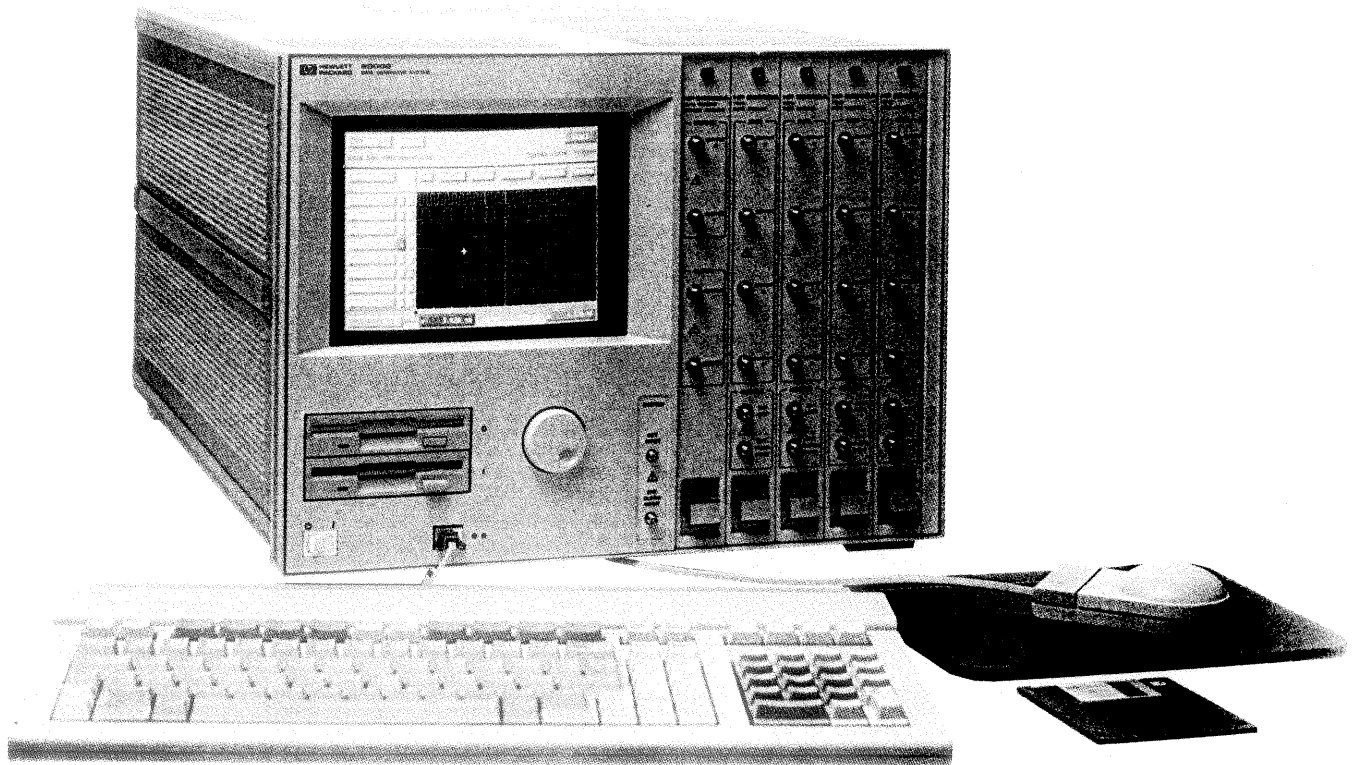


# PULSE GENERATORS & DATA GENERATORS

## Data Generator System

HP 80000

- Clock or data rate up to 1 GHz
- 16 or 128 Kb memory per channel
- Delay range  $\pm 2$  ns, 2 ps resolution
- Amplitude up to 2.5 V or 3.0 V in  $-2$  V to 3 V level window
- Color touchscreen, mouse, keyboard, and knob
- 4 to 80 channels



HP 80000 Data Generator System with 2 strobe and 16 data channels.  
With the new expansion frames, up to 80 channels can be configured



Expansion frame  
128 kbit/channel



### HP 80000 Data Generator System

When you need multiple lines of real data to characterize your device, the HP 80000 system delivers everything needed to make the test complete, accurate, and reliable because it offers the kind of edge-placement precision that is usually only found in high-performance pulse generators—but at up to 1 GHz and over 80 channels!

These features—plus affordability, prbs and conformance to national and international electromagnetic regulations—have made the HP 80000 system a preferred choice when characterizing fast ICs, modules, or components such as:

- MUX, DAC, memories
- ATM, SONET/SDH, switches

as well as passive devices like HF connectors and computer backplanes.

Rapid performance verification can be carried out with the HP 80000's prbs and the help of the HP 54120 Series oscilloscope—using eye-pattern technique—or the HP 71600 Series BERT. The memory is segmentable so that preamble/data or initialize/data sequences can be set up.

Currently, the HP 80000 system consists of a mainframe, an expansion frame, and a choice of modules so that systems with up to 80 channels can be factory-configured or retrofitted. The mainframe includes an internal clock plus synchronous start/stop logic. It has a friendly HP 16500-type user interface and supports a keyboard, a mouse, two internal disk drives and HP-IB. The mainframe, like the extender, has room for five modules.

The four-channel, 1 GHz data modules provide RZ (50% duty cycle) and NRZ formats. Edges can be positioned with 2 ps resolution in a  $\pm 2$  ns window, independent of clock rate. There is a choice of 16 or 128 Kb per channel.

The clock/strobe modules process the mainframe clock to provide normal and complement clock outputs. They also have two channels which can be used as strobes, as clock dividers for multi-phase signals, or for data patterns. 16/128 Kb modules are available.

## Specifications

For more information, please consult the *HP 80000 Data Generator System* brochure p/n 5091-2917 and the *HP 80000 Data Generator System* technical data sheet p/n 5091-2916.

### HP E2900A Mainframe

**Internal Clock:** 7.8 MHz to 1 GHz, 1 ns to 128 ns

#### External Clock Input

**Range:** 10 MHz to 3 GHz

**External input:** Start, start-stop, gate

**External reference input:** Rear panel

**Auxiliary output:** Rear panel

### General Characteristics

**Peripheral Input Devices:** Connected via the HP-HIL connector

**Built-in Disk Drives:** Format 3 $\frac{1}{2}$ -in 1.44 MB HD

**HP-IB Capabilities:** IEEE 488.1 and 488.2, 1987; SCPI 1992.0

**RS-232C Capabilities:** Operates as DTE

**HP E2901A Expansion Frame:** Controlled by HP E2900A mainframe, all specifications apply.

### HP E2902A 1 GHz Clock/Strobe Module

#### Clock Capabilities

**Continuous clock:** The clock is always active, independent of the data sequence.

**Switched clock:** The clock is active during the data sequence and stops synchronously when the sequence is completed.

#### Strobe Capabilities

**Clock and clock divider:** Each strobe channel can be used as an additional clock output to generate phase-shifted signals.

#### Data Patterns

**Data format:** DNRZ, DRZ (50% duty cycle)

**Memory depth:** 16 Kb

**Data sequence:** Preamble data, cycle data, zero run (if data channels are in mixed mode)

### HP E2903A 1 GHz Data Module

#### Data Patterns

**Data format:** DNRZ, DRZ (50% duty cycle)

**Memory depth:** 16 Kb

**Data sequence:** Preamble data, cycle data, PRWS23 (random data based on PRBS sequence  $2^{23}-1$ )

#### PRBS Patterns

$2^{23}-1$  (CCITT O.151)

$2^n-1$  where  $n = 7, 10, 11$

**Zero Substitution:** Zeros can be substituted for data to extend the longest run of zeros.

**Variable Mark Density:** The ratio of 1s to total bits can be set to  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $\frac{7}{8}$ .

**External Clock Input:** The external clock input on the data module is used to generate asynchronous data streams with respect to the mainframe clock.

**External Input** (start, gate): The external input on the data module is used to start and gate the data stream.

### HP E2905A 128 kb 1 GHz Clock Strobe Module

**Memory Depth:** 128 k bit

Other specifications as HP E2902A

### HP E2906A 128 kb 1 GHz Data Module

**Memory Depth:** 128 k bit

Other specifications as HP E2903A

### Clock, Strobe, and Data Timing

**Delay:** Clock, strobe, and data delay variation per channel vs. other channel

**Range:**  $\pm 2.00$  ns

**Resolution:** 2 ps

**Accuracy** (delay variation):  $\pm 80$  ps

**Repeatability:** 4 times better than accuracy

**Jitter, rms:**  $< 25$  ps ( $< 10$  ps typical)

### Clock, Strobe, and Data Outputs

**Terminations Selectable:** 50  $\Omega$  to GND, 50  $\Omega$  to  $-2$  V, into open circuit

**Levels:** All specifications apply for outputs terminated with 50  $\Omega$  to GND.

**Resolution:** 10 mV

**High-Level Range:**  $-1.5$  V to 3.0 V

**Low-Level Range:**  $-2.0$  V to 2.5 V

Minimum amplitude 0.5 V, maximum amplitude 2.5 V, 3 V for

HP E2905A and HP E2906A

**Level Accuracy:** 3%  $\pm$  50 mV

**Overshoot, Ringing:** 10%  $\pm$  30 mV

**Impedance:** 50  $\Omega$  nominal

**Supplementary Information:** 50  $\Omega$  to  $\pm 2$  V:

**High-level range:**  $-1.5$  V to 1.0 V

**Low-level range:**  $-2.0$  V to 0.5 V

Minimum amplitude 0.5 V, maximum amplitude 2.5 V, 3 V for HP

E2905A and HP E2906A

**Into Open Circuit:**

**High-level range:**  $-2.5$  V to 4.5 V

**Low-level range:**  $-3.5$  V to 3.5 V

minimum amplitude 1.0 V, maximum amplitude 5.0 V

**Transition Times:** 10/90 of amplitude:  $< 250$  ps ( $< 150$  ps typical)

20/80 of amplitude:  $< 150$  ps

### Operating Environment

**Storage Temperature:**  $-40^\circ$  C to  $+70^\circ$  C

**Operating Temperature:**  $+15^\circ$  C to  $+40^\circ$  C

**Humidity:** Up to 80% relative humidity at  $+30^\circ$  C

**Power:** 100-120/220-240 V rms,  $\pm 10\%$ , 900 VA max, 47-63 Hz

**Weight:** Net, 32 kg (71.1 lb) + (2 kg (4.44 lb)  $\times$  number of modules);

shipping, 56 kg (124.5 lb) + (4 kg (8.89 lb)  $\times$  number of modules)

**Size:** 323 mm W  $\times$  426 mm H  $\times$  602 mm D (12.7 in  $\times$  16.8 in  $\times$  23.7 in)

### Ordering Information

**HP 80000** Data Generator System Components

**HP E2900A** Mainframe

**HP E2901A** Expansion Frame

**HP E2902A** 1 GHz Clock/Strobe Module

**HP E2903A** 1 GHz Data Module

**HP E2905A** 128 kb 1 GHz Clock/Strobe Module

**HP E2906A** 128 kb 1 GHz Data Module

### Price

\$17,200

\$10,400

\$9,900

\$12,900

### Accessories

**HP 46060B** HP-HIL Mouse

**HP 46021A** HP-HIL Keyboard

**HP 15432B** 250 ps Transition Time Converter

**HP 15433B** 500 ps Transition Time Converter

**HP 15434B** 1 ns Transition Time Converter

**HP 15438** 2 ns Transition Time Converter

**HP 1250-1462** Adapter SMA(m) to SMA(f)

**HP 8120-4948** 50  $\Omega$  Cable, SMA (m-m)

**HP 8710-1582** Torque Wrench 5 in/lb

**HP 1182A/1181A** Testmobile Carts for Instruments

\$179

\$155

\$320

\$320

\$320

\$320

\$25

\$210

\$260

\$950