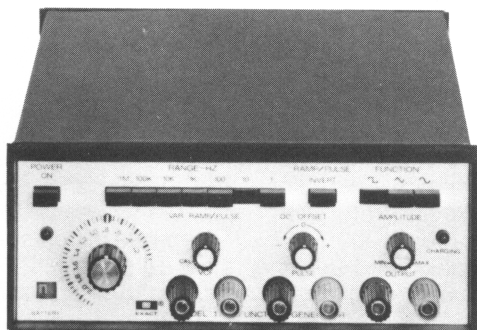




MODEL 119P



MODEL 119

SPECIFICATIONS

DYNAMIC FREQUENCY RANGE:

0.02 Hz to 2.2 MHz (7 ranges).
(0.002 Hz to 200 KHz with "B" option)

FREQUENCY ACCURACY:

±5% of full scale.

VCF (Voltage controlled frequency):

0 to +10 V for 1000:1 from maximum multiplier setting.
Approx. 10K input impedance.

WAVEFORMS:

Sine, square, triangle, ramp, pulse.

MAIN OUTPUTS:

High output — 20 V P-P open circuit.
10 V P-P into 50 Ohms.
50 Ohms output impedance.
Low output — 632 mV P-P open circuit.
316 mV P-P into 50 Ohms.
50 Ohms output impedance.

(Option K and Model 119P have a single 600 Ohm in place of 50 Ohm outputs.)

ATTENUATOR:

30 dB continuously variable affecting both low and high outputs.

(Option A substitutes 20 and 40 dB steps in place of low output)

DC OFFSET (Variable):

±10 V to -10 V open circuit.
+5 V to -5 V into 50 Ohms.

Note: Protection circuit will automatically clip waveform if DC offset plus signal exceeds maximum peak voltage.

SINE DISTORTION:

<1% 0.2 Hz to 100 KHz. Typically Less than 0.5%.
All Harmonics >30 dB down 100 KHz to 2 MHz.
Sine distortion measured at full output, between 0.2 and 2.0 on the multiplier dial.

SINE FREQUENCY RESPONSE:

<±0.1 dB 0.2 Hz to 100 KHz.
<±0.5 dB 100 KHz to 2 MHz.

SQUARE WAVE:

Rise time: <100 nsec.
Aberrations: ±5% of max. P-P amplitude.

PULSE OUTPUT:

TTL Compatible.
Amplitude: +3 V open circuit.
Rise time: 25 nsec (typically 10 nsec).
Will sink 20 TTL loads.

AM (119M only):

Approx. 100K Ohm input impedance.
Approx. 5 V P-P for 100% modulation at maximum carrier.
Separate carrier and modulation controls.
Full four quadrant capability.
Double sideband capability.

SWEEP GENERATOR (121 only):

Period range: 1 msec to 10 sec
Period accuracy: ±10% in CAL position
Sweep width: 0 to 1000:1
Ramp output: 2.5 V peak
Sweep Sync output: 5 V peak

POWER REQUIREMENTS

115 VAC ±10% or 230 VAC ±10%
50 Hz to 400 Hz. Approx. 10 watts
Other voltages available.
(Model 119P also operates from 12 V DC or up to 8 hrs from its built-in rechargeable battery pack)

PHYSICAL CHARACTERISTICS

18.8 cm wide x 7.3 cm high x 21.6 cm deep.
Weight — Approx. 4.4 Kg (119P is Approx. 10.5 Kg.)

NOTE: (Unless otherwise stated). Specifications apply 10% to maximum output voltage terminated into 50 Ohms 0.2 to 2.0 frequency dial setting. Specifications are valid at 25°C ±5°C after 1 hour warmup time. Specifications not valid in AM mode.

MODEL 119

The Model 119 Function Generator provides sine, square, triangle, pulse and ramp waveforms over a frequency range of .02 Hz to 2.2 MHz. Signal amplitudes of 20 V P-P open circuit or 10 V P-P into a 50 Ohm load are available from the 50 Ohm high output. A low output of 632 mV P-P open circuit, 316 mV P-P into 50 Ohms is available simultaneously (30 dB down from high output). A 30 dB continuously variable attenuator varies both the high and low outputs. Front panel features include a variable ramp/pulse control and invert switch, a VCF input which allows the frequency to be varied over three decades (1000:1) by an external voltage, a TTL compatible pulse output capable of sinking 20 TTL loads, and DC offset.

MODEL 119M

The Model 119M AM/FM Function Generator includes all the features of the Model 119 and can also be amplitude modulated by an external signal. Separate modulation and carrier controls allow adjusting the modulation percentage. This AM feature includes full four-quadrant capability and can generate double-sideband suppressed-carrier signals. Approximately 5 V P-P at the 100K AM input provides 100% modulation at maximum carrier.

MODEL 119P

The Model 119P Portable Function Generator includes all of the features of the 119 and can be powered by AC, by 12 V DC, or by its own built-in rechargeable battery pack. For applications where AC power is not readily available, the 119P will operate up to 8 hours on a full charge. Optional power cords are available with either clip connectors or an automobile cigarette lighter connector. A single 600 Ohm output is provided.

MODEL 121

The Model 121 Sweep Function Generator includes all the features of the 119 and also includes a sweep generator. This allows you to frequency sweep the main generator with a variable sweep width up to 3 decades (1000:1). The sweep rate is adjustable from 1 msec to 10 secs. A ramp output of -2.5 V peak allows driving the horizontal input of an oscilloscope or X-Y recorder. A ramp sync output provides a +5 V pulse coincident with the ramp fall time. The Model 121 is a versatile instrument that can be used in a variety of applications. Low cost makes it an ideal lab instrument for use in technical schools offering basic and advanced electronic training courses.

OPTIONS

Except as noted below, the following options are available on all 119/121 generators.

Option A provides a 0-20-40 dB step attenuator in place of the LO output. Together with the variable 30 dB AMPLITUDE control this gives the user a total attenuator range of 70 dB. (Not available on the 119P or in combination with option K.)

Option B provides a dynamic frequency range of 0.002 Hz to 200 KHz in place of 0.02 Hz to 2.2 MHz.

Option K provides a single 600 Ohm output in place of the HI and LO outputs. (Not available in combination with option A. The 119P standard output impedance is 600 Ohms.)

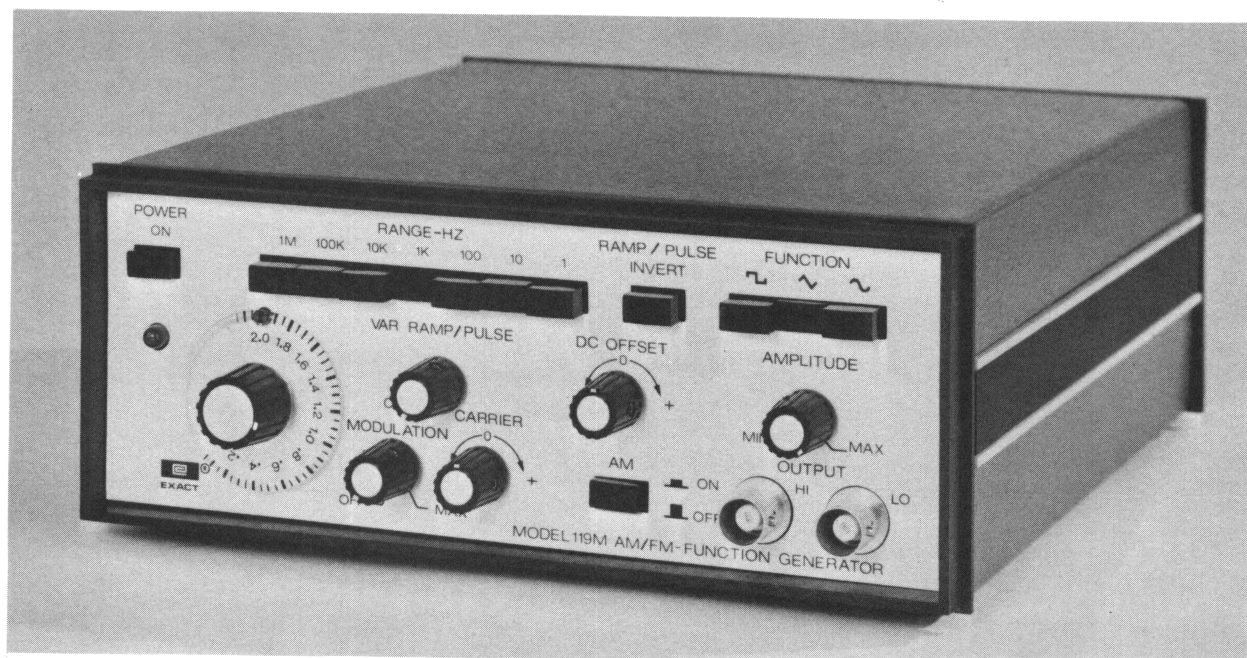
Option T provides a tilting handle.

-
13. PULSE OUTPUT — This output is a pulse regardless of FUNCTION setting. Time symmetry is dependent on "VAR RAMP/PULSE" setting. Will sink 20 TTL loads.
 14. SWEEP RANGE — Pushbuttons select the time required to sweep from minimum to maximum frequency as set by the FREQUENCY MULTIPLIER and WIDTH controls (121 only).
 15. RATE — Continuously variable multiplier for SWEEP RANGE controls. Usable from CAL (1 times the SWEEP RANGE) to 100 times (2 decades) the SWEEP RANGE selection (121 only).
 16. WIDTH — Continuously variable control of sweep width. Generator frequency controls set the lower frequency limit and the WIDTH control provides a variable setting of the upper frequency limit (121 only).
 17. RAMP OUTPUT — 0 to approx. -2.5 V Ramp (sweep waveform). Ramp time is set by the sweep rate controls. (121 only)

18. RAMP SYNC OUTPUT — 0 to approx. +5 V pulse coincident with ramp fall time. (121 only)
19. MODULATION — Sets the level of the AM modulating signal. (119M only)
20. CARRIER — Adjusts the carrier level and phase (0° or 180°). (119M only)
21. AM ON/OFF — Turns on and off the AM functions. (119M only)
22. AM INPUT — External input of AC or DC controls the output signal amplitude. (119M only)

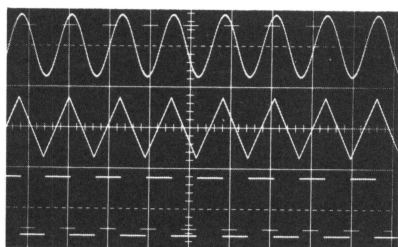
Note: Items in black apply to all 119/121 Models.

MODELS 119,119M AM/FM, and 121 SWEEP FUNCTION GENERATOR

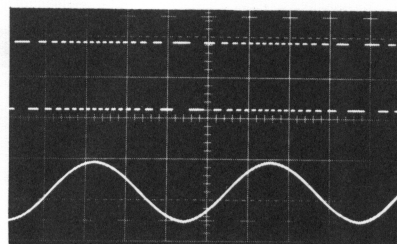


FEATURES

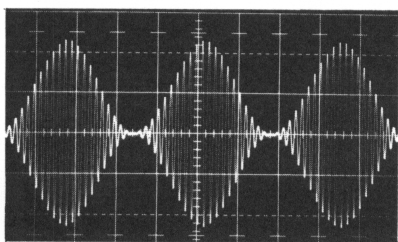
- 0.02 Hz — 2.2 MHz
- 20 Hz — 20 KHz AUDIO RANGE
- VARIABLE DC OFFSET
- VARIABLE RAMP/PULSE
- VCF INPUT FOR SWEEPING OR FREQUENCY MODULATION
- SINE, SQUARE, TRIANGLE, RAMP, AND PULSE
- TTL COMPATIBLE PULSE OUTPUT
- AM MODULATION (119M)
 - 4 QUADRANT CAPABILITY
 - DOUBLE-SIDEBAND CAPABILITY
 - SEPARATE CARRIER AND MODULATION CONTROLS
- INTERNAL SWEEP GENERATOR (121)
 - 1 msec — 10 sec
 - RAMP OUTPUT
 - SYNC OUTPUT



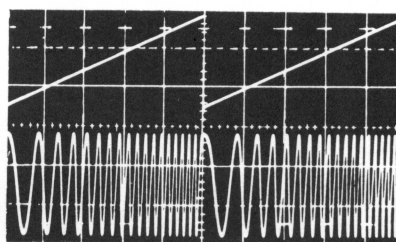
SINE, TRIANGLE, SQUARE



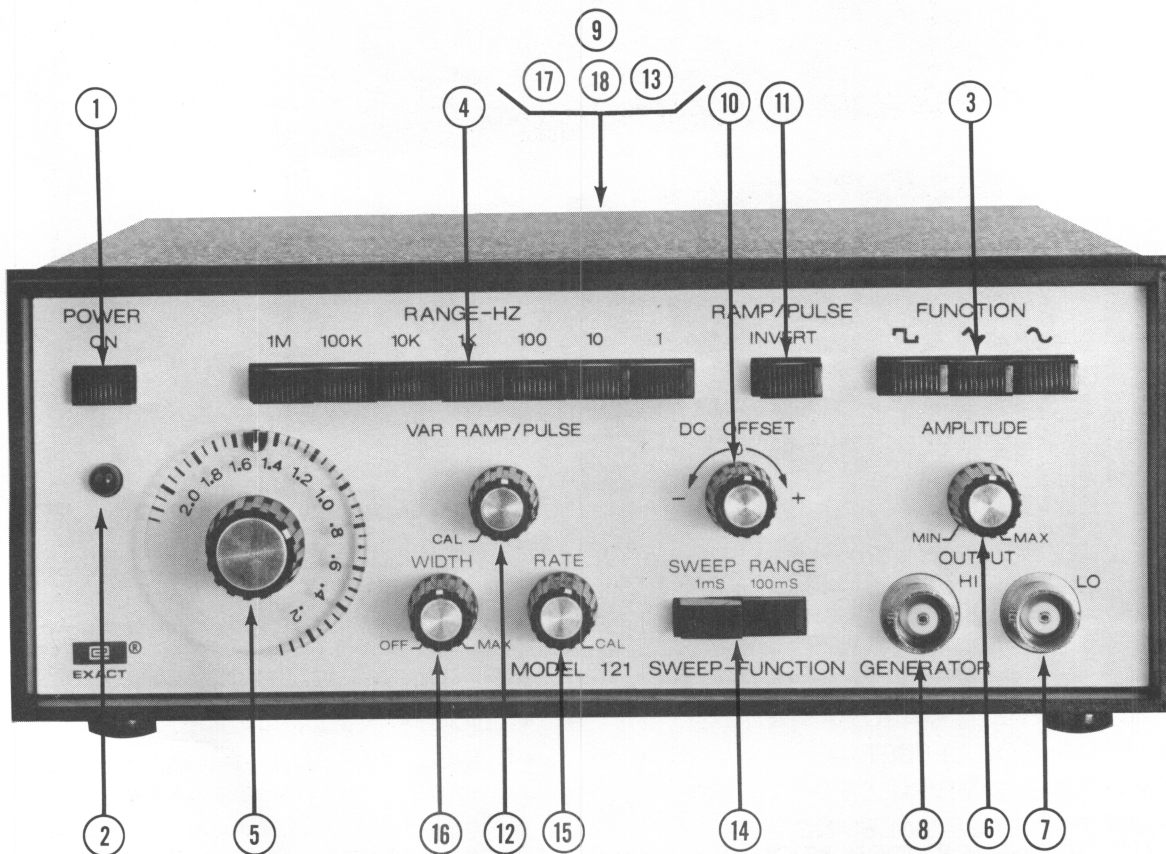
FREQUENCY MODULATION,
SQUAREWAVE CARRIER



100% SINEWAVE MODULATION (119M)



FREQUENCY SWEEP WITH INTERNAL
RAMP (121)



FUNCTION GENERATOR OPERATION

1. POWER — Push on/push off switch to apply power.
2. POWER INDICATOR — LED indicates power is on.
3. FUNCTION — Pushbutton selection for sine, triangle, or square waveform output. Triangle and square provide ramps and pulses with the use of the VAR RAMP/PULSE control.
4. RANGE-HZ — Selects the frequency range of the output waveform in decade steps. The product of the FREQUENCY MULTIPLIER setting and the selected RANGE-HZ pushbutton sets the operating frequency.
5. FREQUENCY MULTIPLIER — Calibrated dial varies the frequency within the selected RANGE-HZ and will operate down to 1/1000 (3 decades down) of the top dial frequency setting.
6. AMPLITUDE — Continuously variable control of waveform output voltage. Does not affect the DC offset of a waveform.
7. HI OUTPUT — BNC output connector for the waveforms selected by the FUNCTION switch. 50 Ohm impedance.
8. LO OUTPUT — BNC output connector for the waveforms selected by the FUNCTION switch. 50 Ohm impedance 30 dB down from HI output.
9. VCF INPUT — External input of AC or DC controls frequency output as referenced to RANGE-HZ and FREQUENCY MULTIPLIER settings.
10. DC OFFSET — Continuously variable control of amplitude symmetry (DC offset).
11. RAMP/PULSE INVERT — Pushbutton switch changes polarity of ramp and pulse waveforms. Selects which slope or logical portion of the waveform will be affected by the VAR RAMP/PULSE control.
12. VAR RAMP/PULSE — Continuously variable control of waveform duty cycle. Used with the normal square and triangle settings to produce ramp and pulse waveforms. Only one slope or logical portion of the waveform is affected.



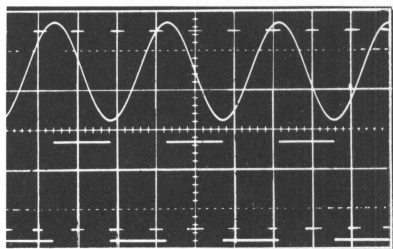
EXACT®

OPTIONS			SPECIALS	
OPTION	DESCRIPTION	MODEL	SPECIAL NO.	DESCRIPTION
A	STEP ATTENUATOR 20 dB STEPS	119 121	336-101	Ramp Up at Rate 1 — Hold at Rate 2 — Ramp Down at 0.1 to 1 times Rate 1.
B	LOW FREQUENCY EXTENSION 1 μ Hz to 1 KHz	337	7056-105	Two Generators w/control box. Bubble Memory Tester.
	0.01 Hz to 5 MHz	126 128 504 506 507	605-114	605 with programming to match Ailtech discontinued model (F280A).
	.002 Hz to 200 KHz	119 121	336-117	Model 336 with zero output impedance and 20 V P-P into 500 ohms at 20 mA.
	0.1 Hz to 11 MHz	513 516 517 519	336-119	Model 336 with inverting amplifier and switch.
			336-121	Extend low frequency to 0.1 μ Hz. Lim- its top frequency to 100 Hz.
D	RAMP HOLD	126	336-124	Ten turn amplitude pot. Front panel power switch.
E	1000 SECOND RAMP	508	336-143	336 with zero output impedance and extend low frequency to 0.1 μ Hz. Lim- its top frequency to 100 Hz.
F	VARIABLE SYMMETRY	126 517 513 516 7260 7271	337-144	Two 337s with reference outputs locked together and two variable out- puts.
			202-161	Model 202 with 100 times slower rate for steps mode only.
G	LOW FREQUENCY EXTENSION ON AM GENERATOR 0.01 Hz to 1 MHz	519	337-163	Provides 0.05° accuracy at 90° for sine/cosine generation.
J	HALF-SINE/HALF-TRIANGLE	126 128		
K	600 OHM OUTPUT	119 121		
M	AM-FM	119		
P	BATTERY PACK MODEL WITH 600 OHM OUTPUT	119		
Q	KVD MULTIPLIER FOR RAMP	7260		
T	ADJUSTABLE HANDLE/STAND	119 121		
X	± SQUARE	126 128 504 506 507		

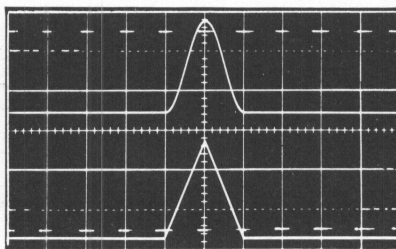
EXACT®
electronics, inc.BOX 160, HILLSBORO, OREGON 97123
(503) 648-6661 TWX 910-460-8811



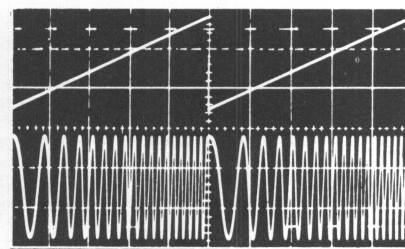
EXACT®



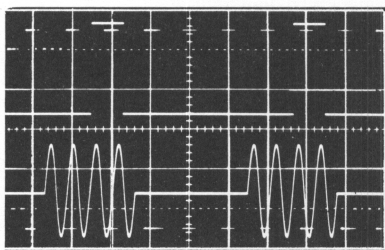
SINE - SQUARE



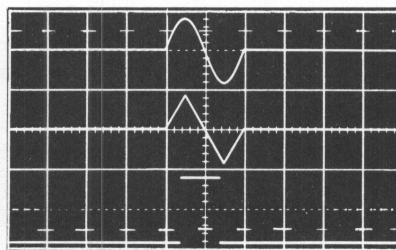
HAVERSINE - HAVERTRIANGLE



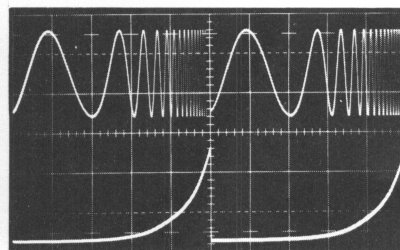
SWEEPING with INTERNAL RAMP



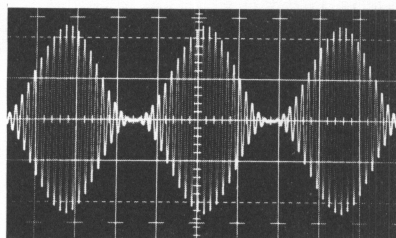
PULSE and BURST MODES



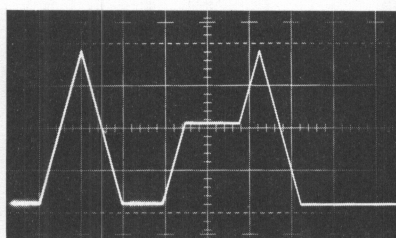
TRIGGERED WAVEFORMS



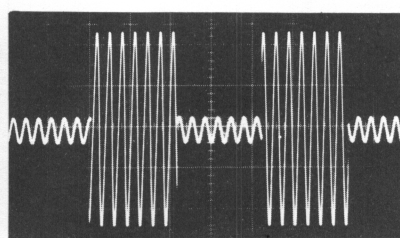
LOG SWEEPING WITH
INTERNAL RAMP



SINE WAVE MODULATION

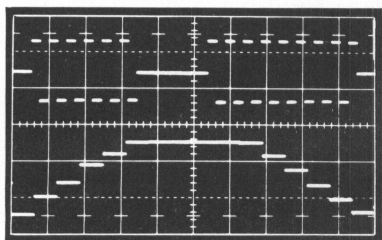


TRIGGERED TRIANGLE
HELD AT ONE POINT

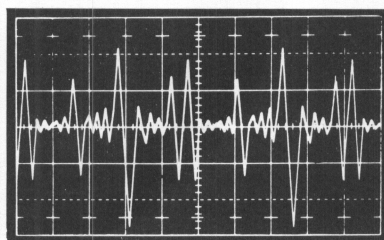


SQUARE WAVE AM

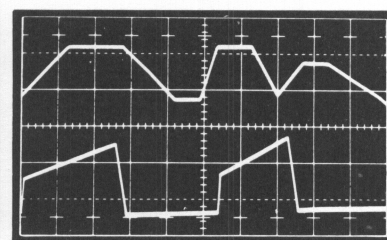
COMPLEX WAVEFORM GENERATION USING THE EXACT MODEL 202



DIGITAL (VARIABLE
LEVELS AND WIDTHS)



ANALOG (VARIABLE SLOPE)



EXACT®
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