The Agilent 83487A—At a Glance

The Agilent 83487A optical/electrical plug-in module is one of several plug-in modules available for the Agilent 83480A, 54750A mainframes. The main features of the Agilent 83487A are:

- Integrated, calibrated optical channel.
- 2.85 GHz optical channel bandwidth and user selectable 12.4 or 20 GHz electrical channel bandwidth.
- 750 nm to 860 nm wavelength range.
- Optical channel has 1063/1250 Mb/s datacom filters.
- 62.5/125 µm (maximum) multimode, user selectable optical input connector option.
- Electrical measurement channel.
- Trigger channel input to the mainframe.
- 3.5 mm (m) connectors on the electrical measurement channel and trigger channel.
- One probe power connector.
- One auxiliary power connector.

NOTE

If you wish to use the Agilent 83487A optical plug-in module in an Agilent 54750A digitizing oscilloscope, a firmware upgrade must first be installed. Order the Agilent 83480K communications firmware kit and follow the installation instructions.

The purpose of the plug-in module is to provide measurement channels, including sampling, for the mainframe. The plug-in module scales the input signal, sets the bandwidth of the system, and allows the offset to be adjusted so the signal can be viewed. The output of the plug-in module is an analog signal that is applied to the ADCs on the acquisition boards inside the mainframe. The plug-in module also provides a trigger signal input to the time base/trigger board inside the mainframe.

For GPIB programming information, refer to the *Agilent 83480A, 54750A Programmer's Guide* supplied with the mainframe.

The Agilent 83487A provides:

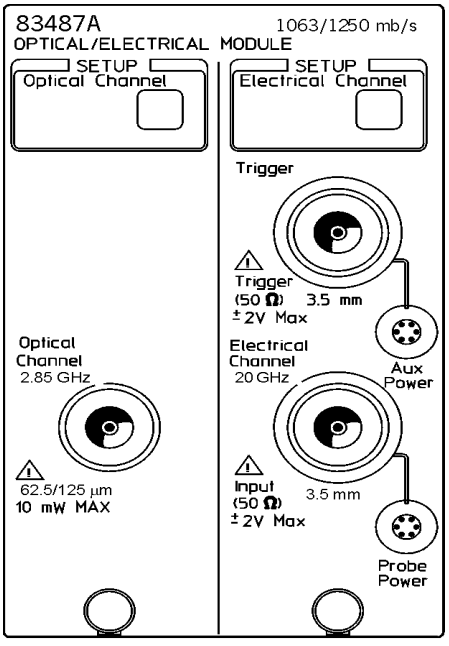
- 2.85 GHz, integrated, calibrated optical channel with sensitivity to below –17 dBm
- 12.4 GHz and 20 GHz electrical channel
- Trigger channel input to the mainframe
- Switchable reference filters for transceiver compliance testing
- Compliance testing at Fibre Channel 1063 and Gigabit Ethernet 1250 rates
- Measurement capability for single-mode or multimode optical signals

Front panel of the plug-in module

The plug-in module takes up two of the four mainframe slots. The optical channel provides calibrated measurement of optical waveforms in power units. The electrical channel provides calibrated measurement of electrical signals in volts. Bandwidths are selectable on both channels to optimize sensitivity and bandwidth.

The front panel of the plug-in module has two channel inputs and an external trigger input. The front panel also has a Probe Power connector for Agilent 54700-series probes, an Aux Power connector for general purpose use, and a key for each channel that displays the softkey menu. The softkey menu allows you to access the channel setup features of the plug-in module.

The front-power Probe Power connector allows automatic channel scaling and probe calibration with Agilent 54700 series probes. The front-panel Aux Power connector provides only power to Agilent 54700 series probes for use as a trigger input. Probe calibration and scaling are not required for a trigger input.



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Front panel of the plug-in module.

Specifications

Table 4-1. Agilent 83487A Electrical Channel Vertical Specifications

Bandwidth (–3 dB)	dc to 12.4 GHz or 20 GHz, user selectable
dc Accuracy—single voltage marker [a]	
12.4 GHz	±0.4% of full scale ±2 mV ±1.5% (reading – channel offset) ± (2%/°C) (ΔT_{cal} [b]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [c]) (reading)
20 GHz	±0.4% of full scale ±2 mV ±3% of reading– channel offset ± (2%/°C) (ΔT_{cal} [b]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [c]) (reading)
dc Difference—two marker accuracy on same channel [a]	
12.4 GHz	±0.8% of full scale ±1.5% of delta marker reading ± (2%/°C) (ΔT_{cal} [b]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [c]) (reading)
20 GHz	±0.8% of full scale ±3% of delta marker reading ± (2%/°C) (ΔT_{cal} [b]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [c]) (reading)
Transition Time (10% to 90%) calculated from T=0.35/BW, characteristic	
12.4 GHz	*≤28.2 ps*
20 GHz	*≤17.5 ps*
Maximum RMS Noise	
12.4 GHz	*≤0.5 mV (0.25 mV typical)*

Table 4-1. Agilent 83487A Electrical Channel Vertical Specifications (Continued)

20 GHz	*≤1 mV (0.5 mV typical)*
Scale Factor (full scale is eight divisions)	
Minimum	1 mV/div
Maximum	100 mV/div
dc Offset Range	±500 mV
Nominal Impedance	50 Ω
Connector	3.5 mm (m)
Reflections	≤5% for 30 ps rise time
Dynamic Range	±400 mV relative to channel offset
Maximum Safe Input Voltage	*16 dBm peak ac ±2V dc*

a. It is recommended that a user vertical calibration be performed after every 10 hours of continuous use or if the temperature has changed by greater than 2°C from the previous vertical calibration.

b. Where ΔT_{cal} represents the temperature change in Celsius from the last user vertical calibration. Note that the temperature term goes to zero upon execution of a vertical calibration.

c. Where $\Delta Time_{cal}$ represents the time since the last user vertical calibration. The uncertainty due to time typically stabilizes after 24 hours. This term goes to zero upon execution of a vertical calibration.

Table 4-2. Agilent 83487A Optical Channel Vertical Specifications

Bandwidth (–3 dB)	dc to 2.85 GHz *(dc to 3.0 GHz characteristic)*
Maximum Specified Peak Input Power[a]	
Continuous Wave	0.6 mW (–2.2 dBm)
Modulated	0.4 mW (–4 dBm)
dc Accuracy (single marker[b]) [c]	±0.4% of full scale ±6 μW ±3% (reading – channel offset) ± (2%/°C) (ΔT_{cal} [d]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [e]) (reading)
dc Difference (two marker accuracy, same channel [b]) [c]	±0.8% of full scale ±3% of delta marker reading ± (2%/°C) (ΔT_{cal} [d]) (reading) – 0.4%/hr ($\Delta Time_{cal}$ [e]) (reading)
Transition Time (10% to 90%), calculated from T=0.48/bandwidth, optical	*<160 ps, unfiltered mode*
RMS Noise, filtered or unfiltered mode	*Characteristic: < 1.5 μW* *Maximum: < 2.5 μW*
Scale Factor (full scale is eight divisions)	
Minimum	5 μW/div
Maximum	100 μW/div
dc Offset Range	+0.2 mW to –0.6 mW, referenced to two divisions above bottom of screen
Connector Type	62.5/125 μm maximum multimode, user selectable connector option
Input Return Loss	*20 dB (HMS-10 connector with fully filled 62.5 μm fiber)*
Filtered Bandwidth Measured response conforms to:	Reference receiver specifications for Fibre Channel 1063 and Gigabit Ethernet 1250.
Calibrated Wavelength	850 nm
Average Power Monitor	

Table 4-2. Agilent 83487A Optical Channel Vertical Specifications (Continued)

Specified operating range (average power)	–30 dBm to –2.2 dBm (1 μW to 500 μW)
Maximum peak power input (typical)	*(4000 μW (6 dBm) typical)*
Factory calibrated accuracy (20°C to 30°C)	±5% of reading ±100 nW ± connector uncertainty
User calibrated accuracy [f] (<5°C temp change)	±2% of reading ±100 nW ± power meter uncertainty
Maximum Safe Input	10 mW peak
Wavelength Range	*750 to 860 nm*

a. Exceeding the specified input power level will cause waveform distortion.
b. Referenced to average power monitor.
c. It is recommended that a user vertical calibration be performed after every 10 hours of continuous use or if the temperature has changed by greater than 2°C from the previous vertical calibration.
d. Where ΔT_{cal} represents the temperature change in Celsius from the last user vertical calibration. Note that the temperature term goes to zero upon execution of a vertical calibration.
e. Where $\Delta Time_{cal}$ represents the time since the last user vertical calibration. The uncertainty due to time typically stabilizes after 24 hours. This term goes to zero upon execution of a vertical calibration.
f. A user calibration can be performed with average optical power levels from 100 to 400 μW, however, the instrument optical accuracy specification is only valid for average optical calibration powers of 200 ±50 μW.

Table 4-3. Electrical and Optical Channels

Temperature	
Operating	15°C to +35°C
Non-operating	–40°C to +70°C
Humidity	
Operating	up to 90% relative humidity (non-condensing) at ≤35°C
Non-operating	up to 95% relative humidity (non-condensing) at ≤65°C

Table 4-4. Power Requirements

Supplied by mainframe.

Table 4-5. Weight

Net	approximately 1.2 kg (2.6 lb.)
Shipping	approximately 2.1 kg (4.6 lb.)

Characteristics

The following characteristics are typical for the Agilent 83487A. Refer to the *Agilent 54701A Active Probe Service Guide* for complete probe characteristics.

Table 4-6. Trigger Input Characteristics for Electrical and Optical Channels

Nominal Impedance	*50 Ω*
Input Connector	*3.5 mm (m)*
Trigger Level Range	*±1 V*
Maximum Safe Input Voltage	*±2 Vdc + ac peak (+16 dBm)*
Percent Reflection	*≤10% for 100 ps rise time*

Refer to the *Agilent 83480A, 54750A User's Guide* for trigger specifications.