

PRECISION

NOISE

GENERATORS

(AWGN)



### General Specifications:

|                           |  |
|---------------------------|--|
| Output                    | White Gaussian noise   |
| Crest factor              | 18 dB minimum  |
| Output noise power        | +3 dBm   |
| Noise attenuator range    | 0 to 63 dB in 0.25 dB steps  |
| Noise attenuator accuracy | ±0.2 dB or 0.5% at 1 - 500 MHz<br>±0.2 dB or 1% at 0.5 - 1.0 GHz<br>±0.3 dB or 2% at 1 - 2 GHz           |
| Signal path gain          | 0 ±1 dB  |
| Group delay variation     | ±0.2 ns/40 MHz   |
| Standard connectors       | BNC female   |
| Dimensions                | 17 in. wide x 5.25 in. high x 12.5 in. deep  |
| Mounting                  | Front panel handles and fold-down feet for bench mounting.<br>Brackets included for 19 in. rack mounting |
| Power                     | 115 VAC, 60 Hz (230 VAC, 50 Hz optional)   |
| Operating temperature     | -10°C to +60°C   |

Specifications subject to change without notice.

The **PNG7000 Series** instruments generate additive white Gaussian noise and provide a summing input to perform signal-to-noise or carrier-to-noise ratio testing capability. A key feature of this instrument is its low distortion signal path which sums the user-supplied signal with the internal precision white noise source.

The signal path has a nominal insertion gain of 0 dB, with very low amplitude and phase ripple. The noise source provides an exceptionally high crest factor of 18 dB for accurate bit error rate testing, even

with large carrier-to-noise (CNR) or bit energy-to-noise density ( $E_b/N_o$ ) ratios. With option 7 (DC instead of AC coupled) signal path, the **PNG7000** can add noise directly to a digital TTL, ECL, or similar signal that operates in a 50-ohm system.

The standard **PNG7000** is a broadband device. For applications in which the frequency range is limited, the unit can be configured with up to five band-limited noise sources, each optimized for flatness over the specified frequency band.

The **PNG7000 Series** is microprocessor-controlled and continually provides information about operation of the instrument on a 4 x 20 character LCD display. The instruments allow control of the noise level, noise on/off, signal on/off, and noise source selection in three ways: at the front panel keypad, remotely via IEEE-488 bus, or automatically under program control.

The **PNG7000** instruments can be integrated into a test station under software control (Lab Windows drivers are available from National Instruments) and with the aid of a precision power meter, carrier-to-noise ratios can be set.

Once a CNR calibration has been performed, the ratio can be changed using the internal precision attenuator to vary the noise power without degrading accuracy. The output noise power level is factory calibrated at a 0 dB attenuator setting and is displayed in dBm/Hz.

Every front panel operation except instrument on/off is programmable, and the user can create up to nine test routines that can run automatically under program control. These routines can include delay times and loops, and can be executed manually or via bus control. The routines are easily written using the program key, and information on the display guides the user through the next steps.

#### Applications:

- C/N Ratio Testing
- $E_b/N_o$  Testing
- AWGN
- CCITT G.95
- SONET
- Data regenerators
- Multiplexers
- Hard disk drives

| PNG7000 SERIES |                  |             |                        |        |                |
|----------------|------------------|-------------|------------------------|--------|----------------|
| MODEL          | FREQUENCY RANGE  | POWER (dBm) | OUTPUT CHARACTERISTICS |        |                |
|                |                  |             | V <sub>rms</sub>       | dBm/Hz | FLATNESS(dB)   |
| PNG7105        | 1 MHz - 10 MHz   | +3          | 0.316                  | -67    | ±0.25          |
| PNG7107        | 10 MHz - 100 MHz | +3          | 0.316                  | -77    | ±0.25 / 40 MHz |
| PNG7108        | 10 MHz - 500 MHz | +3          | 0.316                  | -84    | ±0.25 / 40 MHz |
| PNG7109        | 10 MHz - 1 GHz   | +3          | 0.316                  | -87    | ±0.25 / 40 MHz |
| PNG7110        | 10 MHz - 1.5 GHz | +3          | 0.316                  | -89    | ±0.25 / 40 MHz |
| PNG7111        | 1 GHz - 2 GHz    | +3          | 0.316                  | -87    | ±0.25 / 40 MHz |
| PNG7112        | 10 MHz - 2 GHz   | +3          | 0.316                  | -87    | ±0.25 / 40 MHz |

| OPTIONS       |  |
|---------------|--|
| Option Number | Description                                      |
| PNGopt01      | SMA female input and output                      |
| PNGopt02      | 75 ohms input and output impedance               |
| PNGopt03      | 230 VAC, 50 Hz                                   |
| PNGopt04      | Switch including up to 5 noise sources           |
| PNGopt05      | RS232 in addition to standard IEEE-488 interface |
| PNGopt06      | 127 dB signal attenuator in 1 dB steps           |
| PNGopt07      | DC coupled signal path (6 dB RF Loss)            |

Lab Windows Drivers available  
from National Instruments

To order call 201-261-8797