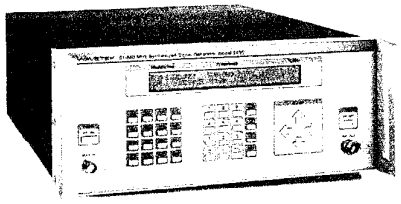
Models 2405 & 2410

RF Signal Generators

- *Model 2410: 0.01 to 1100 MHz Synthesized Signal Generator*
- *Model 2405: 0.01 to 550 MHz Synthesized Signal Generator*
- *Bright, Easy-to-read Display*
- *Data Entry by Keypad*
- *RF On/Off Switch*
- *Independent Modularity*
- *IEEE-488 Interface Standard*
- *50 Watt Reverse Power Protection*
- *Extensive Diagnostic Package*
- *Autocal Routine*
- *Calibration Data Tracking*
- *Ergonomic User Interface*



The 2400 Series of synthesized signal generators presently consists of two models, the 2405 and 2410. These instruments are specifically designed to help increase the productivity of ATE and field service applications. The 2400 Series is the most efficient solution for general purpose RF testing.

Advanced User Interface

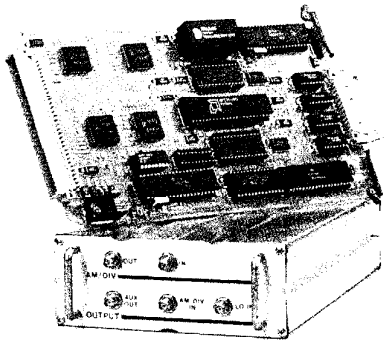
The Wavetek 2400 Series instruments are dual microprocessor-controlled, synthesized signal generators that both increase productivity and decrease learning curves through sophisticated user interfaces. The GPIB programming language is in an English language format utilizing the Wavetek minimum-uniqueness format. An extensive set of internal diagnostic features allows isolation of potential trouble spots to the board level without opening the instrument.

Advanced PLL/DDS Hybrid Synthesis

The Wavetek 2400s combine fractional division, phaselock loop techniques with direct digital synthesis for a wide variety of frequency step sizes. The 2410 covers the frequency range of 10 kHz to 1100 MHz; the 2405 has a range of 10 kHz to 550 MHz. Both have an RF output range of +13 to -127 dBm and exhibit an output accuracy of ±1.5 dB. More level calibration points may be added through a GPIB diagnostic feature. Other standard features include very broad peak FM deviation, 20 stored settings, wide AM bandwidth of 50 kHz, reverse power protection, and external clock input/output.

Enhanced Calibration

AutoCal of the instrument can be initiated both from the front panel and through the IEEE-488 bus. A state-of-the-art error tracking system allows user readout of the calibration error-correction data. This provides statistical process control of the instrument's aging cycle to predict and schedule maintenance.

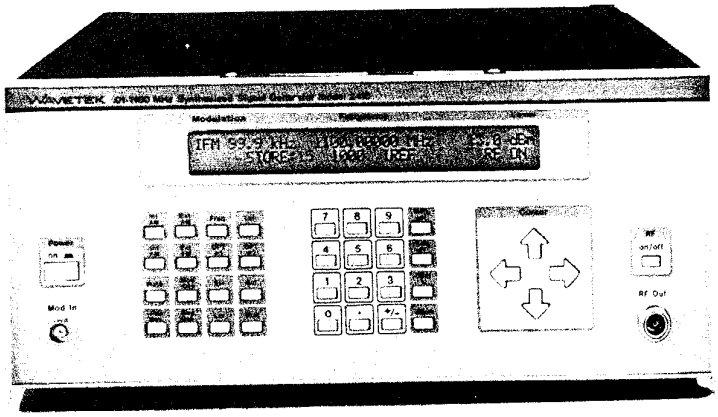


Easy Service Construction

Construction of the instrument is based on a fully modular design. Each module can be replaced or upgraded with no dependent interaction with the surrounding modules. There is no need to return a unit for extensive and expensive upgrade kits.

Long-Term Warranty

The Wavetek 2400s have a standard two-year warranty. Wavetek is committed to supplying its customers with the most reliable instrumentation available.



Specifications

Frequency

Range:
2410: 0.01 to 1100 MHz.
2405: 0.01 to 550 MHz.
Resolution: Digital display, 0.1 Hz.
Frequency Stability (0° to 50° C):
Standard: 2.5 ppm.
Optional: 0.1 ppm.
Frequency Stability (Aging): < 1 ppm/year.
Switching Speed: 200 ms ±100 Hz of final value in CW, changes < 10 kHz in FM, typical 100 ms.
Warm-up Time: 1 hr.
External Reference: 10 MHz.

RF Output

Impedance: 50 Ω (SWR 1.5:1 @ output level < -3 dBm).
Output Connector: Type N, female.
Output Level Range: -127 to +13 dBm.
Output Resolution: 0.1 dB.
Level Accuracy: ±1.5 dB.
Flatness: ±1 dB.
EMI/RFI Leakage: < 1.0 µV into a 2 turn, 1 in dia loop, 1 in from any surface (@ 550 MHz).

Spectral Purity

Harmonics:
For CW > 10 MHz: < -30 dBc.
For CW < 10 MHz: < -26 dBc.
Subharmonics (> 550 MHz): < 25 dBc.
Nonharmonics:
Spurious (> 5 kHz from Carrier): < -55 dBc .
Phase Noise @ 500 MHz:
10 kHz offset: -109 dBc guaranteed.
20 kHz offset: -113 dBc guaranteed.
Residual AM, Mod Off (50 Hz to 15 kHz Postdetector BW): -60 dBc.
Residual FM, Mod Off:

PDBW	0.3 to 3 kHz	0.05 to 15 kHz
< 137.5 MHz	< 15 Hz	< 20 Hz
137.5 to 275 MHz	< 8 Hz	< 12.5 Hz

Modulation

Types: AM, FM.
Internal Source: 400 Hz, 1 kHz.
External Source: 400 Hz, 1 kHz .
AM Freq. Response (0-50%): 10 Hz to 50 kHz.
AM Resolution: 0.1%.
AM Accuracy, (0 to 90%): ±(1% Full Scale +5% of Reading).
AM Range: 0 to 99.9%.
AM Distortion:
< 90% AM: < 5%.
< 70% AM: < 3%.
< 30% AM: < 1.5%.
FM Rate: 50 Hz to 100 kHz (3 dB BW).
FM Resolution:
For FM < 100 kHz: 100 Hz.
For FM > 100 kHz: 1 kHz.
FM Accuracy: ±5% of indicated setting at 1 kHz or 400 Hz rate excluding residual FM.
FM Deviation Range:
0.01 MHz < CW < 1 MHz: 0 to 10 kHz.
1 MHz < CW < 3 MHz: 0 to 100 kHz.
3 MHz < CW < 137.49999 MHz: 0 to 1 MHz
137.49999 MHz < CW < 275 MHz: 0 to 500 kHz.
CW > 275 MHz: 0 to 1 MHz.
FM Distortion:
Internal Source: < 2% harmonic distortion at 1 kHz or 400 Hz rate, FM < 100 kHz peak.
External Source: < 0.5% at 1 kHz or 400 Hz rate, FM < 100 kHz peak.

General

Front Panel Control: Push buttons, GPIB.
Reverse Power Protection: 50 watts.
GPIB (Standard):
Interface: GPIB IEEE-488-1978, 1987.
Functions: T6, L4, SH1, AH1, RL1, DC1, DT1, E2, SR1, TE0, LE0, PP0, C0.
Features:

- 20 nonvolatile stored settings standard.
- Front-panel programming of GPIB address.
- Power-on confidence check.
- AutoCal® frequency and level calibration.

Dimensions: 13.2 cm (5.2 in) high; 31.8 cm (12.5 in) wide; 53.3 cm (21 in) deep.
Weight: 12.7 kg (28 lb).
Power: 100, 115, 215 or 230 Vac ±10%
Environment: MIL-T-28800C, Class 5, 95% humidity, noncondensing.
Operating Temp. Range: 0° to 50° C.

Factory/FOB

Indianapolis, Indiana

For more information, contact your local Wavetek representative (pp 91-96)

Options for 2400 Series

Option PUL, Pulse Modulation

- *80 dB On/Off Ratio*
- *15 ns Rise/Fall Time*

Wavetek's Pulse Modulation Option provides a high quality gallium arsenide (GaAs) switch that boasts > 80 dB on/off ratio and rise/fall times faster than 15 ns.

Frequency Range (Carrier): DC to 2200 MHz.
RF Output (Max Available): +10 dBm to -137 dBm.
On/Off Ratio: > 80 dB.
Pulse Rise Time: ≤ 15 ns.
Pulse Fall Time: ≤ 15 ns.
Maximum Pulse Repetition Rate: 1 MHz.
Input Impedance: 50 Ω, pulse on or off.
Pulse Input (TTL): +5 V = RF Off (≤ 10 V). 0 V = RF On. Threshold Level = 1.4 V.
Temperature Range: 0° to +55° C.
Option Compatibility: All but LEX and XP.

Option 75 Ω, 75 Ω Output Impedance

The 75 Ω output impedance option provides compatibility with TV and CATV applications.

Impedance: 75 Ω (SWR < 1.4:1 @ output level).
Output Connector: BNC female.
Output Level Range
Standard: +55.8 to -33 dBmV.
With Option LEX: +52.8 dBmV.
Option Compatibility: All.

Option LEX, Low Frequency Extension to 100 Hz

- *100 Hz to 10 kHz.*

The low frequency extension option offers a low-cost, one-instrument solution addressing broad frequency applications. This makes the option ideal for EMI/Tempest (emissions) testing in secured communications programs.

The LEX, in conjunction with the 2405 or 2410 synthesized signal generators, provides a frequency range from 100 Hz to 550 MHz (2405) or 1100 MHz (2410).

Frequency:
Range: 100 Hz to 200 kHz.
Resolution: 10 Hz.
Accuracy: 0.5 ppm standard, 0.1 ppm optional.
Output:
Impedance: 50 Ω.
Flatness: ±1.2 dB.
Level: -137 to +10 dBm.
Resolution: 0.1 dB.
Spectral Purity:
Harmonics: ≤ 30 dBc.
Spurious: < 50 dBc.
Option Compatibility: All but PUL.

Option VAR, Variable Modulation

Signal sources have traditionally supplied 400 Hz and 1 kHz internal modulation frequencies. Continued advancement in two-way and secure communications shows numerous applications for other modulation sources such as 150 Hz tone coded squelch in two-way radio systems.

The variable modulation source option uses direct digital synthesis which allows a continuously variable modulation source from 1 Hz to 100 kHz with 1 Hz resolution.

Internal pulse modulation is a product of the VAR option, and the duty cycle can be controlled from 10% to 90% in 1% increments.

Frequency:
Range: 1 Hz to 100 kHz.
Resolution: 1 Hz.
Accuracy: 0.5 ppm standard, 0.1 ppm optional.
Output:
Impedance: 600 Ω.
Level: 1.0 Vp-p.
Sine Distortion: < 1%.
Internal Pulse Modulation:
Duty Cycle: 10% to 90%.
Resolution: 1%.
Rep Rate: 1 Hz to 10 kHz.
Accuracy: ±2.5%.
Rear Panel Output: 5 V TTL for monitor.
Option Compatibility: All.

Option PHM, Phase Modulation

- *External Phase Modulation*
- *Front Panel or GPIB Control*

An external phase modulation signal at 20 Hz to 50 kHz, 1 Vp-p, is applied to the Mod In port for easy implementation of a phase-modulated RF output.

Peak Phase Modulation:
3 to 137.49999 MHz: 19.99 rad.
137.5 to 274.9999 MHz: 9.99 rad.
275 to 1100 MHz: 19.99 rad.
3 dB Band Width: 20 Hz to 50 kHz.
Accuracy: ±6%.
Option Compatibility: All.

Option R02, 0.1 ppm Reference

Option Compatibility: All.

Option RPC, Rear Panel Connectors

Option Compatibility. All.

Option K0137, Rack Mount without Slides

Option Compatibility: All.

Factory/FOB

Indianapolis, Indiana