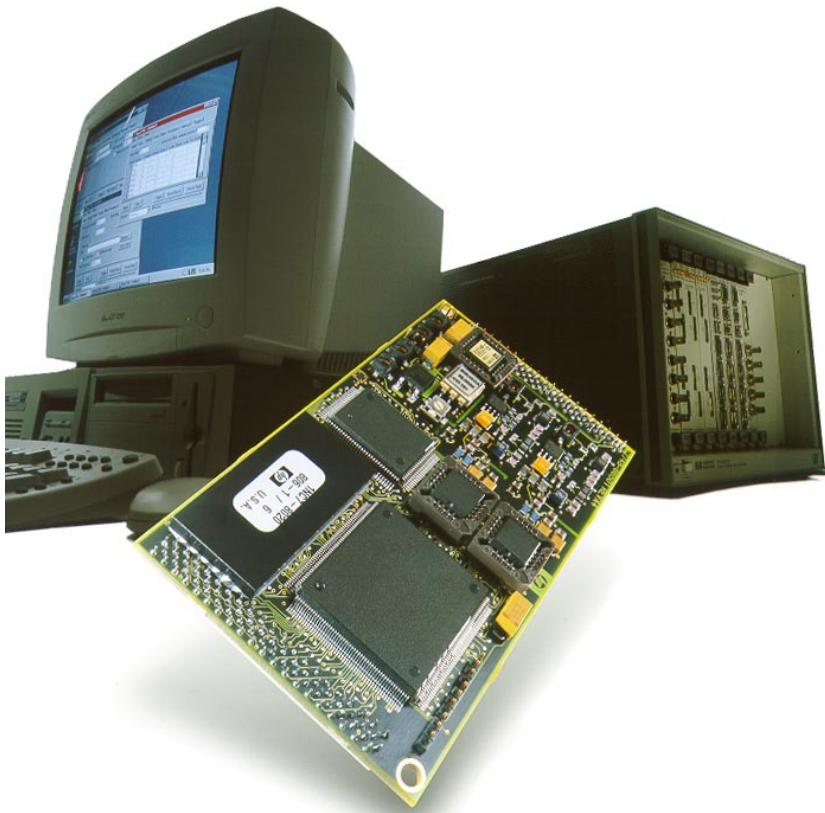

HP E2747/48A

Technical Specifications

Baseband Vector Waveform Generator/Module

Rev. June 1998



The HP E2747A and HP E2748A Vector Waveform Generators use a flexible digital transmitter architecture to provide easy development of vector signals for improved time-to-market of new and unique vector modulation formats.

Applications

- Transmitter Simulation
- Receiver Testing
- Spectral Environment Simulation
- Realistic Production Testing
- Flexible Arbitrary Waveform Generation with Variable Sample Rate

Specifications

General

Hardware form factor HP E2747A

PC-format instrument. Preconfigured hardware, and pre-loaded with the application software.

HP E2748A

Module assembly to be used in separate DSP carrier for system builder applications
Supported DSP carriers include:
•VXI: HP SCMVX008 with options -001 Front panel SMB connectors and -082 4MB DRAM for VXI development environments.
•PCI: Dakar C44-Based PCI Processor Board from Spectrum Signal Processing for PC-based development environments.

Hardware Specifications

(The following apply to both the HP E2747A and the HP E2748A)

Carrier frequency	dc to 6 MHz
Signal bandwidth	Actual bandwidth limit depends on the filter and coding parameters selected by the user. 2 MHz, typical, for real time signal computation 6 MHz, in play back mode.
Output resistance	50 Ohms nominal
Level accuracy	±0.5 dB at 10 kHz
Flatness (relative to 10 KHz)	±0.75 dB
Full scale output	±2V
dc Offset	±50 mV
Harmonic distortion	–55 dB below full scale
Spurious distortion	–70 dB with full scale
DAC resolution	14-bits
DAC clock	
Frequency accuracy (15 MHz, 0°C to 40°C)	±30 ppm w/o phase lock Lockable to external 10 MHz reference to remove absolute frequency error
Clock phase noise density (single sideband power density of 5 MHz signal, <0.05G vibration)	Δf=50 Hz: -80 dBc/Hz Δf=10 kHz: -130 dBc/Hz

Power Requirements

HP E2747A

Auto-ranging, worldwide power supply 100 to 240 VAC over 47 Hz to 63 Hz

HP E2748A

VXI-power and cooling. (Add for each HP E2748A installed in an HP SCMVX008)

Power supply	I _{PM} (A)	I _{DM} (A)
+5.0V	1.0	0.01
+12V	0.150	0.005
-12V	0.100	0.005
+24V	0	0
-5.2V	0	0
-2.0V	0	0

Cooling/Slot

Watts/slot	8 W
Air flow	0.67 liters/second
ΔP_{mmH_2O}	0.093 mmH ₂ O

Note: The above specifications need to be added to the power and cooling specifications of the HP SCMVX008. See its technical specifications for applicable data.

Environmental & Regulatory

HP E2747A

Temperature	Operating: 5° to 40° C Storage or transport: –40° to 70° C
Humidity	Operating: 8% to 80% RH (non-condensing) at 40° C Storage or transport: maximum 95% RH @ 65° C
Maximum altitude	Operating: 4600 m (15,000 ft). Above 2285 m (7500 ft.) derate operating temperature by –3.6°C per 1000 m (–1.1°C per 1000 ft). Storage or transport: 4600 m (15,000 ft.).
Safety (designed for compliance to the following standards)	CSA C22.2, No. 231 UL 1244, 4th Edition IEC-348, 2nd Edition, 1978
Radiated emissions	Designed for compliance to CISPR 11:1990 Group 1, Class A

HP E2748A

Temperature	Operating: 0° to 55°C, Storage or transport: –40° to 70°C
Humidity	Operating: 10% to 90% RH at 40°C, Storage or transport: maximum 95% RH @ 65°C
Maximum altitude	Operating: 4600 m (15,000 ft.). Above 2285 m (7500 ft.) derate operating temperature by –3.6°C per 1000 m (–1.1°C per 1000 ft). Storage or transport: 4600 m (15,000 ft.).
Safety (designed for compliance to the following standards)	CSA C22.2, No. 1010.1 UL 1244, 4th Edition IEC 1010 (Radiated)
Radiated emissions	Designed for compliance to CISPR 11:1990 Group 1, Class A
Immunity (designed for compliance to the following standards)	EN 61000-4-2 (5 kV air, 4 kV contact) EN 61000-4-3 (3 V/m) (in a 3 V/m field, some degradation of product performance occurs)

Warranty

During the warranty period, the unit will either be replaced or repaired, at HP's option, and returned to the customer without charge

HP E2747A 1 year return to HP

HP E2748A 3 year return to HP

Software

Operating system

HP E2747A Windows NT® 4.0 or better (included)

HP E2748A Compatible with Windows NT 4.0, Windows '95, or better (not provided)

User interface

Soft front panel

Parameters set by

Graphical “fill-in-the-blanks” template

Calls to function library

Supported development environment (not provided, both HP E2747A and E2748A): Microsoft® Visual BASIC; Microsoft Visual C++

Save/Recall/Print capability

Channel modulation parameters
Multi-channel workspace settings
Filter parameters
RAM data arrays
Coder tables

Instrument control modes

Run/pause
Select a channel
Apply the configuration to the designated channel
Manual trigger
Reset pseudo-random noise to beginning of sequence
Reset data source to start-up field
Status update

Data source block

Data for each message field may be read from any of the following sources

RAM

128k words maximum
Data word size: up to 16 bits
User viewable & editable

File

Real-time data flow from program file via serial COM port. Data read in byte mode, and packed or unpacked data mode

Noise

Pseudo-random noise;
Repetition rate: >140 trillion input data words

Register

User loadable data register;
16 bits fixed

Program

Only available when using Function Library control.
Allows real-time serial data flow from buffer maintained by external program

Windows NT is a U.S. registered trademark of the Microsoft Corporation.

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Message Fields

Number of fields per message	1 to 16
Field length	1 to 2,097,151; infinity
For each field	Assign data source (see Data Source types). Extend field with additional samples: yes/no; number of samples for extension. JUMP to field 0 on completion. Select bypass coder. Reset the coder feedback register. Restart at the beginning of the RAM data sequence.

Coder

Maximum coder table size	2^{17} codes
Modes	Coder disabled; One symbol per data word; Multiple symbols per data word

Filter, mapping, & resample block

Filter modes	Real; I & Q; Complex;
Filter response shape	Gaussian ($\pm 0.15 F_s$); Gaussian ($\pm 0.075 F_s$); Flat ($\pm 0.25 F_s$); Custom
Custom filter (wizard to synthesize custom filter allows you to cascade any or all of the following)	Standard filter types: Gaussian, raised cosine, root raised cosine with adjustable bandwidth and alpha (Gaussian, bandwidth only) Filter time domain impulse response: real or complex; symmetric or asymmetric Filter frequency domain response: real or complex; symmetric or asymmetric
Mapping	Number of symbol bits (maximum 10 for custom filter, else 16) Edit symbol code map Q channel delay (relative to I); number of filter samples Add symbol rotation: 0, $\pi/4$, $\pi/2$, π , $-\pi/4$, $-\pi/2$
Resampling	Sample frequency Number of filter samples per symbol period

Modulator

Built-in modulation

A library of preprogrammed signal setups is provided. Included are:

NADC
IS-95 (CDMA) Forward traffic channel; Reverse traffic channel
GSM
Multi-level FSK
Automatic Link Establishment (ALE)
Common analog modulation types

Modulation mode

All modulation files can be created by using a form of one of these modulation types

I/Q

Set I attenuation; Q attenuation: 0dB to 84dB in -6 dB steps & infinity

FM

Set full scale FM deviation range: 229 Hz to 7.5 MHz, in octave steps

Settable carrier frequency

dc to 6 MHz

Trigger Modes

Manual

Auto (on transition from pause to run)

Actions on trigger

Center frequency change
Symbol rate change
Reset internal noise source
Reset message to designated start-up field

Memory Allocation

Assign 0, ¼, ½, or Full memory among Filter, Code Table, RAM data

Related HP Literature

- HP E2747A/E2748A Product Overview Pub. No. 5966-4764E
- HP E2747A/E2748A Configuration Guide Pub. No. 5967-5509E
- HP SCMVX008 Technical Specifications Pub. No. 5966-3437E
- HP ESG Series RF Digital and Analog Signal Generators, Publication No. 5965-9088E
- HP Test System and VXI Products Catalog, Publication No. 5965-2815EN
- HP Test System and VXI Products Data Book, Publication No. 5965-5497E

Specification Note

Specifications describe warranted performance over the temperature range of 0° to 50°C, after a 15-minute warm-up from ambient conditions. Supplemental characteristics identified as “typical”, provide useful information by giving non-warranted performance parameters. Typical performance is applicable from 20° to 30°C.

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