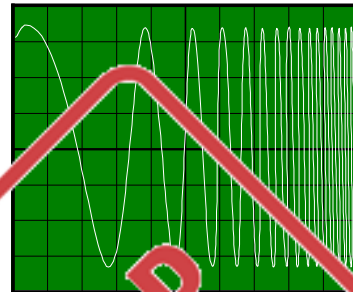


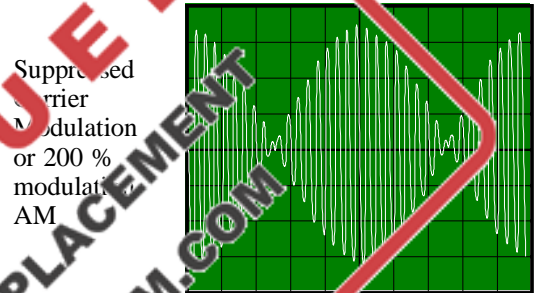
# 20MHz Communications Testing

**1404A**

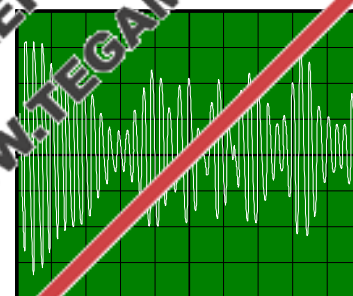
only **\$1,295**  
US List



Logarithmic sweep from 2 Hz to 20 MHz



Suppressed carrier Modulation or 200% modulation AM



16QAM with PRS noise as data

**Sinewaves - 10 kHz to 20 MHz**  
**Linear and log sweeps**  
**AM, FM, and FSK and more...**  
**External modulation port**  
**Direct digital synthesis**

## Filter and Component Testing

For your filter and component testing, use 1404A of 20 MHz linear and log sweep in either direction up to 20 MHz. Both continuous and trigger modes are included for flexibility.

## Modulation Testing

For your modulation testing, you can simply define the digitally synthesized AM and FM signal from the front panel or remote programming ports. Versatile FSK up to 1 MHz rate with local or external control will meet your binary digital transmission testing needs.

## Complex Modulation Testing

For your modern modulation testing, we offer an external modulation port under direct digital control. You can program the amplitude (I and Q), phase, and frequency with 32-bit resolution. Multiple FSK, FM, AM, PM, multiple QAM, multiple PSK and more may be implemented to test your circuits up to 20 MHz.

## Multiple Phase Testing

For your I and Q phase sensitivity testing, you may phase-lock two standard units to generate quadrature outputs up to 20 MHz. You can null the phase differences and adjust the phase with 0.1° resolution.

## All-inclusive Standard Interfaces

You get full programmability using Standard Commands for Programmable Instruments (SCPI) with standard GPIB, RS-232, plus the external modulation port. Maximum flexibility is yours without sacrificing ease-of-programming.

## Technical Staff Support

We have eliminated all road blocks! No voice-mail maze. No phone tag. Our factory direct toll-free number and 24-hour fax are ready to serve you and assist with technical questions. Call **1-800-PRAGMATIC** or **1-800-772-4628** and put us to the test.

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# 20 MHz DDS Function Generator

**1404A**

## Waveforms

Carrier: sinewave  
Sync: TTL clock (in-phase with carrier)  
Modulation: sine, square, triangle

## Frequency

Range: 100 mHz to 20 MHz  
Resolution: 8 digits or 10 mHz  
Accuracy: 10 ppm  $\pm$  10 mHz @  $+23 \pm 5^\circ$  C  
Stability:  $< 2$  ppm /  $^\circ$ C  $T_A = 0$  to  $+50^\circ$  C  
Aging:  $< 10$  ppm / Year  $T_A = 0$  to  $+50^\circ$  C

## Amplitude: (into 50 $\Omega$ load)

Range	Resolution	Accuracy
1.00 V <sub>pp</sub> to 10.00 V <sub>pp</sub>	10 mV	$\pm 1\% + 20$ mV
100 mV <sub>pp</sub> to 999 mV <sub>pp</sub>	1 mV	$\pm 2\% + 4$ mV

Flatness: referenced to 1 kHz 7.5 V<sub>p-p</sub> sinewave into 50 $\Omega$  load

$< 100$ kHz	$\pm 2\%$	( $\pm 1\%$ typ.)
100 kHz to 1 MHz	$\pm 3\%$	( $\pm 2\%$ typ.)
1 MHz to 10 MHz	$\pm 4\%$	( $\pm 3\%$ typ.)
10 MHz to 20 MHz	$\pm 6\%$	( $\pm 5\%$ typ.)

Output Impedance: 50 $\Omega$  fixed  
Resolution: 3 digits  
Output Units: V<sub>pp</sub>, V<sub>p</sub>, V<sub>rms</sub>, dBm, dBv

## Spectral Purity

Harmonic Distortion:

100 mHz to 100 kHz	$< -55$ dB
100 kHz to 1 MHz	$< -45$ dB
1 MHz to 10 MHz	$< -40$ dB
10 MHz to 20 MHz	$< -35$ dB

Total Harmonic Distortion (THD):  
100 mHz to 100kHz 0.14% (0.1% typ)

Spurious:

$< 500$ kHz	$< -60$ dB
500 kHz to 2 MHz	$< -55$ dB
2 MHz to 10 MHz	$< -50$ dB
10 MHz to 20 MHz	$< -45$ dB

## Sync Out:

Front panel TTL signal, BNC connector

## Modulation / Sweep Sync Out:

Rear panel TTL signal, BNC connector

## Phase Lock

Multiple units may be connected to a master clock. Manual phase null and phase offset controls are provided in each unit.

Phase Lock Frequency Range: 100 mHz to 20 MHz

## Sweep

Mode: continuous, trigger  
Profile: linear and logarithmic  
Direction: up or down  
Rate: 1 ms to 500 sec  
Frequency Range: 100 mHz to 20 MHz

## Modulation Characteristics

### AM Modulation

Carrier: 100 mHz to 20 MHz  
Frequency: 10 mHz to 20 kHz  
Depth: 0 % to 200 %  
Source: Internal

### FM Modulation

Carrier: 100 mHz to 20 MHz  
Frequency: 10 mHz to 20 kHz  
Peak Deviation: 0 to 10 MHz  
Source: Internal

### FSK Modulation

Frequency: 100 mHz to 20 MHz  
Internal Rate: 1 kHz, 10 kHz, 50 kHz  
External Rate: 1 MHz max  
Source: Internal / External

### External Modulation Port:

Amplitude (I and Q), Phase, Frequency (direct digital modulation control), FSK, 4FSK, FM, AM, PM, QAM, BPSK, QPSK, 8PSK may be implemented.

## Interface

### GPIB

Standard: IEEE 488.2-1987, SCPI compatible  
Programmable Controls: All front panel control except POWER switch  
Subsets: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1

### Serial Port

Standard: RS-232C  
Baud Rate: up to 9.6 kBaud

## Rear Panel Inputs / Outputs

Trig In (TTL): Sweep / modulation trigger and FSK modulation control  
50 MHz Ref In/Out (TTL): 50 MHz Reference Clock (available for phase-lock operation)  
Mod Sync Out (TTL): Sweep / modulation sync signal  
Modulation Port (TTL): External data input

## Environmental

Operating Temperature:  $0^\circ$  to  $+50^\circ$  C, ambient  
Specified Accuracy:  $+18^\circ$  to  $28^\circ$  C  
Storage Temperature:  $-40^\circ$  to  $+70^\circ$  C  
Humidity Range: 80 % R.H.

## General

Display: 2 line, 16 characters, back-lit LCD  
Power: 115/230 Vac, 50/60 Hz, 40 VA max.  
Stored Setting: one complete front panel setup  
Dimensions: 3.5" x 8.3" x 15.4" (H x W x L)  
Weight: Approximately 9 lbs. (4.1 kg)  
Warm-up Time: 1 hour  
Warranty: 1 year standard  
Accessories Included: Operation Manual and power cord

*Weight and dimensions are approximate.*

*Errors and omissions excepted.*

*Prices and specifications subject to change without notice.*

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