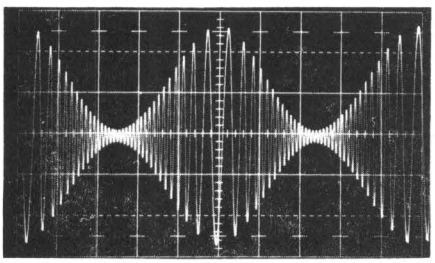
$ 1073

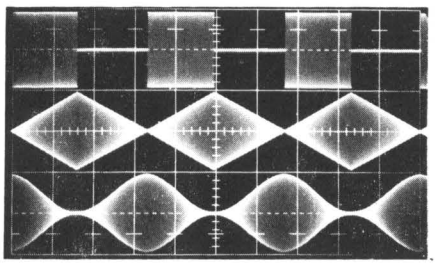
MODEL 519 AM/FM FUNCTION GENERATOR

FEATURES

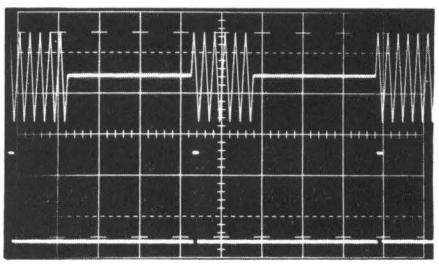
- WAVEFORM GENERATOR — SINE, SQUARE, TRIANGLE, ± PULSE, +SINE
- AM GENERATOR
- FM GENERATOR (1000:1 RANGE)
- SIMULTANEOUS AM/FM
- INTERNAL AM/FM SOURCE
- PULSE GENERATOR — VARIABLE WIDTH AND REPETITION RATE
- TONE BURST GENERATOR
- GATE/TRIGGER
- VARIABLE D.C. OFFSET
- SEARCH MODE FOR MANUALLY SWEEPING OVER THREE DECADES
- FLOATING OUTPUT PROVISION
- OUTPUT AMPLIFIER WITH 60db ATTEN IN 10db STEPS + 20db VAR USABLE TO 120db ATTENUATION (10μV PP INTO 50Ω) IN AM MODE



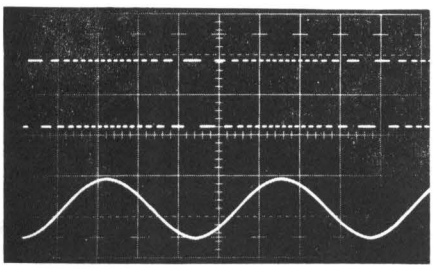
SIMULTANEOUS AM/FM MODULATION



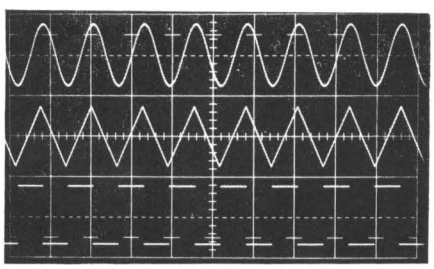
SQUARE, TRIANGLE AND SINEWAVE AM



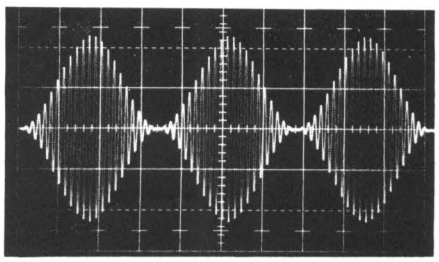
BURST MODE — PULSE MODE



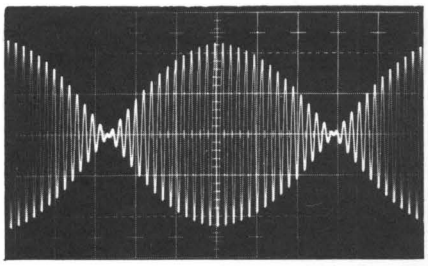
FREQUENCY MODULATION, SQUARE WAVE CARRIER



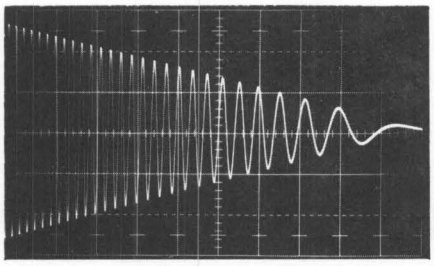
SINE, TRIANGLE AND SQUARE



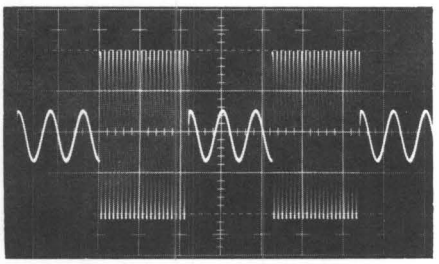
100% SINE WAVE AM



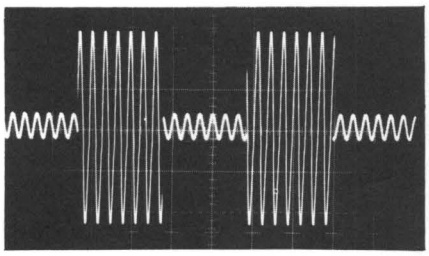
AM SUPPRESSED CARRIER



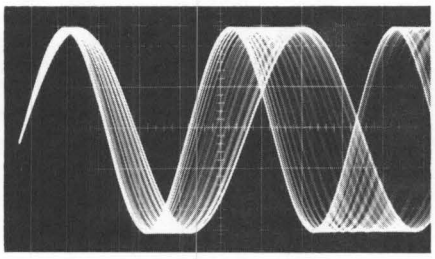
LINEAR AM/FM



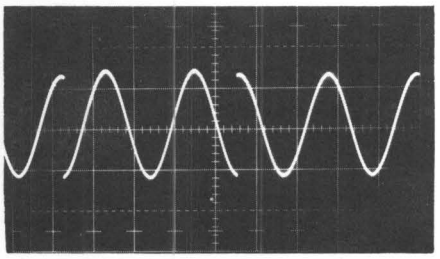
AM/FSK MODULATION



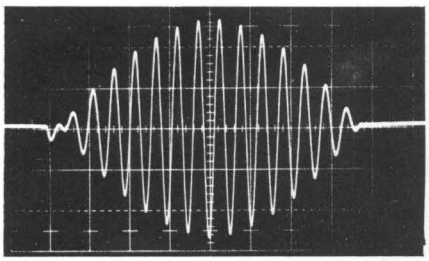
SQUARE WAVE AM



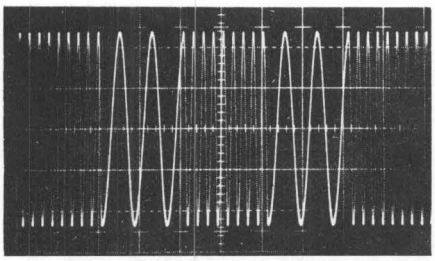
LOW FREQUENCY FM



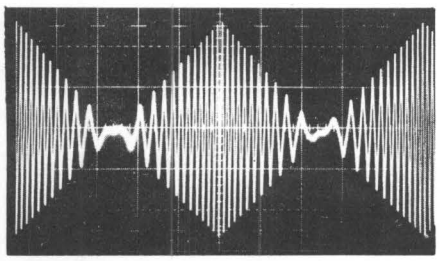
PHASE SHIFT KEYED



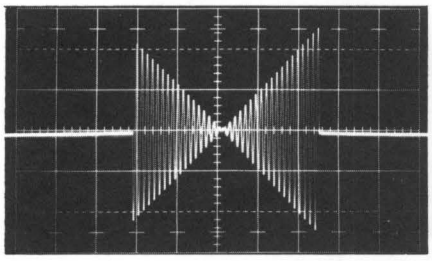
HALF SINE AM BURST



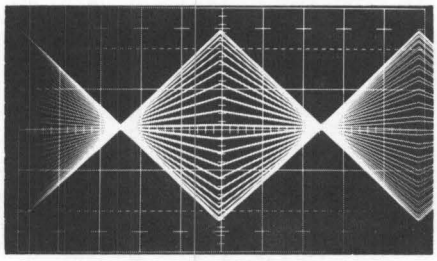
FSK



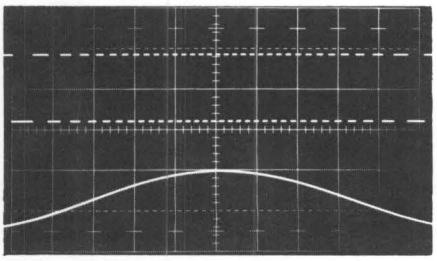
TRIANGLE AM SUPPRESSED CARRIER



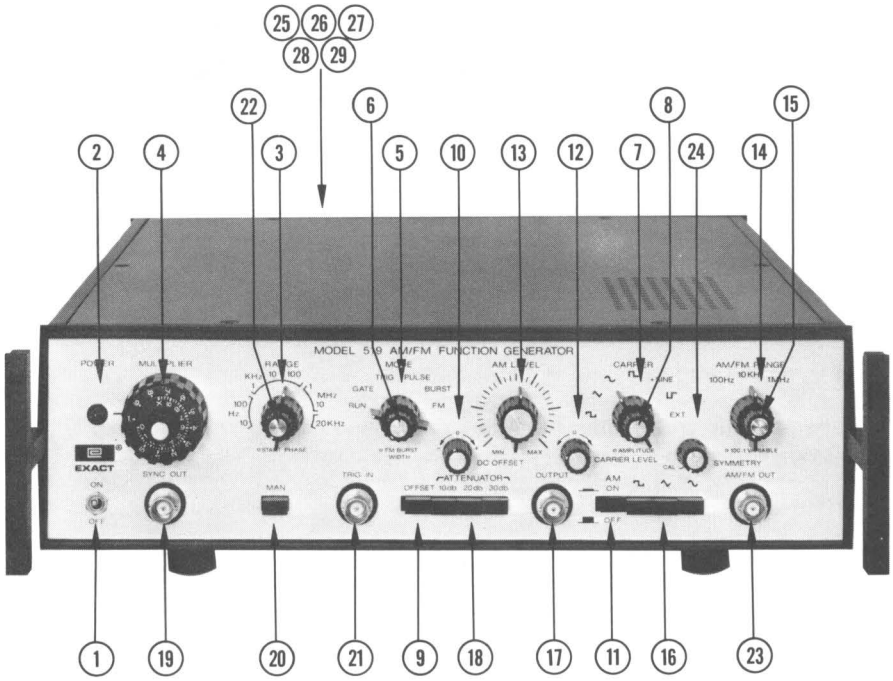
MODULATED TONE BURST (BOW TIE)



ULTRA LOW FREQUENCY AM



LINEAR FM SINE WAVE MODULATION



MODEL 519 AM/FM FUNCTION GENERATOR OPERATION

1. Power On/Off switch — Connects line voltage to the instrument.
2. Pilot Lamp — Visual indication when instrument is on.
3. Range Switch — Selects the desired range of carrier frequencies.
4. Multiplier — Provides calibrated fixed frequency steps between range settings. Each step equals 10% of range setting. The vernier dial provides variable frequency adjustment between fixed steps. The "S" position on the fixed step multiplier dial places the multiplier in the search mode. The search position allows the vernier dial complete control of the frequency over a three decade range.
5. Mode Switch — Selects the desired mode of operation, i.e.; Run, Gate, Trigger, Pulse, Burst or FM.
6. FM/Burst Width — Provides adjustment of the FM (sweep) width when in the FM Mode and Burst width in the Brust Mode.
7. Carrier Switch — Selects the desired carrier or output waveform desired. The Ext Position allows the use of an external carrier waveform.
8. Amplitude — provides >20db variable attenuation of the output signal. Amplitude control has no effect on carrier level or AM level adjustment. (Percent of modulation.)
9. DC Offset Switch — When switched on enables the variable control.
10. DC Offset — Provides variable control of the DC level of the output waveform when the DC Offset switch is depressed.
11. AM Switch — Allows amplitude modulation of selected carrier waveform.
12. Carrier Level — When in the AM Mode, this control provides complete adjustment of the carrier amplitude from max "pos" thru "nul" to max "neg." 180° phase shift occurs from max + to max - setting. May be utilized as a variable PHASE CONTROL.
13. AM Level — This control adjusts the amount of AM signal applied to the modulator. The desired amount of modulation is adjusted by means of the Carrier Level and/or the AM Level controls.
14. AM/FM Range — Selects the desired frequency range of the AM/FM generator.
15. 100:1 Variable — Provides variable adjustment of AM/FM frequency between fixed ranges. This control allows adjustment over a two decade range (100:1).
16. AM/FM Function — A Square, Triangle or Sine waveform may be selected to amplitude modulate the carrier waveform selected by the carrier switch. Simultaneous AM/FM may be obtained by placing the mode switch to FM and the AM switch on. The selected waveform from the AM/FM function switch will AM and/or FM the carrier signal selected. FM Width, AM Level, and Carrier Level are all independent of each other.
17. Output — BNC output connector providing the selected carrier at 50Ω output impedance for connection to external equipment.
18. Attenuator — A pushbutton attenuator providing a 10, 20 and 30db Pad for a total attenuation of 60db in 10db steps.
19. Sync Out — Provides a square wave for syncronizing external equipment to the carrier generator.
20. Manual Pushbutton — The Manual pushbutton allows manual gating and triggering of the carrier generator in the gate and trig mode of operation.
21. External Trigger Input — When in the gate and trig mode, the carrier generator may be externally gated or triggered by application of an external signal at the external trigger input.
22. Start level — When the carrier generator is in the gate, trig, pulse or burst mode of operation, the start level provides adjustment of the start phase over a ± 90° range.
23. AM/FM Out — BNC output of selected AM/FM generator signal.
24. Symmetry — control used to vary the time of the positive slope or logical portion of the selected AM/FM generator signal.
25. V:f — A voltage output which is at all times proportional to the carrier frequency.
26. External FM Input — Provides external control of frequency for FM, sweeping, frequency shift keying, DC frequency control etc
27. External AM Input — When in the AM mode, an external signal may be used to AM the carrier waveform selected. The AM level must be set to min to avoid mixing of the internal and external AM signal, unless mixing is desirable.
28. External Carrier Input — An external carrier or signal may be used when the carrier switch is in the Ext position. Amplitude modulation of this external waveform is easily accomplished utilizing the AM/FM generator or an external AM input.
29. AM/FM Sync Output — Provides a square wave for syncronizing external equipment to the AM/FM generator.

GENERAL

The Model 519 is two generators in one package. The main generator is a VCF (voltage controlled frequency) function generator, producing sine, square, triangle, pulse, +sine and sync waveforms over an overall frequency range of 0.01Hz to 11MHz. The AM/FM generator is a second function generator producing sine, square, and triangle waveforms over a frequency range of 1Hz to 1MHz. It is also used to gate or trigger the main generator for tone-burst and pulse generator operation. Variable symmetry provides a ramp for sweeping the main generator.

Simultaneous AM and FM is provided by selecting both AM and FM with the mode switches. Percent of modulation can be set with either carrier level or AM level and the percent of modulation remains constant for all levels of output settings. Percent of modulation is adjustable from 0% through 100% and on to double sideband suppressed carrier. The symmetry of the AM-FM modulation generator can be varied to provide a ramp waveform suitable for frequency sweeps.

A search mode is provided using the frequency multiplier vernier, so the main generator can be manually swept over three decades. In the pulse mode, pulse duration as well as repetition rate are variable. The main generator can also be manually or externally gated or triggered. External amplitude and frequency modulating signals can be applied to AM and/or FM the main generator. An external carrier mode is provided to allow the Model 519 to modulate other signals. The AM/FM generator output is available on the front panel and the AM/FM sync output (square wave) is available from a rear panel connector. The output amplifier has a 60db step attenuator in 10db steps and 20db variable plus 60db carrier level for greater than 120db attenuation and ±10V of variable DC offset.

The Model 519 is a combination SINE, SQUARE, TRIANGLE, AM, FM, VCF, SWEEP, TONEBURST, PULSE GENERATOR all at a surprising low cost.

SPECIFICATIONS

WAVEFORMS
Sine, Square, Triangle, Positive Sine, Positive Pulse, Negative Pulse.

DYNAMIC FREQUENCY RANGE
Main generator, 1Hz to 11MHz (0.01 Hz in search mode)
AM/FM generator, 1 Hz to 1 MHz.

MODES OF OPERATION
Run, Gate, Trigger, Pulse, Burst, FM, AM, Simultaneous AM-FM, Ext. carrier.

SYNC OUTPUTS
Main generator, square wave approximately 4V P-P open circuit. Approx. 100Ω output impedance.
AM/FM generator, square wave approx. 4V P-P, 100Ω output impedance. Located on rear panel.

FREQUENCY ACCURACY
Main generator, ±2% of frequency range (typically ±2% of setting).
AM/FM generator, 1 Hz to 1 MHz in three calibrated steps. Accurate within ±5%. Uncalibrated continuously variable between steps: variable has 100:1 range down from calibrated step.

OUTPUTS
1. 50Ω output impedance. All waveforms 20V P-P open circuit. 10V P-P into 50Ω with exception of Positive Sine and Positive or Negative Pulses which are 10V peak open circuit, 5V peak into 50Ω. A full 80db of attenuation is provided in 10db steps with 20db continuously variable (greater than 120db utilizing carrier level in AM mode).
2. Separate selected AM-FM output approximately 2V P-P.

GATE AND TRIGGER MODES
Input: DC coupled, input impedance approx. 1K. Trigger and gate signal requirements, manual or external voltage of approx. 1.2V for turn on. TTL compatible.

EXTERNAL AM INPUT
Approx. 10V P-P for 100% modulation at full output. Frequency response, 1db down at 1 MHz.

EXTERNAL FM INPUT
Approx. 5V P-P for Maximum deviation. Slew rate limit approximately 0.1V/μsec.

EXTERNAL CARRIER INPUT
Approximately 10V P-P for full output.

SINE WAVEFORM DISTORTION
< 0.5% 1 Hz to 100KHz (Typically <0.2%). No harmonics.
< 30db down 100KHz to 11MHz

SINE FREQUENCY RESPONSE
0.1db to 100KHz, 2db to 10MHz.

SQUARE WAVEFORMS
Rise and fall < 20 nanoseconds.
Overshoot and ringing < 5%.

TRIANGLE LINEARITY
99% to 100KHz.

D.C. OFFSETS:
Variable ±5V into 50Ω, ±10V open circuit. Circuit will automatically limit (clip) signal if D.C. offset plus signal exceeds maximum voltage output.

FREQUENCY STABILITY
0.05% of setting for 10 min.
0.25% of setting for 24 hrs.

AMPLITUDE STABILITY
0.05% of maximum P-P amplitude for 10 min.
0.25% of maximum P-P amplitude for 24 hrs.

SYMMETRY (time): ±1% + 10 nS

POWER REQUIREMENTS
Input Voltage — 115 VAC ± 10% or 230 VAC ± 10%
Frequency — 50 to 400 Hz
Power Consumption — Approximately 20W.
Other voltages available.

PHYSICAL CHARACTERISTICS
30.5cm wide X 8.9cm high X 37.5cm deep. Weight — 5.22kg. Top and bottom covers are easily removable, exposing all calibration and circuit board areas.

Option "B" — 0.1Hz - 11MHz, Main generator
Option "G" — 0.01 Hz - 1MHz, AM/FM generator

NOTE: (unless otherwise stated). Specifications apply 10% to maximum output voltage with instruments terminated into 50 and do not apply in the Search Mode or AM Mode. Specifications are valid at 25°C ± 5°C warmup time of 30 min.