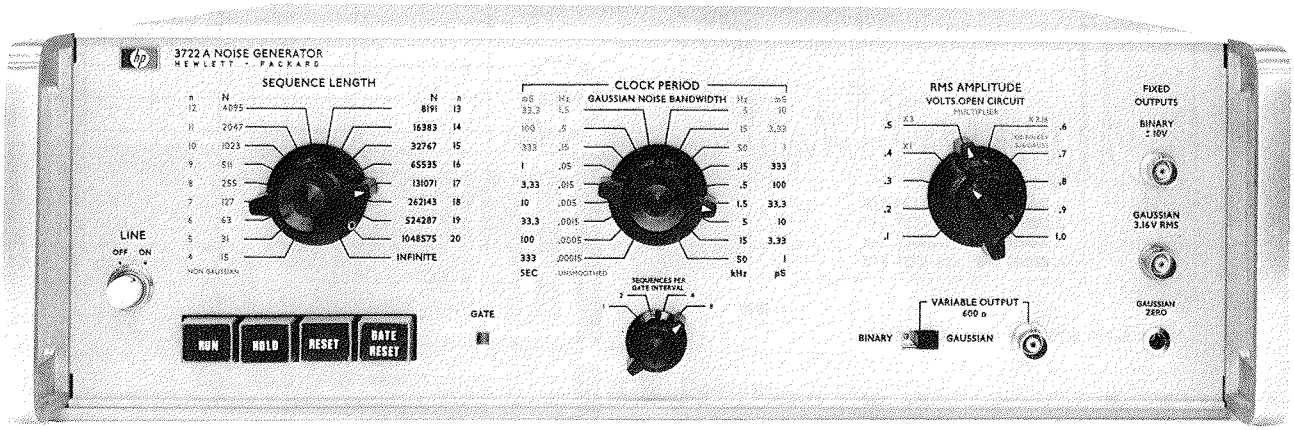
SIGNAL ANALYZERS

Calibrated noise for system stimulation

Model 3722A



3722A

The Model 3722A Noise Generator uses digital techniques to synthesize binary and Gaussian noise patterns. These 'pseudo-random' patterns, which are of known content and duration, are repeated over and over without interruption. Since one pattern is identical with the next, each pattern has the same effect on the system under test. For this reason, pseudo-random noise signals cause no statistical variance in test results. The Model 3722A also generates truly random binary and Gaussian noise.

The basis of the Model 3722A is a binary waveform generator. The binary output has a $(\sin x/x)^2$ shaped spectrum and the Gaussian output, which is derived from the binary signal by precision low-pass filtering, has an almost rectangular spectrum. Both binary and Gaussian outputs are controllable in bandwidth, but the output power remains constant regardless of selected bandwidth. The frequency of the first null in the binary spectrum is selectable from 0.003 Hz to 1 MHz, and the bandwidth (at −3 dB point) of the Gaussian noise is selectable from 0.00015 Hz to 50 kHz.

Opt H01

Model 3722A Option H01 is a standard Model 3722A Noise Generator modified to provide a second binary output which can be delayed by a selectable number of clock periods with respect to the main binary output. The delayed binary output is available only when the instrument is in the pseudo-random mode. The delay introduced between the two binary outputs is selected by three decade switches on the front panel. These switches are set according to a conversion table supplied with the instrument.

Specifications

Binary Output (Fixed Amplitude)

Amplitude: ±10 V.
Output impedance: <10Ω.
Load impedance: 1 kΩ minimum.
Rise time: <100 ns.
Power density: approximately equal to (clock period x 200) V^2/Hz at low frequency end of spectrum.
Power spectrum: ($(\sin x/x)^2$ form) first null occurs at clock frequency, and −3 dB point occurs at 0.45 x clock frequency.

Gaussian Output (Fixed Amplitude)

Amplitude: 3.16 V rms.
Output impedance: <1Ω.
Load impedance: 600Ω minimum.
Zero drift: <5 mV change in zero level in any 10°C range from 0° to +55°C.
Power density: approximately equal to (clock period x 200) V^2/Hz at low frequency end of spectrum.
Power spectrum: rectangular, low-pass: nominal upper frequency f_0 (−3 dB point) equal to 1/20th of clock frequency. Spectrum is flat within ±0.3 dB up to $\frac{1}{2}f_0$, and more than 25 dB down at $2f_0$.
Crest factor: up to 3.75, dependent on sequence length.

Variable Output (Binary or Gaussian)

Amplitude (open circuit)
Binary: 4 ranges: ±1 V, ±3 V, ±3.16V, and ±10 V, with ten steps in each range, from X0.1 to X1.0.
Gaussian: 3 ranges: 1 V rms, 3 V rms. and 3.16 V rms, with ten steps in each range, from X0.1 to X1.0.
Output impedance: 600Ω ±1%.

Main Controls

Sequence length switch: first 17 positions select different pseudo-random sequence lengths: final position selects random mode of operation (INFINITE sequence length.) $N = 2^n-1$, where n is the range 4 through 20.
Clock period switch: selects 18 frequencies from internal clock.

Internal Clock

Crystal frequency: 3 MHz nominal.
Frequency stability: <±25 ppm over ambient temperature range 0° to +55°C.
Output: +12.5 V rectangular wave, period as selected by CLOCK PERIOD switch.

External Clock

Input frequency: usable BINARY output (pseudo-random only) with external clock frequencies up to 1 MHz.
Input level: negative-going signal from +5 V to +3 V initiates clock pulse.
Maximum input: ±20 V.

Remote Control

Control inputs: remote control inputs for RUN, HOLD, RESET, and GATE RESET functions are connected to 36-way receptacle on rear panel.
Sequence length indication: 18 pins plus one common pin on the 36-way receptacle are used for remote signaling of selected sequence lengths (contact closure between common pin and any one of the 18 pins).

Delayed Binary Output (Opt H01)

Typical performance figures for the delayed output are:
Amplitude: switches between +1.5 V and +12 V.
Maximum sink current at 1.5 V level: 10 mA.
Impedance: 50Ω (+1.5 V) and 600Ω (+12 V).
Rise time: <50 ns.
Fall time: <20 ns.*
*Measured with ÷ probe shunted by 10 pF.

General

Size: 132.6 H x 425 W x 416 mm D ($5\frac{7}{32}$" x $16\frac{3}{4}$" x $16\frac{3}{8}$").
Weight: net, 10.5 kg (23 lb). Shipping 13.5 kg (30 lb.)

3722A Noise Generator	**$4185**
Opt H01: Delayed Ouput	add $350