

## Model 7410

# AC Voltage Reference

A Calculable, Transportable AC Reference Traceable to DC Voltage Standards



## 7410 FEATURES

- > Precision AC Reference
- > Calibration referenced to DC SOURCE
- > 16 different frequencies
- > 16 selectable waveforms
- > External sensing
- > Voltage range 1 mV to 7.07 V
- > 100mA Output Current
- > Thermal converter calibration
- > Ease of use

**G**uildline Model 7410 AC Voltage Reference is a digitally synthesized AC voltage source. It provides 16 Multiple waveform shapes at 16 different frequencies, and at 5 different voltage levels.

Precision waveforms stored in non-volatile memory are generated using new technology developed at The National Institute of Standards and Technology (NIST). The model 7410 utilizes two Digital to Analogue Converters (DACs) to generate extremely stable AC Analogue waveforms at frequencies of up to 20 kHz. Up to 512 DC steps are used to generate the output waveform.

In operation, data stored in the non-volatile memory for a given waveform is sent alternatively to each of the two DACs. One DAC is set using bytes on all even addresses, while the other is set using all odd addresses. The output of each DAC is time-multiplexed to the output amplifier so that the output of the first DAC is being used to drive the output, while the output of the second DAC is being changed to its pre-programmed next step. By multiplexing the two DACs in this manner, step noise is reduced, resulting in the highest accuracy/stability RMS voltage

***The 7410 is a precision AC Reference that can be referenced directly to DC voltage standards.***

Versatility designed into this innovative AC Voltage Reference enables the use of an external 10V DC Solid State Reference as the DC reference for the DACs, instead of the 7410's own internal 10V DC Reference.

An optional attenuator, Guildline Model 74101, has been designed for those applications and requirements where a lower output is needed. The ranges provided are 1mV, 10mV, 100mV and 1V. This expands the range of use for the 7410 AC Voltage Reference significantly.

Calibration of the 7410 AC Voltage Reference is easily accomplished utilizing a precision DC Voltmeter and a computer.

The standard equipment software supplied enables fast and efficient calibration of the instrument.

After calibration, the typical total stability of the 7.07 RMS output is better than 10 ppm over the frequency range 0.1 Hz to 1 kHz and 25 ppm to 10 kHz.

The 7410 is based on the original work performed at the National Institute of Standards and Technology, (NIST)

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## 7410 Specifications

**Output Uncertainty (24 hrs) @ 23 °C ± 5 °C, Nominal Output 7.07V RMS**

Number Of Steps in Waveform	Uncertainty of 7.07 Vrms Nominal Output (ppm) 24 Hrs, 23 ± 5 °C						
	Frequency Range (Hz)						
	0.1	1	10	100	1k	10k	20k
512	10	10	10	10	10	300	500
256	10	10	10	10	10	150	300
128	10	10	10	10	10	25	35
64	10	10	10	10	10	50	200

Absolute uncertainty, traceability to National Standards, is dependant on the absolute uncertainty of the DC Reference and the digital voltmeter used to step calibrate the 7410.

<b>Frequency Range</b>	1.16mHz to 156.25kHz, specified to 20 kHz
<b>Switch Frequencies</b> (512 step waveform)	1.16mHz; 1.2, 2.3, 4.8, 9.5, 19.1, 39.1, 76.3, 156.6, 305.2, 610.3Hz; 1.22, 2.44, 4.88, 9.76, 19.53kHz.
<b>Waveforms</b>	Sine – 512, 256, 128, 64 steps Ramp – 512 steps Chopped Sine – 45° & 90° firing angle Sine with Pulse – crest factor 8, 5, & 3 Sine with 40% 2 <sup>nd</sup> Harmonic - 0° & 90° Sine with 40% 3 <sup>rd</sup> Harmonic - 0°, 90°, 180° & 270°
<b>Attenuator, (optional)</b>	1V, 100mV, 10mV and 1mV

*Note: Slight degradation in performance may occur when using the attenuator.*

## 7410 Ordering Information

7410	AC Voltage Reference
TM7410	Technical Manual (included)
	Certificate of Calibration (included)
	Report of Calibration (extra charge)

### Accessories:

<b>74101</b>	Attenuator
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## GENERAL SPECIFICATIONS

<b>Environment</b>	
Operating	18 °C to 28 °C < 50% RH
Non Operating	-20 °C to 60 °C, 15 to 80% RH
<b>Voltage</b>	100, 120, 220, 240 ± 10% Frequency – 50/60Hz Consumption – 20VA
<b>Dimensions</b>	H 190 mm (7.5 in.) W 223 mm (8.8 in.) D 500 mm (19.7 in.)
<b>Weight</b>	5.5 KG (12 pounds)

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