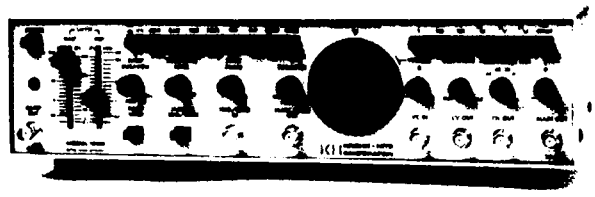
0.2Hz to 3MHz LIN/LOG SWEEP GENERATOR Model 1600A

model 1600A

- **Waveforms:** Sine, Square, Triangle, Ramp and Pulse
- **LIN/LOG Sweep:** 1500:1, Up or Down
- **Frequency Marker**
- **14 Modes of Operation:** Continuous, Gate, Trigger, Pulse, Cont Sweep, Trig Sweep, Gated Sweep, Hold Sweep Hold, Tone Burst, Trig Burst, Gated Swept Burst, Trig Swept Burst, Sweep-Hold Burst, External VC
- **Calibrated Sweep Start and Stop Controls**
- **DC Offset:** ±10V
- **Calibrated dB Attenuator**
- **Variable Start Phase and Trigger Level**



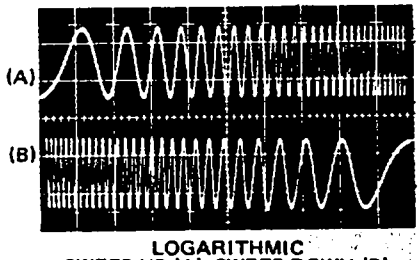
The KROHN-HITE Model **1600A** is the most versatile Lin/Log Sweeper available! It is the first in the industry to offer 14 different modes of operation, *plus* an exclusive Frequency Marker feature that greatly simplifies swept response measurements.

The Model **1600A** is really 2 generators in 1. The main generator provides sine, square and triangle waveforms over a frequency range of 0.2Hz to 3MHz. The ramp generator provides linear and exponential (log) ramps over a range of 0.001Hz to 1kHz. These 2 generators can be operated independently, or interconnected to provide a wide variety of operational modes, including: Triggered (single cycle) or gated waveforms; tone bursts with variable rates and durations; variable-width pulses, with independently adjustable rep-rates; continuous, triggered or gated sweeps, either linear or logarithmic, with independent slide controls for start and stop frequencies.

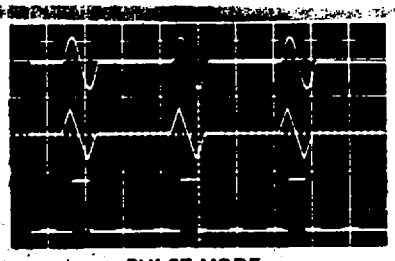
An exclusive feature of the Model **1600A** is the Frequency Marker. This feature allows the user to selectively pause during a frequency sweep, for any duration between .1ms and 10s. Connecting the RAMP output to a scope horizontal input provides intensification of the scope trace for the pause period. The dial indicates the frequency of the pause in this mode of operation to provide accurate frequency marking during response tests. A marker pulse is also simultaneously generated during the pause, and may be used to gate or trigger other external circuits.

The main output of the **1600A** is adjustable from 5mV to 20 volts p-p, by the calibrated dB attenuator and vernier. The VARIABLE DC OFFSET control allows all waveforms to be positioned about zero to a maximum of ±10 volts. Haversine and havertriangle waveforms are obtained with the START PHASE control.

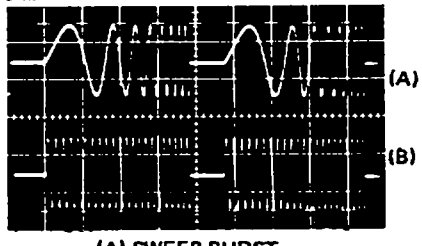
Several auxiliary outputs are also provided on the 1600. The output of the internal linear ramp is available at the RAMP OUT connector. The PEN LIFT output is provided for use with an x-y plotter. The TTL output is coincident with the main generator frequency, and may be used for gating, blanking, etc. The CV (control voltage) output may be monitored with a digital voltmeter for more precise frequency adjustment. The MARK GATE output is coincident with the pause duration and provides gating and timing signals.



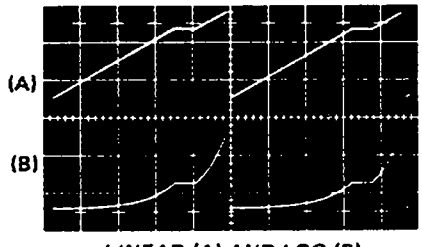
LOGARITHMIC
SWEEP UP (A), SWEEP DOWN (B)



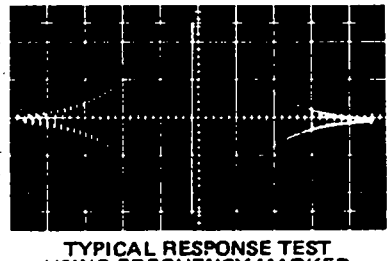
PULSE MODE



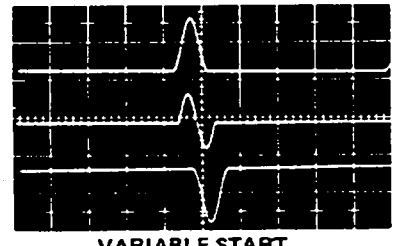
(A) SWEEP BURST
(B) TONE BURST



LINEAR (A) AND LOG (B)
RAMPS WITH PAUSE



TYPICAL RESPONSE TEST
USING FREQUENCY MARKER



VARIABLE START
PHASE CONTROL

SPECIFICATIONS

MAIN OUTPUT

Waveforms: Sine, square, triangle, positive and negative pulses.

Frequency Range: 0.2Hz to 3MHz.

Frequency Control: Dial calibrated linearly from .2 to 300, and a 3 position pushbutton multiplier switch.

BAND	MULTIPLIER	FREQUENCY RANGE (Hz)
1	1	0.2-300
2	100	20-30k
3	10k	2k-3M

Frequency Accuracy: ± 5% at three dial calibration settings of 10, 100 and 300; ±20% maximum at other settings.

Maximum Output: 20V p-p (10V p-p into 50 ohms).

Impedance: Constant 50 ohms, ±2%.

Amplitude Control: Attenuator calibrated in 20dB steps to 60dB and vernier. dB attenuator accuracy ±0.2dB. Minimum output less than 5mV.

DC Component: Nominal zero volts. Drift, less than ±5mV/°C, reduced in proportion to dB attenuator setting.

Frequency Response: Sinewave; 0.1dB, 0.2Hz to 300 kHz, 1.0dB to 3MHz.

Sinewave Distortion: Less than 0.5% 2Hz to 300kHz, 3% to 3MHz.

Squarewaves and Pulses: Rise and fall time less than 40ns, total aberrations less than 5% with 50 ohm matching load.

Triangle Linearity: 99% 0.2Hz to 300kHz, 95% to 3MHz.

Time Symmetry: 99% 0.2Hz to 300kHz.

VC (external voltage control): Frequency controlled about the dial setting with zero to ±3 volts. Range 1500:1. Slew rate 0.2V/us. Impedance 10k ohms. Upper frequency limited to maximum of selected band.

VARIABLE DC OFFSET: Allows setting of waveform about ground to ±10 volts peak. Peak AC plus DC offset limited to ±10 volts.

OPERATIONAL MODES (MAIN OUTPUT)

CONT: Continuous output, frequency determined by dial and multiplier.

GATE: Continuous output for duration of external or manual gate.

TRIG: Single cycle output when externally or manually triggered.

PULSE: Pulse output adjustable between 160ns and 2.5s or single cycle of selected waveform. Rep rate from 0.001Hz to 1kHz.

CONT SWP: Continuous sweeping between frequencies determined by START and STOP controls. Range: 1500:1, linear or log.

TRIG SWP: Holds at START frequency, single sweep when externally or manually triggered.

TRIG BURST: Single tone burst when externally or manually triggered.

The following additional modes are obtained by simultaneously depressing the mode buttons in brackets:

TONE BURST [GATE, PULSE]: Repetitive tone burst, rate variable from 0.001Hz to 1kHz.

GATED SWP [CONT, GATE, CONT SWP]: Holds at START frequency, continuous sweeping when externally or manually gated.

GATED SWP BURST [GATE, CONT SWP]: Continuously sweeping burst when externally or manually gated.

TRIG SWP BURST [TRIG SWP, TRIG BURST]: Single swept burst when externally or manually triggered.

HOLD SWP HOLD [GATE, TRIG SWP]: Continuous output at START frequency, swept and held at STOP frequency when externally or manually gated.

SWP-HOLD BURST [GATE, TRIG SWP, TRIG BURST]: Single swept burst and hold when externally or manually gated.

TRIG/GATE: Manual or external. Waveform start/stop point adjustable ±90° to 300kHz, ±70° to 3MHz. Input level variable -10V to +10V. Triggers on positive slope. Maximum trigger frequency, 3MHz. Impedance, 10k ohms.

SWEEP CHARACTERISTICS

Linear or logarithmic. Start and stop frequencies independently selected. Typical accuracy: Linear scale 10% f.s., Log scale, 20%. Frequencies may sweep up or down. Sweep may be stopped with RAMP HOLD control. Hold drift: Linear, (.03Hz/sec) X MULTIPLIER; logarithmic, .6% of frequency/sec.

Range: 1500:1, linear or logarithmic.

Duration: Variable, 1ms to 1000s.

MARKER CHARACTERISTICS (positive ramp, sweep up only)

Marker frequency set by MARKER dial and MULTIPLIER. Swept frequency pauses at selected marker frequency. Pause variable from 1ms to 10s.

Marker accuracy: ± 5% at dial settings of 10, 100 and 300; ± 20% maximum at other settings.

Pause frequency drift: Linear (.03Hz/sec) X MULTIPLIER; Log .6% of frequency/sec.

AUXILIARY OUTPUTS

RAMP OUT: Linear 5V. Impedance 600 ohms.

PEN LIFT (rear panel): TTL pulse, "high" during sweep and marking.

TTL OUT: Frequency same as Main Output. Drives up to 10 TTL loads. Rise and fall time less than 15ns. Total aberrations less than 10%. Impedance 50 ohms.

CV (control voltage) OUT: 2mV to 3 volts, proportional to generator frequency. Accuracy better than 5%. Impedance 600 ohms.

MARK GATE OUT: TTL pulse, variable with pause duration control.

OPERATING TEMP RANGE: 0°C to 50°C

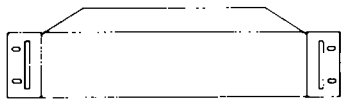
POWER REQUIREMENTS: Switch selectable, 90-110, 108-132, 180-220, or 216-264 volts, single phase, 50-400 Hz, 25 watts.

DIMENSIONS AND WEIGHTS

Cabinet Size/Weight	H	W	D	Net	Gross
U.S.	3½"	14"	8½"	7.5 lb.	9.5 lb.
Metric	8.9cm	35.6cm	21.6cm	3.4kg	4.3kg

Specifications apply at 25°C, ±5°C, with maximum output voltage and dial set between 2 and 300.

OPTIONAL RACK-MOUNTING KIT:
Part No. RK-314: Permits installation of the Model 1600 into a standard 19" rack spacing.



Specifications subject to change without notice.