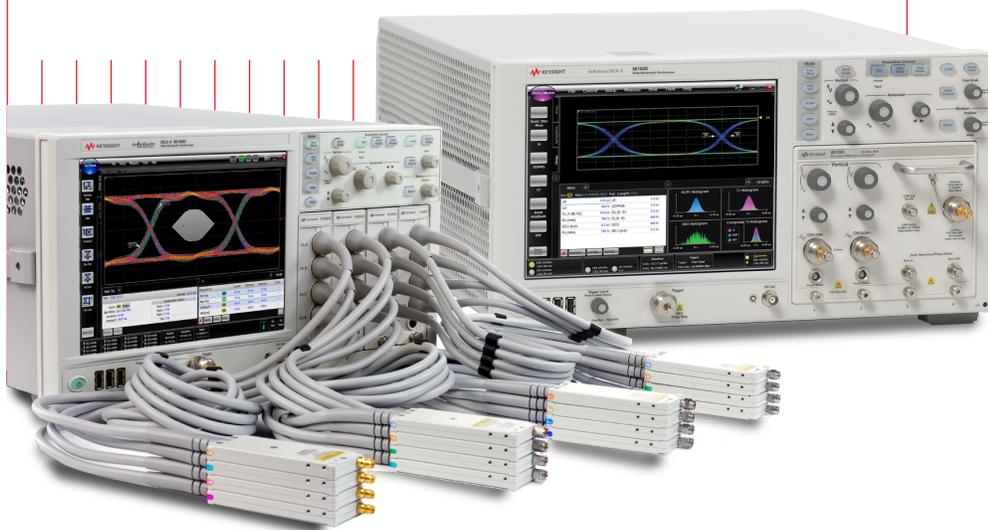


# Keysight Technologies

## DCA Probes & Accessories

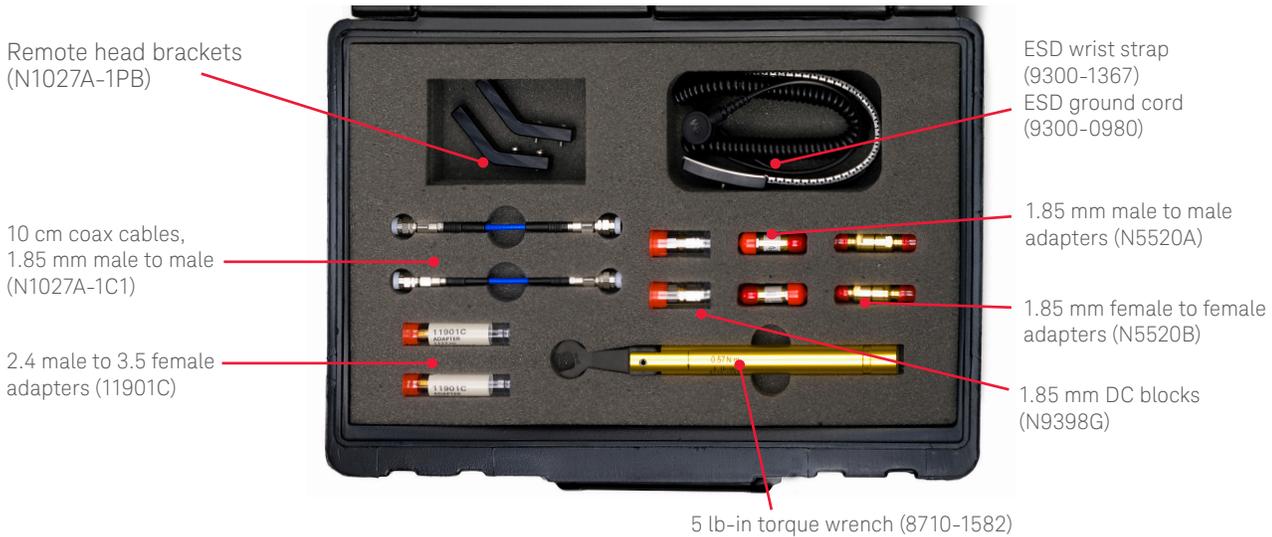
Technical Overview



## N1027A-45A Accessory Kit for Remote Head Modules

Kit consists of:

Quantity	Part number	Description
1	8710-1582	0.57 Nm (5 lb-in) torque wrench
2	N1027A-1PB	Remote head brackets
2	11901C	2.4 mm male to 3.5 mm female adapter
2	N9398G	1.85 mm DC block
2	N5520A	1.85 mm male to male adapter
2	N5520B	1.85 mm female to female adapter
2	N1027A-1C1	1.85 mm cable
1	9300-1367	ESD wrist strap
1	9300-0980	ESD ground cord
1	N1027A-1AC	Accessory case



## TDR Calibration

85058B	Standard mechanical calibration kit, DC-67 GHz, for 1.85 mm applications
85058E	Economy mechanical calibration kit, DC-67 GHz, for 1.85 mm applications
85056A	Standard mechanical calibration kit, DC-50 GHz, for 2.4 mm applications
85056D	Economy mechanical calibration kit, DC-50 GHz, for 2.4 mm applications
N1024B	Mechanical calibration kit for 3.5 mm applications

N4694A-HFF	DC-67 GHz Electronic calibration module with female 1.85 mm connectors <sup>1</sup>
N4694A-HMF	DC-67 GHz Electronic calibration module with one male and one female 1.85 mm connector
N4694A-HMM	DC-67 GHz Electronic calibration module with male 1.85 mm connectors <sup>2</sup>

N1027A-34F	Accessory kit for 35 GHz N1055A-32F/34F TDR/TDT module
N1027A-34M	Accessory kit for 35 GHz N1055A-32M/34M TDR/TDT module
N1027A-54F	Accessory kit for 50 GHz N1055A-52F/54F TDR/TDT module
N1027A-54M	Accessory kit for 50 GHz N1055A-52M/54M TDR/TDT module

1. Directly connects to N1055A-52M/54M remote heads.
2. Directly connects to N1055A-52F/54F remote heads.



85058E



N1027A-54F

### N1027A-### quantities

-34F	-34M	-54F	-54M	Part number	Description
1		1		N4694-61002	DC-67 GHz Electronic calibration module with male 1.85 mm connectors
	1		1	N4694-61003	DC-67 GHz Electronic calibration module with female 1.85 mm connectors
	2	4		11901-60003	2.4 mm male to 3.5 mm female adapter
2			4	11901-60004	2.4 mm female to 3.5 mm male adapter
1				85052-60014	3.5 mm male to 3.5 mm male adapter
	1			85052-60012	3.5 mm female to 3.5 mm female adapter
		1		85058-60113	1.85 mm male to male adapter
			1	85058-60114	1.85 mm female to female adapter
1	1	1	1	9300-1367	ESD wrist strap
1	1	1	1	9300-0980	ESD ground wire
4	4	4	4	5022-6494	Bracket for remote head
1	1	1	1	8710-1764	0.9 nm (8 lbs-in) torque wrench, 20 mm
1	1	1	1	8710-1765	0.9 nm (8 lbs-in) torque wrench, 5/16 inch
1	1	1	1	8121-0506	USB Cable (part of ECal)
1				85052-60006	3.5 mm male short
1				85052-60008	3.5 mm male open
1				00902-60003	3.5 mm male load
	1			85052-60007	3.5 mm female short
	1			85052-60009	3.5 mm female open
	1			00902-60004	3.5 mm female load
		1		N1027A-2AC	Accessory case
			1	N1027A-3AC	Accessory case
1				N1027A-4AC	Accessory case
	1			N1027A-5AC	Accessory case

## Clock Recovery Phase Matching Cable Kits

### N1027A-S32 kit

1x N1075-60013 9/125  $\mu\text{m}$  single-mode fiber, FC/PC, 5.3 m  
 2x N1075-60017 2.92 mm male-to-male coaxial cable, 1 m<sup>1</sup>

### N1027A-M14

1x N1075-60015 9/125  $\mu\text{m}$  single-mode fiber, FC/PC 7.1 m  
 1x N1075-60016 62.5/125  $\mu\text{m}$  multimode fiber, FC/PC, 6.0 m  
 2x N1075-60017 2.92 mm male-to-male coaxial cable, 1 m<sup>1</sup>



### N1027A-MC1

This kit provides specially matched cables that will minimize (align) clock-to-data delays and ensure accurate jitter measurements when using the N4877A external clock recovery. The N1027A-MC1 works with an 86100D with Option PTB, the N4877A external clock recovery module and the N1045A 60 GHz electrical module and/or N1055A 50 GHz TDR module.

- 2x 50 GHz pick-off
- 2X 11901D 3.5 mm m to 2.4 mm f
- 1X N1027-60011 Cable set (4 pieces)
- 1X N1027-60009 Precision time base strobe delay cable
- 1X N1027-00001 Strobe delay cable cover
- 1X N1027-00002 Strobe delay cable lid
- 1X 1870-1625 20X100 Torx driver
- 1X 1870-1623 10X100 Torx driver
- 1x 8710-1765 8 in-lb, 5/16 Torque wrench



1. To connect the N4877A recovered clock output to the 86100C/D trigger input and to connect the N4877A auxiliary output with an optional 86107A precision timebase.

## Adapters & Connector Savers

Description below specifies gender of adapter

N5520A 1.85 mm male to 1.85 mm male adapter/connector saver  
 N5520B 1.85 mm female to 1.85 mm female adapter/connector saver  
 N5520C 1.85 mm female to 1.85 mm male connector saver

11900A 2.4 mm male to 2.4 mm male adapter/connector saver  
 11900B 2.4 mm female to 2.4 mm female adapter/connector saver  
 11900C 2.4 mm female to 2.4 mm male connector saver  
 11901A 2.4 mm male to 3.5 mm male adapter  
 11901B 2.4 mm female to 3.5 mm female adapter  
 11901C 2.4 mm male to 3.5 mm female adapter  
 11901D 2.4 mm female to 3.5 mm male adapter

85130-60010 2.4 mm female to 3.5 mm male NMD bulkhead adapter  
 83059A 3.5 mm male to 3.5 mm male adapter/connector saver  
 83059B 3.5 mm female to 3.5 mm female adapter/connector saver  
 83059C 3.5 mm female to 3.5 mm male connector saver

5061-5311 3.5 mm female to 3.5 mm female adapter/connector saver

2.4 mm connectors are mechanically compatible with 1.85 mm.  
 2.92 mm connectors are mechanically compatible with 3.5 mm and SMA connectors.

### Examples

Use two 11901Cs to connect SMA cables to an N1045A-02F or 86108B-HBW or N4903B.  
 Use 5061-5311 as a connector saver for the 86112A, 54754A or 86105X electrical inputs.



11900B



11901C



85130-60010  
2.4 F -3.5 M



5061-5311

## DC Blocks, Phase Trimmers, Cables, Caps

N9398G	1.85 mm male-to-female DC block 16 V 700 kHz - 67 GHz
N9398F	2.4 mm male-to-female DC block 16 V 50 kHz - 50 GHz
N9398C	3.5 mm male-to-female DC block 16 V 50 kHz - 26.5 GHz
N1027A-PT2	2.4 mm male-to-female phase trimmer, range > 22 ps, IL ≤ 0.8 dB at 50 GHz
N1027A-PT3	3.5 mm male-to-female phase trimmer, range > 53 ps, IL ≤ 0.8 dB at 26 GHz
N1027A-1C1	1.85 mm coaxial male-to-male cable, 67 GHz, 10 cm
N4910A	2.4 mm male-to-male matched coaxial cable pair, 61 cm
N4871A	3.5 mm male-to-male matched coaxial cable pair, 91 cm
N1027A-3CF	Shipping cap to protect 2.92/3.5 mm female inputs
N1027A-3CM	Shipping cap to protect 2.92/3.5 mm male inputs
N1027A-1CF	Shipping cap to protect 1.85/2.4 mm female inputs
N1027A-1CM	Shipping cap to protect 1.85/2.4 mm male inputs
N1027A-3CF	Shipping cap to protect 2.92/3.5 mm female inputs
N1027A-3CM	Shipping cap to protect 2.92/3.5 mm male inputs

2.4 mm connectors are mechanically compatible with 1.85 mm.  
 2.92 mm connectors are mechanically compatible with 3.5 mm and SMA connectors.



N9398F



N4910A



N1027A-PT2

### Examples

The N1045A-04F requires four N1027A-1CF caps;  
 the N1055A-32M requires two N1027A-3CM caps.

## Attenuators, Terminations

8493C-003	3.5 mm 3 dB attenuator
8493C-006	3.5 mm 6 dB attenuator
8493C-010	3.5 mm 10 dB attenuator
8493C-020	3.5 mm 20 dB attenuator
8490D-003	2.4 mm 3 dB attenuator
8490D-006	2.4 mm 6 dB attenuator
8490D-010	2.4 mm 10 dB attenuator
8490D-020	2.4 mm 20 dB attenuator
909D-011	3.5 mm female 50 Ω load
909D-301	3.5 mm male 50 Ω load
0960-0055	3.5 mm male short
85138A	2.4 mm male 50 Ω load
85138B	2.4 mm female 50 Ω load
85140A	2.4 mm male short
85140B	2.4 mm female short
85141A	2.4 mm male open
85141B	2.4 mm female open



8493C



8490D



909D-011



85138A

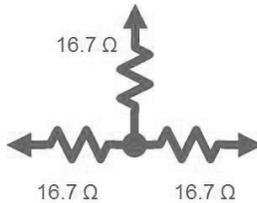


85140B

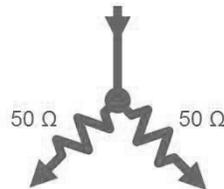
## Power Dividers, Splitters

11636B	3.5 mm power divider, DC to 26.5 GHz
11636C	2.4 mm power divider, DC to 50 GHz
11667B	3.5 mm power splitter, DC to 26.5 GHz
11667C	2.4 mm power splitter, DC to 50 GHz

### Divider



### Splitter



## Storage

See also [www.keysight.com/find/parts](http://www.keysight.com/find/parts)

- N1000-40008      Front cover for 86100D<sup>1</sup>
- N1027A-1AC      Accessory case<sup>2</sup>
- N1027A-2AC      Empty N1027A-54F accessory case
- N1027A-3AC      Empty N1027A-54M accessory case
- N1027A-4AC      Empty N1027A-34F accessory case
- N1027A-5AC      Empty N1027A-34M accessory case
- N1027A-1MC      Module storage case for N1045A module
- N1027A-3MC      Module storage case for N1055A module
- N1027A-1CL      Clip for two N1045A cables
- N1027A-2CL      Clip for two N1045A or N1055A remote heads
- N1027A-1PB      Bracket for one N1045A or N1055A remote head



N1000-40008

N1027A-1MC/3MC



N1027A-1CL



N1027A-2CL

- 86101-60017      Module filler panel for 86100A/B/C/D (1/4 bay width)<sup>3,4</sup>

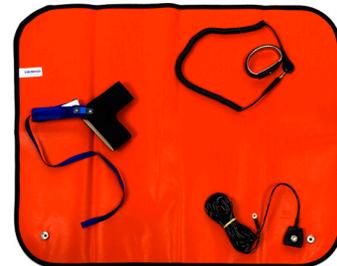
1. Does not fit 86100A/B/C mainframes.
2. Empty N1027A-45A case (see photo on page 2).
3. Use filler panels to ensure proper airflow through the inside of modules. Otherwise the movement of air may be cut short, and components may overheat in hot environments.
4. The 86100D always ships with two filler panels to fill two slots. Mini-modules ship with one filler panel.



86101-60017

## ESD Protection

- N9355CK01      3.5 mm DC coupled limiter
- 9300-1308      ESD heel strap
- 9300-1367      ESD wrist strap
- 9300-0980      ESD ground cord
- 9300-1484      ESD desk mat



## Rackmount Kits, Tools

- 1CM030A      Rackmount kit for 86100A/B/C
- 1CP018A      Rackmount kit with handles for 86100A/B/C
- 1CM015A      Rackmount kit for 86100D
- 1CP020A      Rackmount kit with handles for 86100D
- 8710-1582      0.57 nm (5 lbs-in) torque wrench<sup>1</sup>
- 8710-1765      0.9 nm (8 lbs-in) torque wrench<sup>2</sup>
- 8710-1764      0.9 nm (8 lbs-in) torque wrench<sup>3</sup>



1. Recommended for 1.85/2.4 mm DCA connectors (e.g. N1045A, 86116C, 86118A).
2. Recommended for 3.5 mm DCA connectors (e.g. 54754A, 86105x, 86112A).
3. Recommended for DCA bulkheads (e.g. 86100x trigger input, 54754A, 86105x, 86112A).

## InfiniiMax III/III+ Probing System Overview

### Probe amps

- 16 GHz - 30 GHz (InfiniiMax III)
- 4 GHz - 20 GHz (InfiniiMax III+) with InfiniiMode
- Industry's highest fidelity and accuracy
- Bandwidth upgradable (InfiniiMax III)

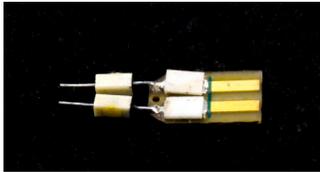


InfiniiMax III probe amps  
(N2800A-03A)  
16 GHz, 20 GHz, 25 GHz, 30 GHz



InfiniiMax III+ probe amps  
(N2830A-32A)  
4 GHz, 8 GHz, 13 GHz

### InfiniiMax III/III+ probe heads and accessories



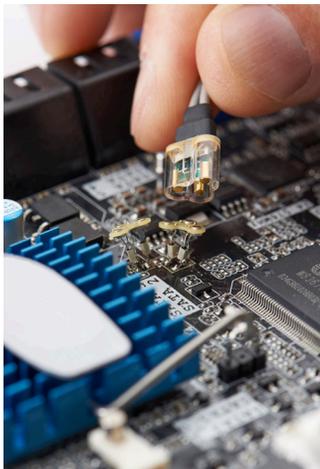
N2838A  
25 GHz PCB ZIF probe tips  
(for use with N5439A)



N5439A  
ZIF probe head  
N5440A 28 GHz 450 Ω ceramic tips  
N5447A 28 GHz 200 Ω ceramic tips



N5445A  
30 GHz browser



N2848A InfiniiMax III 16 GHz  
QuickTip head



N5444A  
2.92 mm/3.5 mm/SMA  
28 GHz probe adapter



N5441A  
16 GHz solder-in probe head



N2836A  
26 GHz solder-in probe head

### InfiniiMax III probe adapters



N5477A  
Sampling oscilloscope adapter



N5449A  
Hi impedance probe adapter



N5442A  
Precision BNC 50 Ω adapter



N5443A  
Performance verification &  
deskew fixture

## Using InfiniiMax III Probe with DCAs

For directly connecting to any DCA module with a 3.5 mm bulkhead connector:  
N5477A sampling oscilloscope adapter to InfiniiMax III probes.

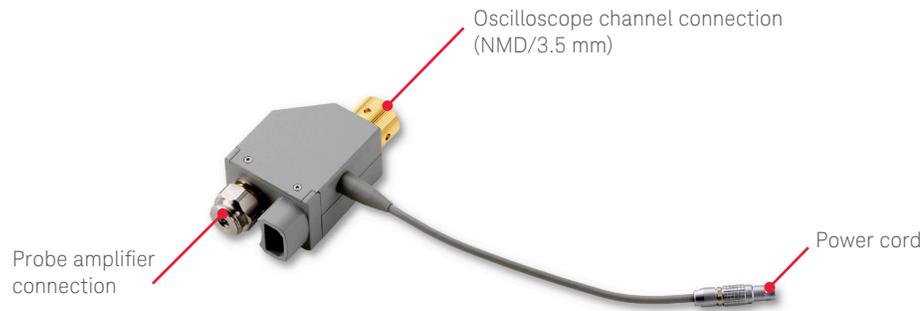
- For directly connecting to any DCA module with a 2.4 mm bulkhead connector:  
N1022B plus 85130-60010 2.4 mm (f) to 3.5 mm (m) NMD adapter.
- For modules that do not have built-in probe power: add an 1143A probe power supply with Option 001.
- N5477A plus InfiniiMax III N2803A probe provide 30 GHz bandwidth.



85130-60010  
2.4 F -3.5 M



1143A



N5477A sample oscilloscope adapter for InfiniiMax III

## Using InfiniiMax I/II/III+ Probe with DCAs

### Required accessories and instruments:

- For directly connecting to any DCA module with a 3.5 mm bulkhead connector: N1022B.
- For directly connecting to any DCA module with a 2.4 mm bulkhead connector: N1022B plus 85130-60010.
- For modules that do not have built-in probe power: add an 1143A probe power supply with Option 001.
- E2655C performance verification and deskew fixture for probe calibration and performance verification.

### Typical 1143A configuration for 86117A

Model	Description	Quantity
1143A	7 GHz probe amp	1
E2669A	Differential connectivity kit	1
N1022B	Probe adapter	1
85130-60010	2.4 to 3.5 mm adapter	1
1143A	Probe power supply	1
Option 001	5-foot power extension cable	1
E2665C	Calibration/deskew fixture	1

## N1021B 18 GHz Differential TDR/TDT Probe Kit

Quantity	Description	Replacement
1	Differential TDR probe	–
1	Pair of matched cables (1 m)	N1021-60003
2	SMA short (m)	0960-0055
2	SMA load 50 $\Omega$ (m)	1810-0118
2	SMA adapter (f-f)	1250-1666
1	Adapter to positioners (includes two 2.5 mm screws and one Allen wrench)	N1021-60008
1	ESD wrist strap	9300-1367
1	ESD wrist strap ground cord	9300-0980
1	ESD warning label stickers	–
1	User's guide (either printed or on CD)	–
1	Box with foam insert	–



## Optical Interfaces

- DCA modules (8610XX, 8611XX, 83496X, N107XX)
  - Have removable connector interfaces
  - Ship with 81000FI FC/PC pre-installed
  - Compatible with 81000xl interfaces shown here (sold separately)
- Internal fiber tip is mini HMS-10 ferrule
  - Requires patchcords with straight physical contact (DIN, E2000, FC/PC, LC, MU, SC, or ST connector)
  - Easy to clean – just unscrew the connector interface



81000FI – FC/PC  
(Ships standard with all optical inputs on modules for the DCA family)



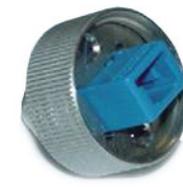
81000LI – LC



81000KI – SC



81000HI – E2000



81000MI – MU



81000SI – DIN4108/47256

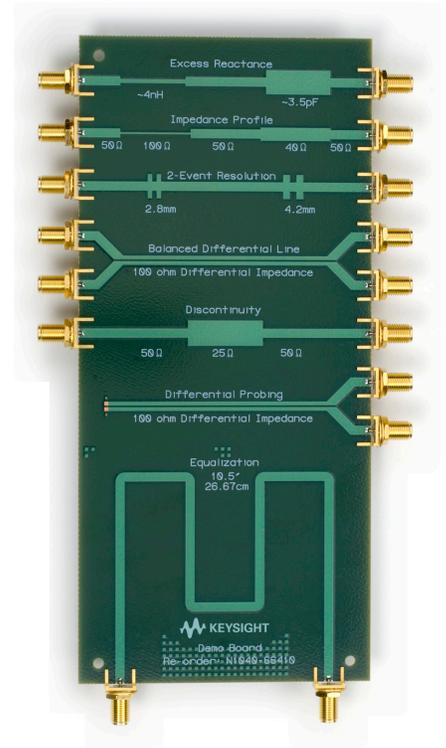


81000VI – ST

## Training Tools and Devices

Available from [www.keysight.com/find/parts](http://www.keysight.com/find/parts)

N1040-66410 TDR/TDT, equalization and de-embedding demo board



## Appendix: DCA Input Connectors

Product	Probe power	2.92 mm	3.5 mm	2.4 mm	1.85 mm	Optical	Comment
54754A	Yes		f/f CS				
83496B	No		f/f CS			FC/PC nut	
86100C/D	No	f/f CS	f/f CS				2.92 mm with option PTB
86105C	No		f/f CS			FC/PC nut	
86105D	No		f/f CS	f/f CS		FC/PC nut	2.4 mm with Option 281
86107A	No		f/f CS	f/f CS			2.4 mm only on 40 GHz input
86108A	Yes		f/f CS				
86108B	Yes		f/f CS	f/f CS			2.4 mm only on 50 GHz input
86112A	Yes		f/f CS				
86115D	No					FC/PC nut	
86116C	No				m fixed	FC/PC nut	
86117A	No			f/f CS			
86118A	No				f fixed		
N1045A-xxF	No				f fixed		
N1045A-xxM	No				m fixed		
N1055A-xxF	No	f fixed			f fixed		1.85 mm with Options 5xx
N1055A-xxM	No	m fixed			m fixed		1.85 mm with Options 5xx

f/f CS Female/female connector saver (bulkhead is male, customer can remove connector saver)

m/m CS Male/male connector saver (bulkhead is female, customer can remove connector saver)

f fixed Female fixed interface

m fixed Male fixed interface

FC/PC nut 86100FI straight FC/PC interface (customer can exchange it with other interfaces, see Optical Interfaces on page 11)

## Appendix: RF/Microwave Connectors

### 3.5 mm connector

The 3.5 mm connector was primarily developed at Hewlett Packard – now Keysight Technologies, Inc. with early manufacturing at Amphenol. Its design strategy focused on highly-rugged physical interfaces that would mate with popular SMA dimensions, allowing thousands of repeatable connections. It is mode-free to 34 GHz.

### 2.92 mm connector

The 2.92 mm connector mates with SMA and 3.5 mm connectors and offers mode-free performance to 40 GHz.

### 2.4 mm connector

The 2.4 mm connector was developed by Hewlett Packard, Amphenol, and M/A-COM for use to 50 GHz. This design eliminates the fragility of the SMA and 2.92 mm connectors by increasing the outer wall thickness and strengthening the female fingers. It can mate with SMA, 3.5 mm and 2.92 mm, with the use of precision adapters. The 2.4 mm product is offered in three quality grades: general purpose, instrument, and metrology. General-purpose grade is intended for economy use on components, cables, and microstrip where limited connections and low repeatability is acceptable. Instrument-grade is best suited for measurement applications where repeatability and long life are primary considerations. Metrology-grade is best suited for calibration applications where the highest performance and repeatability are required.

### 1.85 mm connector

The 1.85 mm connector was developed in the mid-1980s by Hewlett Packard (now Keysight Technologies) for mode-free performance to 65 GHz. Hewlett Packard offered their design as public domain in 1988 to encourage standardization of connector types; a few devices are available from various manufacturers for research work. The 1.85 mm connector mates with the 2.4 mm connector and has the same ruggedness. In recent years, the 1.85 mm connector has been optimized to operate mode-free to 67 GHz.

## Appendix: Literature References

<i>RF and Microwave Test Accessories Catalog</i> ( <a href="http://www.keysight.com/find/mta">www.keysight.com/find/mta</a> )	5990-8661EN
86100D DCA-X Data Sheet ( <a href="http://www.keysight.com/find/dcax">www.keysight.com/find/dcax</a> )	5990-5824EN
<i>Using the Keysight N5477A Sampling Oscilloscope Adapter</i>	N5477-97000

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[www.lxistandard.org](http://www.lxistandard.org)

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.



[www.pxisa.org](http://www.pxisa.org)

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United States	(800) 829 4444

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Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

**Europe & Middle East**

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Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
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