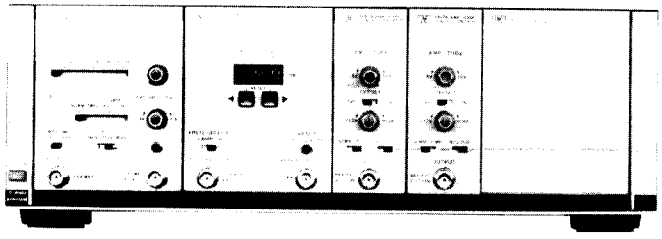
PULSE GENERATORS

Configurable Pulse/Data Stimuli

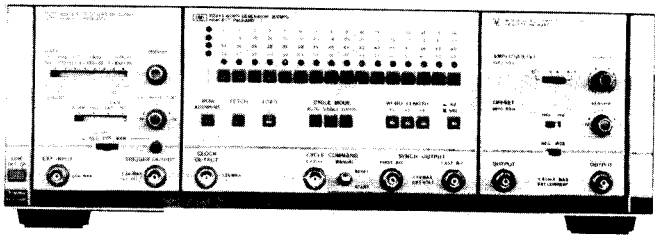
HP 8080A Series

Example: HP 8080A SO4
- 1 GHz, 300 ps transitions
- Interchannel delay

Example: HP 8080A DO1
- 300 MHz, 800 ps transitions
- Manually programmable data



HP 8091A Rate Generator | HP 8092A Delay Generator | CHA CHB HP 8093A Output Amplifiers | HP 15400A Blank Panel



HP 8081A Rate Generator | HP 8084A Word Generator | HP 8083A Output Amplifier

Research and development in advanced technologies such as subnanosecond ICs, fiber optics and nucleonics, require fast pulses for thorough characterization. HP 8080A configurations can generate simultaneous 1 GHz clock and simulated NRZ data for testing today's fastest memories. (see 8080A#S04, above). Another example (8080A#D03) is simultaneous normal and complement data with up to 64 bits and fast 300 ps edges.

A series of Multi-channel Data and Pulse Generator configurations are available, and further variations can be factory-systemized on request.

Full details on all the modules and some of the factory-systemized configurations are contained in the HP8080A data sheet. Users who wish to do their own systemizing should request the Systemizing Guide (publication number 5952-9546).

Leading Characteristics (50-ohm load)

HP 8080A SO4

Timing
Repetition rate: 100 Hz – 1 GHz.
Interchannel delay: ± 9.9 ns in 0.1 ns steps.
Channel B divider: 0.5 f selectable for simulating NRZ data.
Width: Square wave.
Modes: Int, Ext Width, Gate, Manual.
Independent 50-ohm Outputs
Amplitude: 0.6 V to 1.2 Vpp.
Offset: ± 1.2 V.
Transitions times (10% to 90%): <300 ps.
Polarity: selectable
Format: Normal/Complement selectable

HP 8080A DO1

Timing
Repetition rate: 10 Hz–300 MHz.
Width: square wave (RZ) or NRZ.
Modes: Int, Ext/Manual Width.
Data cycle modes: Ext/Man Single and Gated Cycle, Auto Cycle.
Data: Serial, 16/32/64 bit selectable.
Simultaneous Normal and Complement 50-ohm Outputs
Amplitude: 0.2 V to 2 V.
Offset: ± 1 V.
Transition times (10% to 90%): <800 ps.
Polarity: selectable.

General

Operating temperatures: 0°C to 55°C.
Power: 115/230 V rms; + 10%, –22%; 48 to 66 Hz, 200 VA max.
Weight: (typical, HP 8080A Mainframe plus full complement of modules) 9.4 kg (16.6 lbs) net; 19.7 kg (43.3 lbs) shipping.
Size: (HP 8080A Mainframe): 133 H x 426 W x 422 mm D (5.24" x 16.77" x 16.61").

Ordering Information

HP 8080A Mainframe	$3,750
Opt. 907: Front handle kit (P/N HP5061-9689)	add $55☎
Opt. 908: Rack flange kit (P/N HP5061-9677)	add $33☎
Opt. 909: Opt 907, 908 combined (P/N HP5061-9683)	add $82☎
Opt. Series S: Single- and Multi-Channel Pulse Generator systems	ask for information and prices
Opt. Series D: Single- and Multi-Channel Data Generator systems	ask for information and prices
Opt. W30 Two additional years of Return-to-HP service	ask for info and prices
HP 8081A 300 MHz Rate Generator module	$1,850
HP 8083A 300 MHz Output Amplified module	$1,850
HP 8084A 300 MHz Word Generator module	$5,250
HP 8091A 1 GHz Rate Generator module	$5,500
HP 8092A 1 GHz Delay Generator module	$4,400
HP 8093A 1 GHz Output Amplifier module	$3,000
HP 8093A Opt H01: Variable-width operation (requires HP 8092A)	add $480
Additional manuals: Opt 910, per module	add $28

Accessories Available

HP 15400A Blank Panel, ¼ mainframe width	$140
HP 15401A Blank Panel, ⅛ mainframe width	$110
HP 15402A BNC Feedthru panel, ⅛ width	$300

Pulse Generator Accessories

HP 15104A/15115A

HP 15116A

HP 15104A Pulse Adder/Splitter dc to 2 GHz	$120
HP 15116A Pulse Inverter 3 MHz to 2 GHz	$230
HP 15115A Pulse Splitter/Inverter 3 MHz to 2 GHz	$230

☎ Fast-Ship product — see page 734.

SUPPLEMENTAL CHARACTERISTICS FOR MODULE SYSTEMIZATION

ITEM 5

The following characteristics provide electrical compatibility information useful in combining the 8080A Mainframe and modules 8081A, 8083A, 8084A, 8091A, 8092A and 8093A.

The information given for the internal SMC inputs and outputs is valid for 50-ohm sources or loads respectively (e.g. a single 8080A module as source or load).

Module performance and front panel input and output characteristics are provided in the data sheet and manual.

Supplemental characteristics provide information useful in applying the modules by giving typical or nominal, but non-warranted, performance parameters.

8081A AND 8091A RATE GENERATORS

TIMING	8081A	8091A
Output Advance (Internal SMC output connector relative to front panel Trigger Output connector):	0.5 ns	0.5 ns
Propagation Time of SMC/SMC Output cable:	2.3 ns	1.9 ns

INTERNAL GATE INPUT

Fixed SMC (m) connector	**A2J5**	**A2J3**
Min Amplitude	500 mVpp	500 mVpp
Threshold (fixed):	−300 mV	−300 mV
Max Levels:	± 1 V	± 1 V
Leading Edge: Negative edge turns on internal repetition rate generator.		
Max Transition Time:	10 ns	10 ns
Gate Duration:		
Min on time:	One 8081A period.	One 8091A period.
Worst case (min off time):	Add +10 ns	Add +10 ns
Min off time:	One 8081A period.	One 8091A period.
Worst case (min on time):	Add +20 ns	Add +20 ns
Input Impedance:	50 ohm	50 ohm

INTERNAL OUTPUT

Fixed SMC (m) connector	**A2J7**	**A3J4**
Amplitude:	> 500 mV	> 500 mV
High Level more positive than	−100 mV	−100 mV
Low Level more negative than	−500 mV	−500 mV
Max Ext Levels:	± 2 V	± 2 V
Leading Edge:	Positive	Positive
Transition Time:	≤ 1.2 ns	≤ 500 ps
Output Impedance:	50 ohm	50 ohm
Max Load	Can drive one 8080 module.	Can drive one 8080 module*.

** 8091A Internal Output must be terminated by 50 ohm, e.g. one 8080A module or internally-selectable load.*

8092A DELAY GENERATOR

TIMING

Propagation Time (Internal Drive Input SMC connector to cable-mounted SMC output connector, 0.0 ns delay selected): 8.8 ns.

INTERNAL DRIVE INPUT

Connector: Fixed SMC (m), A3J4.
Min amplitude: 500 mVpp for transitions ≤ 0.5 ns, 800 mVpp for transitions > 0.5 ns.
Threshold: ± 1 V, internally adjustable.
Max Levels: ± 2 V.
Leading Edge: Positive (divider, direct and delay circuits).
Frequency: dc to 1 GHz.
Max Transition Time: 1.2 ns
Min Width: 0.5 ns
Input Impedance: 50 ohm

INTERNAL OUTPUTS (Channel A and Channel B)

Connector: Cable-mounted SMC (f) connectors, A3J5, A3J6.
Amplitude: ≥ 500 mVpp
High Level: More positive than −100 mV.
Low Level: More negative than −500 mV.
Max Ext Levels: ± 2 V
Leading Edge: Positive
Transition Time: ≤ 500 ps (Channel B in f/2 mode: ≤ 800 ps).
Output Impedance: 50 ohm
Max Load: Each output can drive one 8080A module.

8080A SERIES POWER CHARACTERISTICS

MODULE TYPE	LOAD (A)				MODULE WIDTH
	+10 V	−5.2 V	−10 V	−20 V	
8081A	0.06	0.22	0.18	0.01	1/4
8084A	0.25	3.64	0.34	0.003	1/2
8083A	0.39	–	0.06	0.4	1/4
8091A	0.27	0.40	0.27	0.29	1/4
8092A	0.75	0.75	0.7	0.17	1/4
8093A	0.06	0.13	0.02	0.22	1/8

Aid for calculating number of 8080A's:

MODULES TO BE USED	LOAD (A)				WIDTH
	+10 V	−5.2 V	−10 V	−20 V	
TOTAL					
MAX PER 8080A	1.1	7.4	1.0	0.9	1/1

SUPPLEMENTAL CHARACTERISTICS FOR MODULE SYSTEMIZATION (cont'd)

ITEM **5**

8084A WORD GENERATOR

TIMING

Propagation Time
Rate input to Clock output: 20 ns
Word output interconnecting cables: 2.3 ns

INTERNAL RATE INPUT

Connector: Fixed SMC (m), A1J3.
Min Amplitude: 500 mVpp
Threshold: −300 mV, internally adjustable ± 100 mV.
Leading Edge: positive (low-to-high transition generates bit).
Frequency: dc to 300 MHz.
Max Transition Time: 3 ns (effectively no limitation for f > 16 MHz).
Min Width:
Frequency ⩽ 100 MHz: 3 ns
Frequency > 100 MHz: 40 % of period.
Max Levels: ± 3 V
Input Impedance: 50 ohm

INTERNAL OUTPUTS (Word, $\overline{\text{Word}}$, $\overline{\text{Clock}}$, Gate)

Word output is the 8084A's data output. The $\overline{\text{Word}}$ and $\overline{\text{Clock}}$ outputs are additional outputs giving more flexibility for special configurations.

Gate output is for operation in Single cycle and Gated cycle modes. Its purpose is to stop the Rate Generator module after a word cycle. This allows the 8084A's bit counter to be reset.

Connector: Fixed SMC (m); A1J4/J5/J7/J2 respectively.
Amplitude: ⩾ 500 mVpp
High Level: More positive than − 100 mV.
Low Level: More negative than − 500 mV.
Max External Levels: ± 2 V
Leading Edge: Positive (Word); negative ($\overline{\text{Word}}$, $\overline{\text{Clock}}$).
Active Level: Low level Gate enables Rate Generator module.
Format:
Word, $\overline{\text{Word}}$ outputs: RZ/NRZ selectable.
Clock output: RZ
Transition Time:
Word, $\overline{\text{Word}}$, $\overline{\text{Clock}}$ outputs: ⩽ 1.2 ns
Gate output: ⩽ 1.5 ns
Output Impedance: 50 ohm
Max Load: Each output can drive one 8080A module. If Word, $\overline{\text{Word}}$ and $\overline{\text{Clock}}$ outputs are not used, they must be terminated by a 50-ohm load. For this purpose, the $\overline{\text{Word}}$ and $\overline{\text{Clock}}$ outputs have internally selectable terminations (A3S3, A3S2).

8083A AND 8093A OUTPUT AMPLIFIERS

TIMING	8083A	8093A/ 8093A # H01
Propagation Time (Internal input to BNC output connector):	4.6 ns	4.0 ns
Shaper Delay:	—	2.7 ns

DIRECT INPUTS*		
Fixed SMC (m) connector:	**A2J3**	**A2J3 [A2J101]**
Min Amplitude:	500 mVpp	500 mVpp (800 mVpp for transitions ⩾ 0.5 ns).
Threshold (int adjust)	± 1 V	± 1 V
Max Levels:	± 2 V	± 2 V
Leading Edge:	Positive	Positive [negative]
Frequency:	dc to 300 MHz	dc to 1 GHz
Max Transition Time:	No limitation	1.2 ns
Min Width:	1.6 ns	0.5 ns
Input Impedance:	50 ohm	50 ohm

*The 8093A Option H01 allows access via internal SMC connector A2J101 to the inverting input of the differential input stage. Characteristics which apply exclusively to this input are shown in square [brackets].

Option H01 functions as a standard 8093A when the internal jumper cable is connected between A2J101 and A2J102.

Option H01 requires a 30-minute warmup time.

SHAPER INPUT. When using this input, the internal jumper cable must be connected from the Shaper Output to the Direct Input (A2J3).

Fixed SMC (m) connector:		A2J4
Min Amplitude:		500 mVpp (800 mVpp for transitions ⩾ 10 ns).
Threshold:	—	300 mV, internally adjustable ± 150 mV.
Max Levels:	—	± 1 V
Leading Edge:	—	Positive
Frequency:	—	dc to 300 MHz
Max Transition Time:		100 ns
Min Width:		1.6 ns
Input Impedance:		50 ohm

Data subject to change

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For more information, call your local HP Sales Office or: East (301) 258-2000, Midwest (312) 255-9800, South (404) 955-1500, West (213) 877-1282. Or write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94304. In Europe: Hewlett-Packard SA, P.O. Box, CH 1217 Meyrin 2, Geneva, Switzerland. In Japan: Yokogawa-Hewlett-Packard Ltd., 29-21 Takaido-Higashi 3-chome, Suginami-ku, Tokyo 168.

B100
5952–9546

Published by Hewlett-Packard GmbH, 12/82
Printed in the Federal Republic of Germany