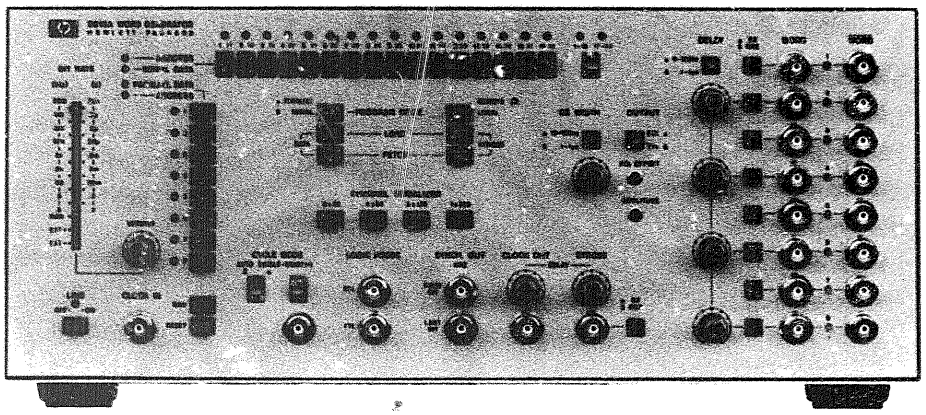
OPERATING AND SERVICE MANUAL

8016A
WORD GENERATOR



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SECTION 1

INTRODUCTION

1–1 The model 8016A is a multichannel word generator incorporating the following features:

- 50 MHz clock;
- 9 x 32 bit memory maximised by use of a channel serializer;
- 6 independent delay circuits;
- output levels and transition times complying to ECL and TTL test specifications;
- RZ or NRZ format with variable RZ width;
- free programmability of bit pattern;
- finally, a particularly useful feature, the PARALLEL/SERIAL switch to eliminate laborious conversion work by the user before entering date.

1–2 In contrast to the wide-ranging features, the front panel is designed with simplicity the objective. The number of data-setting pushbuttons is optimised to a single column/single row arrangement. Each pushbutton controls a one-bit buffer register and is neatly complemented by an LED which indicates the status of the register i.e. illuminated for data "1". Data can be loaded in parallel or serial form dependent on the selected position of the PARALLEL/SERIAL switch. When data is loaded into the buffer registers, a single switch transfers the data to the 288-bit high speed memory. If data in any memory address needs to be checked or transferred, there is a fetch facility for returning the required data to the buffer registers, where it is indicated by LEDs.

1–3 The output of data can also be in parallel or serial form. In parallel, data is output as 32 words each 8 bits wide; in serial, data is output as 8 words each 32 bits long. When in the serial mode, the output channels can be serialized via a channel serializer to produce word lengths of up to 256 bits. The channel serializer also determines the function of the strobe output. The strobe can function either as a ninth data channel (channel serializer in the 8 x 32 position only) or as a 32-bit trigger word which can be assigned to any or all words in the serialized 8-word data frame. Additional outputs for synchronizing purposes are provided in the form of first and last bit outputs and the clock output.

1–4 Applications

1–5 The 8016A is designed for flexibility as demonstrated by the free programmability of bit pattern, which combined with the short cycle time (50 MHz clock), makes the 8016A especially effective for determining worst case conditions in I.C. testing e.g. high speed testing of critical areas of memory. The free programmability of bit pattern is also useful both for component evaluation, by enabling small quantities of devices to be tested by unskilled personnel, and for feeding controlled bit patterns into data bus lines e.g. data communications systems, time-sharing systems, telemetry systems etc.

1–6 Optional Versions

1–7 8016A – Option 001: This enables the bit pattern to be programmed from a calculator, a computer, or any other controller which is compatible with the HP Interface Bus (HP-IB).

1–8 8016A – Option 002: Provides a card reader, which can program the bit pattern of the 8016A Opt. 001 in approximately 2 seconds.

Table 1–1. Specifications

DATA CAPACITY

Number of channels: 8 data channels plus 1 strobe channel.

Number of bits per channel: 32 (fixed)

Total bit capacity: 288

Data can be loaded in parallel or serial form depending on the position of the PROGRAM MODE switch. The data is loaded via a single row and single column of push-buttons, each pushbutton controlling a one-bit buffer register.

SERIAL CAPACITY

One word consists of 32 bits in serial. A front panel switch serializes words to form a frame.

Serial formats:

9 words on 9 channels, including strobe word, each 32 bits long.

4 frames on 4 channels, each consisting of 2 words or 64 bits.

2 frames on 2 channels, each consisting of 4 words or 128 bits.

1 frame on 1 channel consisting of 8 words or 256 bits.

PARALLEL CAPACITY

Parallel Format:

32 words each 9 bits wide (including strobe bits)
64 words each 4 bits wide
128 words each 2 bits wide

DATA OUTPUTS

Two separate outputs per channel, one for normal and one for complement.

Amplitude: TTL or ECL voltage levels, selectable by front panel control.

Source impedance: 50Ω

Delay: four channels can be separately delayed between 0ns and 1 μsec with reference to the channels 1, 3, 5 or 7.

Two ranges: 0ns 100ns
0.1μs 1μs

Ranges are common to all delayable channels. Channels have individual vernier controls.

Delay jitter: 0.1% + 50ps.

Skewtime: Skewtime of undelayable channels (3, 5, 7) with reference to channel one: ± 1ns.

FORMAT

RZ or NRZ, separately selectable for each data channel and strobe channel.

RZ width: 10nsec to 1μsec in two ranges. Vernier provides continuous adjustment within ranges. Range switch and vernier is common to all channels.

Width jitter: ± 0.2% + 50ps.

AUXILIARY OUTPUTS

First bit: Corresponds with parallel word one or with the first bit of serial word. Format is NRZ.

Last bit: Corresponds with the last parallel word or with the last bit of the last word of a frame. Format is NRZ.

Clock: Delivers one trigger pulse per bit. Format is RZ.

Clock pulse width: controlled by RZ-width control.

Clock pulse may be delayed between 0ns and 1μs with reference to channels 1, 3, 5 or 7.

Table 1–1. (cont'd)

STROBE WORD

In addition to the LOAD DATA and FETCH DATA pushbuttons, there are LOAD STROBE and FETCH STROBE pushbuttons. The strobe word length is 32 bits but can be extended by repetition to 256 bits.

The strobe word may be delayed between 0ns and 1μsec with reference to channels 1, 3, 5 or 7.

Amplitude of Aux. Outputs: TTL or ECL voltage levels selectable by front panel control.

Source impedance: 50 ohms.

PROBE POWER

ECL: −5.2V dc ± 10%; 80mA

TTL: +5V dc ± 10%; 100mA

BIT RATE

Internal, 0.5 Hz to 50 MHz in eight ranges. Vernier provides continuous adjustment within ranges.

External: dc up to 50 MHz or manual triggering.

CLOCK INPUT

Repetition rate: 0 to 50 MHz

Trigger pulse width: ⩾ 10nsec

Trigger amplitude: selectable by internal switches on Bit Rate board A5. Max. Amplitude: ± 7V at 100% duty cycle.

Ext. +: setting of bit rate control (for TTL)

Amplitude: ⩾ +2.0V

Input impedance: ⩾ 1KΩ to GND.

Ext. +:

Amplitude: ⩾ +1.0V

Input impedance: 50Ω to GND

Ext. −: setting of bit rate control (for ECL).

Amplitude: ⩽ −1.6V

Input impedance: 50Ω to −2V

Ext. −: Trigger level adjustable at Potentiometer A5R114 from +1V to −1V.

Input impedance: 50Ω to GND.

RECYCLING

Auto Mode: data is recycled continuously.

Single Cycle (2 modes):

a) One word generated for each cycle command.

b) Words generated as long as the cycle command is active. Last word always completed. If channels are serialized, the serialized word (64 bits, 128 bits, 256 bits) is always completed.

Period between cycle commands: Byte (frame) length plus 200ns

External Command Specifications

Amplitude: > +2V, < +10V

Width: > 12ns

Input impedance: 1KΩ

MANUAL RESET

Auto cycle: All channel outputs are set to "0". The next clock pulse after RESET generates parallel word one.

Single cycle: All channel outputs are reset to word pause. A rear panel switch sets the pause level to zero or to the level of the last bit.

Table 1–1. (cont'd)

PULSE CHARACTERISTICS

The level of all output signals is controlled by a TTL–ECL switch. Adjusts for amplitude and offset. Source impedance is 50Ω.

TTL (across 50Ω): HIGH LEVEL variable from 2.5V to 1V. LOW LEVEL ⩽ +0.2V.

Transition times: < 3.0ns (First/Last Bit Trigger < 4.0ns).

ECL (across 50Ω): HIGH LEVEL OFFSET variable from –0.9V to +1.1V. Amplitude variable from ⩽ 0.4V to ⩾ 1.0V.

Transition times: ⩽ 2.5ns (First/Last Bit Trigger < 4.0ns).

REMOTE PROGRAMMING OPTION (001)

Provides an interface card to the Hewlett-Packard Interface Bus (HP-IB).

The bit pattern can be programmed via any controller which is HP-IB compatible.

CARD READER OPTION (002)

Provides an optional card reader that programs the bit pattern in the 8016 via HP-IB and the interface card. The interface card has to be ordered separately as option 001.

GENERAL

Operating temperature range: 0°C to 50°C

Power requirements: 100/120/220 or 240V +5%, –10%, 48 Hz to 66 Hz, 200 VA (maximum).

Weight: net 14,5 kg (31,96 lbs); shipping 16 kg (35,27 lbs).

Dimensions: 460 x 475 x 178 mm (18 x 18,650 x 7 ins.).