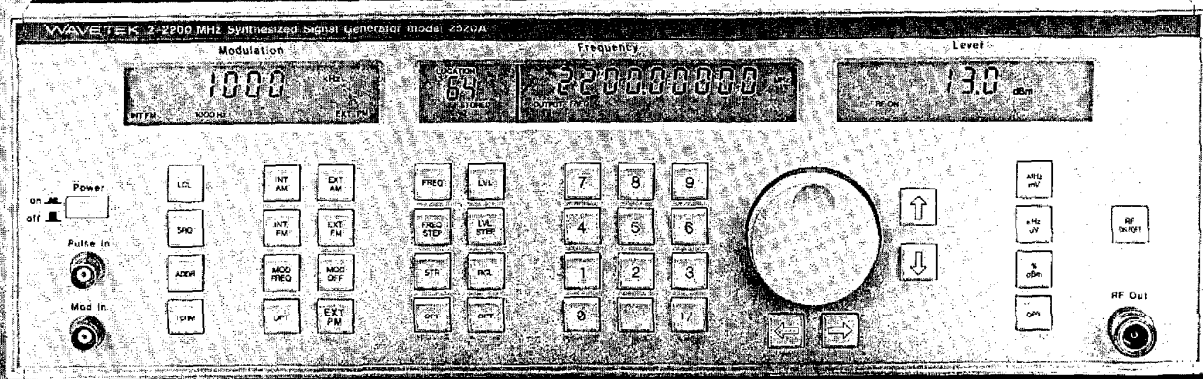


## RF SIGNAL GENERATORS

### MODELS 2510A/2520A



# 2200 MHz and 1100 MHz Signal Generators

- 64 Front Panel Stored Settings
- Keypad or Spin Knob Control
- AutoCal® of Frequency & Output Level
- GPIB & Pulse Modulation Options
- 200 kHz Low End/10 Hz Resolution

The Wavetek Model 2520A, 2.2 GHz and 2510A, 1.1 GHz signal generators are the first to use modern phase lock technology and a low frequency direct digital synthesizer to provide outstanding performance at a modest cost. The new 2520A/2510A offers the frequency accuracy, stability, and programmability previously available only in laboratory type synthesizers costing much more.

#### +13 dBm Output Power and 1 ppm Frequency Accuracy

A broad range of output power from -137 dBm to +13 dBm makes the 2520A suitable for driving high level mixers or making low level receiver sensitivity tests with a resolution of 0.1 dB throughout the full range of output level. A temperature compensated crystal reference provides frequency accuracy of 1 ppm

over a 0° to 50°C operating range. Higher stability reference of .5 ppm is available as an option.

#### Self Diagnostics and Operation

At power up the Models 2520A/2510A automatically steps through twelve self diagnostic programs to verify proper operation. If a problem is detected, additional diagnostics assist the operation in pinpointing the fault.

Activating a key switch on the rear panel will place the 2520A/2510A in the AutoCal® mode. The AutoCal® mode accesses a machine prompted calibration procedure for frequency, FM deviation, and output level that can be completed on site in approximately 15 minutes. The AutoCal® procedure extends the laboratory calibration interval to the allowable drift of the crystal reference. This could easily be a two year interval. Level cali-

bration can be made at the R.F. output connector or at the device under test to compensate for cable or fixture frequency response.

#### Flexible Modulation Capability

Internal and external AM and FM modulation capability are standard. Internal rates of 400 Hz or 1000 Hz may be combined with an external source for AM on FM or FM on AM complex modulation. FM deviation of 1 MHz or greater is available over most of the frequency range of the 2520A/2510A. Several standard modulation options provide for phase, pulse, and FSK modulation.

#### 64 Nonvolatile Front Panel Stored Settings

Frequently used test parameters may be stored and recalled from 64 nonvolatile RAM locations. Each location contains information for a complete front panel

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test set-up. Settings may be recalled at random or sequentially using either the spin knob or the up-down keys. The stored or recalled location is displayed adjacent to the frequency display.

#### Simple but Versatile Operation

The Models 2520A/2510A use the straight forward front panel control system found on all Model 2500 series signal generators. Parameters may be set using a numerical keypad or using an analog type spin knob. The additional convenience of incrementing or decrementing in programmable steps, using either the spin knob or up-down keys, has been added to the Model 2520A/2510A. Increment/decrement for both frequency, level, and stored settings is standard.

#### FREQUENCY

##### Range:

0.2 to 2200 MHz (all specs apply); usable to 0.1 MHz (2520A).

0.2 to 1100 MHz (all specs apply); usable to 0.1 MHz (2510A).

##### Resolution:

10 Hz < 1100 MHz.

20 Hz > 1100 MHz (2520A).

**Frequency Stability (0° to 50°C):** 2.5 ppm.

**Frequency Stability (Aging):** < 1ppm/year.

**Switching Speed** 200 ms, typically.

#### RF OUTPUT

**Impedance:** 50Ω (SWR < 1.6:1 at output levels < -7 dBm).

**Output Connector:** Type "N".

**Output Level Range:** -137 to +13 dBm.

**Output Resolution:** 0.1 dB.

##### Level Accuracy:

±1.5 dB; > -37 dBm.

±1.5 • (0.1/10 dB step decrease) dB;

< -36.9 dBm > 1100 MHz.

±1.5 • (0.2/10 dB step decrease) dB;

< -36.9 dBm > 1100 MHz.

**Flatness:** ±1.2 dB (typically ±0.7 dB).

**EMI/RFI Leakage:** < 0.5µV into a 2-turn 1 inch diameter loop, 1 inch from any surface (at 1100 MHz) and MIL-T-28800C Class 5.

#### SPECTRAL PURITY

##### Harmonics:

< -27 dBc < 0.4 MHz.

< -30 dBc < 1100 MHz.

< -25 dBc < 1100 MHz (2520).

##### Sub-Harmonics:

< -25 dBc above 550 MHz.

##### Non Harmonics Spurious:

(> 5 kHz from carrier).

< -50 dBc (< 137.5 MHz).

< -60 dBc (137.5 to 1100 MHz) < -70 dBc typical.

< -54 dBc (> 1100 MHz) (2520).

#### PHASE NOISE AT 500 MHz

**10 kHz Offset:** < -117 typical dBc/Hz (guar. < -110 dBc/Hz).

**20 kHz Offset:** Typ < -123 dBc/Hz.

#### RESIDUAL AM:

< -65 dBc (.05 to 15 kHz post-detected bandwidth).

#### 2510A/2520A RESIDUAL FM:

(0.05-15 kHz post-detected bandwidth.)

| Spec  | Typ (Hz rms)          |
|-------|-----------------------|
| < 30  | < 12 (< 137.5 MHz)    |
| < 4.5 | < 2.5 (137.5-275 MHz) |
| < 9   | < 5 (275-550 MHz)     |
| < 18  | < 10 (> 550 MHz)      |
|       | < 80 (> 1100 MHz).    |

(0.3-3 kHz post-detected bandwidth.)

|       |                     |
|-------|---------------------|
| < 20  | < 8 (< 137.5 MHz)   |
| < 2   | < 1 (137.5-275 MHz) |
| < 3.5 | < 2 (275-550 MHz)   |
| < 7   | < 4 (> 550 MHz)     |
|       | < 40 (> 1100 MHz).  |

#### MODULATION

##### Types:

AM, FM, Std.

FSK, Opt.

Pulse Mod, Opt.

**Internal Source:** 400 Hz, 1 kHz.

**External Source:**

**AM Frequency Response (0 to 50%):**

DC to 15 kHz (typical to 20 kHz).

**AM Resolution:** 0.1%.

**AM Accuracy:** ±(1% F.S. + 5% of setting).

**AM Range:** 0 to 100%.

**AM Distortion at 1 kHz:**

< 5% (70 to 90% AM).

< 3% (30 to 70% AM).

< 1.5% (0 to 30% AM).

**FM Rate:** 20 Hz to 100 kHz.

**FM Resolution:**

**Freq < 1000 MHz.**

10 Hz (dev. < 10 kHz).

100 Hz (dev. < 100 kHz).

1 kHz (dev. < 1 MHz).

Freq > 1100 MHz (2520).

20 Hz (dev. < 10 kHz).

200 Hz (dev. < 100 kHz).

2 kHz (dev. < 1 MHz).

**FM Accuracy:** ±6% at internal rate (typ ±3%).

**FM Deviation Range (k kHz rate).**

1 MHz peak (3 to 137.5 MHz).

500 kHz peak (137.5 to 275 MHz).

1 MHz peak (275 to 1100 MHz).

1.999 MHz peak (> 1000 MHz) (2520).

**FM Distortion:** < 2% for internal source and < 100 kHz deviation, not including residual

**FM:** 0.2% for external source, typically.

#### FRONT PANEL CONTROL

**Type:** Push buttons, Spin Knob.

#### REVERSE POWER PROTECTION

**Maximum Reverse RF Power:** 50 watts.

**Trip Level:** 0.7 watts.

**Trip Time:** < 2 ms.

**Maximum Reverse DC Voltage:** 50V.

#### REMOTE PROGRAMMING

**Interface:** GPIB IEEE-488-1978. Controls all functions except on/off AutoCal<sup>®</sup> and diagnostics.

**Functions:** T6, L4, SH1, AH1, RL1, DC1, DT1, E2, SR1, TE0, LE0, PP0, C0.

#### FEATURES

64 nonvolatile stored settings.  
Front Panel programming of GPIB address.  
Settable Frequency Step.  
Stored setting increment.  
Power-on Confidence Check.  
AutoCal<sup>®</sup>

#### GENERAL

**Environment:** MIL-T-28800C Class 5.

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

**Dimensions:** 13.3 cm (5.5 in.) high; 43.2 cm (17 in.) wide; 53.3 cm (21 in.) deep.

**Weight:** 16.3 kg (36 lb).

**Power:** 100 or 120, 220 or 240 Vac. 50 to 400 Hz; 75 watts.

#### OPTIONS

**FSK:** Frequency Shift Keying.

**PUL:** Pulse Modulation, On/Off ratio

> 80 dB  $t_r$  and  $t_f$  < 15 ns typical.

**LEX:** Low frequency extension 10 Hz to 200 kHz

**VAR:** Variable modulation source replaces internal 400 Hz and 1 kHz sources with a variable source from 1 Hz to 100 kHz.

**XP:** +23 dBm maximum RF output 1 to 1100 MHz (2510A only).

**RO2:** 0.1 ppm reference option.

**RPC:** RF In, Ext Modulation Rear Panel Connector.

**Systems Only:** Blank front panel.

**K0295:** Rack Mount Ears (2520A).

**K0294:** Rack Mount Slides (2520A). For full descriptions of options, see 2500 family options on page 86.

**NOTE:** All specifications apply to both units except where noted.

**FACTORY/FOB**  
**Indianapolis, IN**

#### ORDER INFORMATION

**Model 2510A**

**Model 2520A**