



REVISIONS

DOC. NO. SPC-F004 * Effective: 7/8/02 * DCP No: 1398

| DCP # | REV | DESCRIPTION | DRAWN | DATE | CHECKD | DATE | APPRVD | DATE |
|-------|-----|-------------|-------|---------|--------|---------|--------|---------|
| 1718 | A | Released | JWM | 9/30/04 | SF | 9/30/04 | JC | 10/1/04 |



FEATURES

- Setability of 10Hz in up to 2GHz
- Accuracy better than 1 ppm over 15°C to 30°C
- Ageing better than 1 ppm over one year
- External frequency locking
- Low phase noise and low leakage
- Amplitude range of -127dBm to +7dBm
- Amplitude entry in dBm or μ V / mV
- Amplitude setability of 0.1dBm or 0.01 μ V
- FM, Phase and AM modulation
- Direct numeric entry or rotary control with user setable frequency/amplitude increments
- Non-volatile storage for 9 generator set-ups
- Full remote control via RS-232 or GPIB
- Unmatched price/performance ratio

SPC-F004.DWG

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|--|---------------|---------|-------------------------------|----------|-----------------|-----|
| TOLERANCES: UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY. | DRAWN BY: | DATE: | DRAWING TITLE: | | | |
| | Jeff McVicker | 9/30/04 | 2GHz Synthesised RF Generator | | | |
| | CHECKED BY: | DATE: | SIZE | DWG. NO. | ELECTRONIC FILE | REV |
| | Steve Feiwell | 9/30/04 | A | 72-7860 | 01J2675.dwg | A |
| APPROVED BY: | DATE: | SCALE: | U.O.M.: | SHEET: | | |
| John Cole | 10/1/04 | NTS | Millimeters | 1 OF 3 | | |

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FREQUENCY

Frequency Range: 150kHz to 2000MHz

Setting Resolution: 10Hz by direct keyboard entry, or in user-set increments of 10Hz to 999-99999MHz.

Display Resolution: 10Hz.

Frequency Accuracy: See Frequency Reference specifications.

Phase Noise: -116dBc/Hz at 25kHz offset, 500MHz carrier.

Residual FM:(FM Off) Equivalent peak deviation in a 300Hz to 3-4kHz bandwidth: 12Hz at 500MHz carrier.

REFERENCE FREQUENCY

Options: Internal or External (via rear panel BNC).

Internal Accuracy: $< \pm 1$ ppm over temperature range 15°C to 30°C

($< \pm 2$ ppm over temperature range 5°C to 40°C).

Internal Stability: $< \pm 1$ ppm per year.

Internal Ref. Out: 10MHz from 50Ω amplitude 2V pk-pk into 50Ω

External Ref In: 10MHz into 50Ω amplitude 2V pk-pk to 5V pk-pk.

OUTPUT LEVEL

Output Level Range: -127dBm to +7dBm (0-1μV to 500mV into 50Ω),

-127dBm to +1dBm in AM mode.

Setting Resolution: 0-1dB (or 0-01μV to 1mV) by direct keyboard entry, or

in user-set increments of 0-1dB to 100dB (or 0-01μV to 100mV).

Accuracy: Better than ± 2 dBm.

Harmonics: < -25 dBc @ +7dBm.

Sub-Harmonics: < 1000 MHz - None; > 1000 MHz - < -25 dBc at +7dBm.

Non-Harmonic Spuri: < -60 dBc at ≥ 62.5 MHz, < -50 dBc at < 62.5 MHz,

Carrier Leakage: < 0.5 μV generated into a 50Ω load by a 2 turn 25mm loop, at a distance of 25mm from the generator with the output set to < -10 dBm into a 50Ω sealed load.

Output Type: Output impedance 50Ω Type N connector.

Reverse Protection: 50VDC, up to 25W from 50Ω source, LED indication.

Output Switch: RF OUT on-off switch with LED showing ON status.

MODULATION

Modulation Source

Type: Internal from built-in sine wave generator, or external from front panel BNC.

Internal: 400Hz or 1kHz sine, signal also available as an output.

External: Calibrated for 1V rms sine, input impedance 600Ω

Frequency Modulation

Max Peak Deviation: See Table.

Setting Resolution: 0.5 kHz.

Deviation Accuracy: $< \pm 10\%$ ± 0.5 kHz for 1kHz Internal

or 1kHz / 1Vrms External Modulation.

External Modulation: 100Hz - 300kHz (± 2 dB relative to 1kHz).

Distortion: $< 2\%$ @ 1kHz modulation, max. deviation (300-3.4kHz bandwidth).

Phase Modulation

Max Peak Deviation: See Table.

Setting Resolution: 0.05 rads for < 10.0 rads deviation,

0.1 rads for ≥ 10.0 rads deviation.

Deviation Accuracy: $< \pm 10\%$ ± 0.05 rads for 1kHz Internal

or 1kHz / 1Vrms External Modulation.

External Modulation: 100Hz - 10kHz (± 2 dB relative to 1kHz).

Distortion: $< 2\%$ @ 1kHz modulation, max. deviation

(300-3.4kHz bandwidth).

Max. Peak Deviation versus Carrier Frequency

| | Frequency Mod. | Phase Modulation |
|-------------------|----------------|------------------|
| 1000MHz - 2000MHz | 800kHz | 80.0 rads |
| 500MHz - 1000MHz | 400kHz | 40.0 rads |
| 250MHz - 500MHz | 200kHz | 20.0 rads |
| 125MHz - 250MHz | 100kHz | 10.0 rads |
| 62.5MHz - 125MHz | 50kHz | 5.0 rads |
| 150kHz - 62.5MHz | 100kHz | 10.0 rads |

Amplitude Modulation

Max Mod. Depth: 100%, useability decreasing to 90% at 2GHz.

Setting Resolution: 0.5%.

Deviation Accuracy: $\pm(5\% \text{ setting} + 1\%)$ for 1kHz Internal or 1kHz / 1Vrms External Modulation, <70% depth.

External Modulation: 50Hz - 200kHz ($\pm 1\text{dB}$ relative to 1kHz).

Distortion: 150kHz to 1GHz - $\leq 3\%$ @ 30%, $\leq 5\%$ @ 70%

1GHz to 2GHz - $\leq 5\%$ @ 30%, $\leq 10\%$ @ 70%

@ 1kHz modulation, max. deviation (300-3.4kHz bandwidth).

BUS INTERFACES

Full remote control facilities are available through both RS232 and GPIB interfaces

RS232: Variable Baud rate, 19200 Baud maximum, 9-pin D-connector.

GPIB (IEEE-488): Conforming with IEEE488-1 and IEEE488-2.

GENERAL SPECIFICATIONS

General

Display: 20 character x 4 row backlit alphanumeric LCD

Data Entry: Keyboard selection of frequency, amplitude, etc. ;
value entry direct by numeric keys or by rotary control.

Stored Settings: Up to 9 complete instrument set-ups may be stored
and recalled from battery-backed memory.

Mechanical

Size: 130mm (3U) H; 212mm (half-rack) W; 330mm D.

Weight: 4.6 kg. (10 lb)

Power Requirements

100V or 110V - 120V or 220V - 240V, all $\pm 10\%$ 50/60Hz,
adjustable internally; 30VA max. Installation Category II.

Temperature & Environmental

Operating Range: $+5^{\circ}\text{C}$ to 40°C , 20-80% RH.

Storage Range: -20°C to $+60^{\circ}\text{C}$.

Environmental: Indoor use at altitudes up to 2000m,
Pollution Degree 2.

Safety & EMC

Safety: Complies with EN61010-1.

EMC: Complies with EN61326.