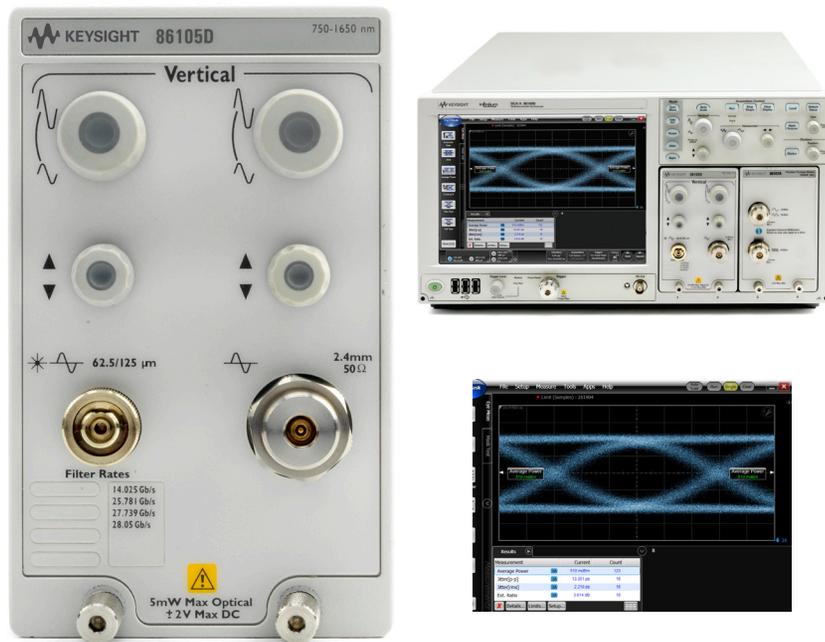


# Keysight 86105D (86115D) Option 281 (282) Plug-in Module

## For 25 and 28 Gb/s Optical Waveform Test

Easily and accurately verify your designs for next-generation 25/28/100 Gb/s optical communications

Accurate waveform analysis of multimode and single-mode signals for 750 to 1630 nm wavelengths. Built-in reference receivers for 14.025 Gb/s to 28.05 Gb/s standards compliance test. 34 GHz unfiltered optical channel. 50 GHz electrical channel for receiver test.



Key specifications for 86105D option 281 (also 86115D option 282, dual optical channels only)		
	Optical channel	Electrical channel
Bandwidth (typical)	34 GHz (-3 dBo, unfiltered)	25 GHz and 50 GHz (user settable)
RMS noise (typical)	8 μW/6 μW/6 μW (850/1310/1550 nm, 14.025 filter)	0.25 mV 25 GHz BW, 0.60 mV 50 GHz
	17 μW/13 μW/15 μW (850/1330/1550 nm, 25.781 filter)	
	18 μW/15 μW/17 μW (850/1330/1550 nm, 28.05 filter)	
	25 μW/18 μW/21 μW (850/1330/1550 nm, unfiltered)	
Wavelength range	750 to 1630 nm	
Connector type	62.5/125 μm	2.4 mm
Reference receivers	14.025, 25.78, 27.95, 28.05 Gb/s (With option IRC, reference receivers can be defined at arbitrary rates between < 8 and > 40 Gb/s, pattern lengths restricted to PRBS16 and shorter. IRC is not required for standard rates from 14.025 to 28.05 Gb/s). 14.025 Gb/s reference receiver is optional. A general purpose 15 Gb/s filter is included at no charge when the 14.025 Gb/s optional filter is not selected.	

Keysight 86100D DCA-X:  
The industry standard for optical communications waveform analysis

Keysight Technologies, Inc.'s Digital Communications Analyzers have provided optical communications engineers with the most accurate and easy-to-use tool to characterize their waveform performance. The modular platform has allowed the 86100 system to be reconfigured and upgraded as communications technology has evolved. The 86105D has a wide bandwidth optical channel and electrical channel. A multiple optical channel system can be created with the 86115D. The 86115D has two optical channels similar to those available with the 86105D and no electrical channels.

The standard 86105D (86115D) plug-in module is typically used for testing multimode and single-mode optical signals at rates from 8 to 14 Gb/s. The new option 281 (282) uses state-of-the-art high-speed photodetector technology and improved sampler electronics to provide true measurement hardware bandwidth capable of reference receiver performance to rates as high as 28.05 Gb/s. No pattern length restrictions are imposed, and no signal processing is required. The companion electrical channel bandwidth has been improved to exceed 50 GHz bandwidth. The 86105D-281 (86115D option 282) is compatible with both 86100C and 86100D mainframes (using firmware 10.0 or higher for the 86100C and firmware 2.0 or higher for the 86100D).

The key to accurate and consistent optical waveform measurements is a well-controlled frequency response. Both the photodetector and the entire signal path from the optical connector to the electrical sampler must be designed as a system to achieve the fourth-order Bessel-Thomson response typically required by industry standards. The standard 86105D (86115D) is able to provide reference receiver performance at 8.5, 9.95, 10.3, 10.5, 11.1, 11.3, and 14.025 Gb/s rates. Option 281 (282) uses a different photodetector and electrical sampler than the standard product, enabling it to achieve a reference receiver response for 14.025<sup>1</sup>, 25.78 Gb/s and 28.05 Gb/s transmission rates. Option 281 and 282 do not allow the module to have hardware reference receivers for rates from 8.5 to 11.3 Gb/s. Option 281/282 plus option IRC allows software filtering to provide reference receiver performance at any rate from 8 Gb/s to 42 Gb/s. Pattern lengths are restricted to PRBS 16 or shorter.

### Configuring a system

A complete system requires an 86100C or 86100D mainframe and 86105D plug-in module. For low jitter signals, an 86107A precision timebase module can reduce the residual jitter of the test system to ~ 100 fs. A synchronous trigger is required, which can be provided by a pattern generator clock or extracted from the signal being observed through the N1070A clock recovery solution.



86100D/86107A/86105D



86100D/86107A/86105D + N1070

86105D (86115D) filter rate options in Gb/s	8.5	9.95	10.31	10.51	10.66	10.71	11.10	11.32	14.03	25.78	28.05
Standard product	*	*	*	*	*	*	*	*	*		
Option 100 (102)	*	*	*	*	*	*	*	*			
Option 200 (142)									*		
Option 281 (282)									* <sup>1</sup>	*	*

1. Reference receiver capability for 14.025 Gb/s will be optional. A general purpose 15 Gb/s filter is available with all option 281 (282) modules. While not guaranteed to meet reference receiver tolerances for 16x Fibre Channel, the response of the 15 Gb/s filter will provide results nearly identical to those achieved with a compliant receiver. Contact Agilent for details

### The 86100 family of plug-in modules

The 86100 sampling oscilloscope system has a variety of plug-in modules to provide the ideal bandwidth and number of channels (up to 16) required for your testing needs:

Model	Description
86105C	Optical and electrical channels. Low noise, highest flexibility with reference receivers from 155 Mb/s to 11.3 Gb/s. Single-mode and multimode compatible
86105D	Optical and electrical channels. High fidelity, reference receivers from 8.5 to 28.05 Gb/s. Single-mode and multimode compatible
86115D	Dual or quad optical channels. High fidelity, reference receivers from 8.5 to 28.05 Gb/s. Single-mode and multimode compatible
86116C	Optical and electrical channels. Single-mode only, reference receivers for 25.78 and 28.05 Gb/s or 39, 41, and 43 Gb/s
86108B	Dual electrical channels to 50 GHz, integrated clock recovery, integrated precision timebase
86112A	Dual electrical channels to 30 GHz
86117A	Dual electrical channels to 50 GHz
86118A	Dual electrical channels in remote sampling heads to 70 GHz
N1045A	Dual or quad electrical channels in mini-module form factor, remote sampling heads to 60 GHz (allows up to 16 channels in a single mainframe)
54754A	Dual electrical channels to 18 GHz, internal step generators for time-domain reflectometry

See 86100D data sheet, literature number 5990-5824EN for detailed technical information.

[www.keysight.com/find/86105d](http://www.keysight.com/find/86105d)

#### Three-Year Warranty

[www.keysight.com/find/ThreeYearWarranty](http://www.keysight.com/find/ThreeYearWarranty)

Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

