

## Model 4402B

1Hz to 110kHz

Ultra-Low Distortion RC Oscillator

- Frequency Range: 1Hz to 110kHz
- Distortion: Typically <0.0002%
- Output Amplitude: 7Vrms o.c., 3.5V rms into 50 ohms, +48dBm
- Balanced 50 ohm Output
- Amplitude Flatness: 0.02dB
- Calibrated Pushbutton Attenuator
- Simultaneous Main, Quadrature and Inverted Outputs



### DESCRIPTION

The Model 4402B is an ultra-pure sinewave, stable amplitude oscillator designed to meet the needs of today's high precision 16 to 18 bit A/D converter testing, and audio test and measurement technology.

Covering the frequency range from 1Hz to 110kHz, with precise 3 digit frequency tuning, the 4402B produces a virtually "distortion-free" (<0.0005%) sinewave for measuring A/D converter accuracy, audio preamplifier and power amplifier harmonic distortion. With its exceptionally flat response (0.02dB), the 4402B eliminates the need to constantly monitor voltage levels, during frequency response testing.

### OUTPUT

The 4402B provides a 7Vrms sinewave output (balanced output, 14Vrms end-to-end), 3.5Vrms into 50 ohms, and has no loss in performance when loaded with a linear 50 ohm load. A 3-position, push-button attenuator calibrated in 20dB steps, along with a 30dB vernier, provides a total dynamic range of 90dB.

Simultaneous fixed and quadrature (90°) outputs are provided. Each output is 7Vrms with a 600 ohm source impedance.

The 4402B is the perfect addition to your present test and/or precision measurement set-up.

### SPECIFICATIONS

**FREQUENCY RANGE:** 1Hz to 110kHz.

**Accuracy:** ±0.5% of frequency setting.

**Stability:**

**Vs. Time:** 0.01% in 1hr or less.

**Vs. Temperature:** 0.05%/°C.

**Vs. Line:** <0.001% for a 10% change in line voltage.

**Control:** 2 digits of frequency, calibrated in 1Hz and 0.1Hz steps, with a calibrated vernier providing continuous coverage between the 0.1Hz steps, plus a 5 decade push-button multiplier with overlapping ranges.

### MAIN OUTPUT

(specifications apply to each output to ground)

**Maximum Amplitude:** 7V rms open circuit; 3.5Vrms (+48dBm) into 50 ohm load.

**Impedance:** constant 50 ohms.

**Maximum Current:** 75mA rms.

**Minimum Amplitude:** <0.2mV.

**Amplitude Flatness:** ±0.02dB, 1Hz to 110kHz.

**Amplitude Stability:**

**Vs. Time:** 0.01% in 1hr or less.

**Vs. Temperature:** 0.05%/°C.

**Vs. Line:** <0.001% for a 10% change in line voltage.

**Amplitude Control:** A 4-position push-button attenuator calibrated in 20dB steps from 0dB to -60dB, accuracy  $\pm 0.25\text{dB}/20\text{dB}$  step; volts rms control with greater than 30dB of coverage calibrated in volts.

**Accuracy:**  $\pm 20\%$  of setting.

**Main Output Distortion:**

Frequency	Distortion (%)	Distortion (dB)
1Hz to 10kHz	<0.0005	-106
10kHz to 20kHz	<0.0018	-95
20kHz to 50kHz	<0.0056	-85
50kHz to 110kHz	<0.01	-80

**Hum and Noise:** Greater than 110dB below signal (10Hz to 20kHz detector bandwidth).

### FIXED OUTPUT

**Amplitude:** 7V rms open circuit; 3.5V rms (+13dBm) into 600 ohm load.

**Impedance:** Constant 600 ohms.

**Amplitude Flatness:**  $\pm 0.02\text{dB}$ , 1Hz to 110kHz.

**Amplitude Stability:**

**Vs. Time:** 0.01% in 1hr or less.

**Vs. Temperature:** 0.05%/°C.

**Vs. Line:** <0.001% for a 10% change in line voltage.

**Distortion:**

Frequency	Distortion (%)	Distortion (dB)
1Hz to 10kHz	<0.0005	-106
10kHz to 20kHz	<0.0018	-95
20kHz to 50kHz	<0.0056	-85
50kHz to 110kHz	<0.01	-80

**Phase Accuracy (180° from Main Output):** 1Hz to 10kHz,  $\pm 0.2^\circ$ ; 10kHz to 110kHz,  $\pm 1^\circ$ .

### QUADRATURE OUTPUT

**Amplitude:** 7V rms open circuit; 3.5V rms (+13dBm) into 600 ohm load.

**Impedance:** Constant 600 ohms.

**Amplitude Flatness:**  $\pm 2\text{dB}$ , 1Hz to 110kHz.

**Amplitude Stability:**

**Vs. Time:** 0.01% in 1hr or less.

**Vs. Temperature:** 0.05%/°C.

**Vs. Line:** <0.001% for a 10% change in line voltage.

**Distortion:**

Frequency	Distortion (%)	Distortion (dB)
1Hz to 10kHz	<0.0031	-90
10kHz to 20kHz	<0.0056	-85
20kHz to 50kHz	<0.0174	-75
50kHz to 110kHz	<0.031	-70

**Phase Accuracy (-90°):** 1Hz to 1kHz,  $\pm 0.2^\circ$ ; 1kHz to 10kHz,  $\pm 1^\circ$ ; 10kHz to 110kHz,  $\pm 10^\circ$ .

### GENERAL

**Ambient Temperature Range:** 0°C to 50°C.

**Power Requirements:** Switch selectable, 90-132 or 180-264 volts, single phase, 50-60Hz, 18 watts.

**Floating Ground:** Rear panel switch floats circuit ground from chassis ground up to 100V.

**Dimensions:** 3.5" (8.9cm) high, 9" (23cm) wide, 8.5" (21.6cm) deep.

**Weights:** 5 lbs (2.3kg) net; 7 lbs (3.2kg) shipping.

**Accessories:** 3-terminal line cord; operating manual.

### OPTIONS

**Rack Mounting Kit:** Part No. RK-39 permits the installation of the Model 4402B into a standard 19" rack spacing.

**Extended 1 Year Warranty:** Part No. EW4402B.

### OPTIONAL ACCESSORIES

**CAB-025:** Cable, BNC, 3ft, Low Noise.

Specifications are subject to change without notice.