# SECTION II
# SPECIFICATIONS AND TEST PROCEDURES

This section contains specifications for the WAVETEK instruments discussed in this handbook, and procedures for testing their accuracy. This table provides specifications for the Models 114 and 114B.

## VERSATILITY

Waveforms

Sine ∿ , square ⊓ , triangle ∧ , offset sine ∿̲ , and sync pulse.

Dynamic Frequency

0.0015 Hz to 1 MHz (10 min. to 1 μsec.).

Ranges:

| | |
|---|---|
| X.01 | = 0.005 Hz to 0.1 Hz |
| X.1 | = 0.05 Hz to 1 Hz |
| X1 | = 0.5 Hz to 10 Hz |
| X10 | = 5 Hz to 100 Hz |
| X100 | = 50 Hz to 1 KHz |
| X1K | = 500 Hz to 10 KHz |
| X10K | = 5 KHz to 100 KHz |
| X100K | = 50 KHz to 1 MHz |
| X.003 | = 0.0015 Hz to 0.03 Hz |
| X.03 | = 0.015 Hz to 0.3 Hz |

Ranges (cont.)

X.3 = 0.15 Hz to 3 Hz

X3 = 1.5 Hz to 30 Hz

X30 = 15 Hz to 300 Hz

X300 = 150 Hz to 3 KHz

X3K = 1.5 KHz to 30 KHz

X30K = 15 KHz to 300 KHz

Nine Simultaneous Outputs

1) ∿ , ⩘ , ⊓ , ⊔ , ∿ , ⩘ , ⩘° , or °⩘ selectable with variable amplitude. Specifications apply from 10% to 100% of maximum amplitude setting. 50Ω output impedance. (600Ω output impedance available by removing one jumper wire.)

   30v p-p (15v offset sine) into 600Ω load.

   10v p-p (5v offset sine) into 50Ω load.

   Short circuit output current ±100 ma.

   Model 114B: 5v p-p into open circuit, 600Ω output impedance.

2) ⊓ 1v p-p

3) ⊓ 5v p-p

4) ∿ 5v p-p

5) ∿ 5v p-p

6) ⩘° 2.5v p-p offset -1.25v

7) ∿ , ⊔ , ∿ , or ∿ o selectable .5v p-p differential output 180° out of phase with outputs 2 through 6.

8) Sweep monitor. (Output of sweep generator) 2.5v nominal

9) Sync pulse: At least -10v into open circuit; less than 5 μsec. duration.

NOTE: Outputs 2 through 8 are 50Ω output impedance. Output voltage stated is into open circuit

## OPERATIONAL MODES

Generator Modes:

Continuous Mode

Operates as a standard VCG. Frequency determined by dial/range settings in parallel with VCG input.

Trigger Mode

One complete cycle is generated by activating the manual trigger or applying a pulse or gate to the trigger input. Start-stop point of the waveform may be adjusted through 360°.

Sweep Generator Modes:

Sweep and Hold Mode

Generator runs at the selected frequency until triggered by the manual trigger or external pulse. When thus activated, the unit sweeps to a new frequency determined by the sweep width control and holds this frequency until manually reset.

Continuous with Sweep Mode

The main generator operates in the continuous mode until the sweep is activated. The sweep generator may be gated by operating the manual trigger, by applying a gating signal, or it may be free-run. When swept, the main generator frequency rises from the frequency set by the dial and range settings to a frequency selected by the sweep width control. Sweep rate is set by panel controls.

Trigger with Sweep Mode

No output is generated until manual trigger is activated or trigger input is applied. The unit starts at the frequency selected by the dial and range settings and sweeps to a frequency controlled by the

sweep width control. The generator stops oscillating at this point and will not restart until triggered again. Sweep rate is selected by front panel controls. Tone burst operation may be obtained in this mode by setting the sweep width control to zero; the number of cycles generated for each trigger applied is determined by sweep rate controls.

Trigger Controls

Input impedance is 10KΩ.

Input voltage is ±0.5v min., ±100v max.

Trigger level and slope are adjustable by front panel controls. (These controls are similar to trigger adjustments of an oscilloscope.)

The start-stop point of the generated waveform is adjustable through 360°.

Sweep Controls

Sweep width is adjustable from 0 to 100:1. Accuracy of the sweep repetition rate is ±5% of setting with variable control set at maximum. Repetition rate is variable from 0.0015 Hz to 100 KHz. Burst lengths in tone burst operation may be varied from 10 μsec. to 10 min.

VCG - Voltage Controlled Generator

Over 20:1 frequency ratio (selectable in ranges of 3:1 allowing excellent range overlap). 4.75v input for 20:1 frequency ratio (0.5v per major dial division ±1%). Input impedance 10 KΩ.

## HORIZONTAL PRECISION

Dial Accuracy

±1% of full scale to 100 KHz.

±2% of full scale 100 KHz to 1 MHz.

Dial is high-quality composition potentiometer allowing true continuously variable frequency control.

Typical VCG Linearity

±0.1% frequency versus input voltage (frequency error 0.1% of total deviation - best straight line method). 0.0015 Hz to 100 KHz generated frequency. From 10% to 100% of maximum dial frequency.

VCG Bandwidth

100 KHz.

Jitter

±0.025% cycle-to-cycle stability

STABILITY*

Short term: ±0.05% for 10 min.

Long term: ±0.25% for 24 hr.

*Percentages apply to amplitude, frequency and dc offset of main generator.

VERTICAL PRECISION

Frequency Response

Amplitude change with frequency less than 0.1 db 0.0015 Hz to 100 KHz and 0.5 db 100 KHz to 1 MHz.

Peak-to-Peak Voltage Accuracy

±1% for outputs 3 through 7

±1% for output 1 at 30v out

±10% for output 2

Symmetry

All waveforms, except offset sine, are symmetrical about ground within ±1% of maximum p-p amplitude. Rear dc zero adjustment, 114; charge rate adjustment, 114B.

## PURITY

Sine Wave Distortion

| | | |
|---|---|---|
| Less than: | 0.5% | 0.0015 Hz to 10 KHz |
| | 1.0% | 10 KHz to 100 KHz |
| | 2.0% | 100 KHz to 600 KHz. |
| | 3.0% | 600 KHz to 1 MHz. |

Triangle Linearity

| | | |
|---|---|---|
| Greater than: | 99% | 0.0015 Hz to 100 KHz |
| | 95% | 100 KHz to 1 MHz |

Square Wave Rise and Fall Time

Less than 10 nsec., output 2

Less than 15 nsec., output 3

Less than 100 nsec., output 1

Total Aberrations

Less than 5% (overshoot, preshoot, etc.).

Tilt

Less than 0.5%

| | | |
|---|---|---|
| Time Symmetry, all waveforms: | 99.5% | 0.0015 Hz to 100 KHz |
| | 99% | 100 KHz to 1 MHz |

## ENVIRONMENTAL

Temperature

All specifications listed, except stability, are for $25^{\circ}C \pm 5^{\circ}C$.

For operation from $0^{\circ}C$ to $55^{\circ}C$, derate all specifications by a factor of 2.

## MECHANICAL

Dimensions

7-3/4 inches wide, 5-1/4 inches high, 11-1/2 inches deep

Weight

10 pounds net, 15 pounds shipping

Power

Model 114: 105v to 125v or 200v to 250v, 50 Hz to 400 Hz.

Model 114B: DC rechargeable ni-cad batteries provided with built-in charger. Five hours of operation on batteries for every 16 hours of charge; simultaneous operation and charge. 105v to 125v or 200v to 250v, 50 Hz to 400 Hz. Less than 15 watts.

Specifications apply from 0.5 to 10 on frequency dial.