DCA Accessories

N1027A kits and general-purpose parts

Achieving the highest accuracy with a Digital Communication Analyzer (DCA) can be made easier with the right accessories. This document lists recommended items for N1000A DCA-X mainframes, their modules, the N109XX DCA-Ms and the N107XX clock recoveries:

- Attenuators, DC blocks
- Calibration kits, loads, shorts, terminations
- Adapters and connector savers
- Phase matching cable kits, equalizers
- Power dividers/splitters, pickoffs
- Rack mount kits, storage and protection
- Torque wrenches and other tools

Unless stated otherwise, all accessories are sold separately from the main products.

KEYSIGHT

Table of Contents

Accessory Kits for Electrical Channels

N1027A-45A demo kit for N1045A and N1046B remote head modules

Qty	Part number	Description
1	8710-1582	7.9 mm (5/16 in) 0.57 Nm (5 lbs-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, 700 kHz to 67 GHz
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

Figure 1. N1027A-45A demo kit

N1027A-46A demo kit for N1046A remote head modules

Qty	Part number	Description
2	11901C	Adapter, 2.4 mm male to 3.5 mm female
2	11920-60001	1.0 mm male to 1.0 mm male adapter
2	11921E	1.0 mm male to 1.85 mm male adapter
2	11921G	1.0 mm male to 1.85 mm female adapter
4	5022-6494	Bracket, remote head probe
1	8710-1582	7.9 mm (5/16 in) 0.57 Nm (5 lbs-in) torque wrench
1	8710-2079	6 mm (15/64 in) 0.45 Nm (4 in-lbs) torque wrench
1	9300-0980	ESD ground cord
1	9300-1367	ESD wrist strap
2	N1027-20001	Coaxial cable, 1.85 mm connectors, 100 mm
2	N9398G	1.85 mm DC block 16V 700 kHz to 67 GHz
1	N1046-40003	Accessory case for N1046A demo kit

N1027A-AxF accessory kits shipping with every N1046A module

-A1F	-A2F	A4F	Part number	Description
1	2	4	11921G	1.0 mm male to 1.85 mm female adapter
1	1	1	8710-2156	6 mm holding wrench
1	1	1	710-1761	7 mm holding wrench
1	1	1	8710-2079	6 mm 0.45 Nm (4 lbs-in) torque wrench
1	1	1	8710-1582	7.9 mm (5/16 in) 0.57 Nm (5 lbs-in) torque wrench
1	1	1	N1027A-1CL	Clips for remote head cables (4 colors, qty 4 each)
-	1	2	N1027A-2CL	Clip for two N104XX remote heads
1	1	1	N1046-40002	Accessory case for N1046A

Figure 2. N1027A-A4F accessory kit

N1060-60005 accessory kit shipping with every N1060A module

The N1060A module has 1.0 mm male ruggedized connectors. The N1060-60005 Accessory Kit provides ruggedized adapters (and required wrenches) to 1.85 mm and 2.92 mm female connector interfaces.

Qty	Part number	Description
2	Y1901B	Ruggedized 1.0 mm female to 1.85 mm female adapter
2	Y1903B	Ruggedized 1.0 mm female to 2.92 mm female adapter
1	8710-1582	7.9 mm (5/16 in) 0.57 Nm (5 lbs-in) torque wrench
1	8710-1761	7 mm holding wrench
1	8710-1764	20 mm 0.9 Nm (8 lbs-in) torque wrench
1	8710-2819	14 mm 0.45 Nm (4 lbs-in) and 1.13 Nm (10 lbs-in) special double torque wrench
1	N1060-20009	8 mm holding wrench
1	N1060-90001	User Guide (how to torque adapters)

Figure 3. N1060A-60005 accessory kit

Accessory Kits for TDR/TDT Modules

N1027A-34F/34M/54F/54M TDR/TDT accessory kits

The N1027A series accessory kits for N1055A modules provide ECal units, adapters and tools for the TDR/TDT remote heads. To be fully compatible the N1027A-xxx option of the accessory kit must match the N1055A-xxx option of the module (e.g., use a N1027A-54F for a N1055A-54F configuration[1]).

Part number	Description
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

Figure 4. N1027A-54F accessory kit

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1. The first character of the N1055A option code defines 35 or 50 GHz bandwidth, the second character the number of remote heads (2 or 4), and the third character the gender of the input connector on the remote head (male of female).

N1027A-xxx kits for the N1055A modules contain the following quantities:

–34F	–34M	–54F	–54M	Part number	Description
1		1		N4694D/0DC/M0M	67 GHz 2-port 1.85 mm ECal module, DC coupled, 2 male connectors
	1		1	N4694D/0DC/F0F	67 GHz 2-port 1.85 mm ECal module, DC coupled, 2 female connectors
	2	4		11901C	2.4 mm male to 3.5 mm female adapter
2			4	11901D	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	20 mm 0.9 Nm (8 lbs-in) torque wrench
1	1	1	1	8710-1765	7.9 mm (5/16 in) 0.9 Nm (8 lbs-in) torque wrench
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	1	1	1	N1027A-xAC	Accessory case
	1			N1027A-xAC	Accessory case

ECal Modules

ECal modules are included in the N1027A-xxx TDR/TDT accessory kits (page 7). They can also be purchased standalone. Configurations depend on the connector size and gender of the device under test (DUT). Keysight recommends the following combinations:

DUT connector	ECal module	TDR/TDT module	Adapters
1.85 or 2.4 mm Female	N4694D with #F0F and #0DC	N1055A with #52M or #54M	None
1.85 or 2.4 mm Male	N4694D/ with #M0M and #0DC	N1055A with #52F or #54F	None
2.92 mm Female	N4694D with #F0F and #0DC	N1055A with #52M or #54M	11901C on ECal 11901D on remote head
1	N4694D with #F0F and #0DC	N1055A with #32M or #34M	11901C on ECal (2.4 mm male to 3.5 mm female)
2.92 mm Male	N4694D/ with #M0M and #0DC	N1055A with #52F or #54F	11901D on ECal 11901C on remote head
	N4694D/ with #M0M and #0DC	N1055A with #32F or #34F	11901D on ECal (2.4 mm female to 3.5 mm male)
3.5 mm or SMA Female	N4694D with #F0F and #0DC	N1055A with #32M or #34M	11901C on ECal (2.4 mm male to 3.5 mm female)

- The N4694D with options M0M and 0DC is a 67 GHz 2-port DC coupled ECal module with male 1.85 mm connectors.
- The N4694D with options F0F and 0DC is a 67 GHz 2-port DC coupled ECal module with female 1.85 mm connectors.
- The N1055A option code stands for:
  - First character: 35 or 50 GHz bandwidth
  - Second character: 2 or 4 remote heads per module
  - Third character: male or female inputs
- For best accuracy the ECal module (or the ECal module plus adapters) should have the same connector size and gender as the DUT. This allows the reference plane to be placed at the DUT's connectors during calibration. FlexDCA knows the 11901C/D adapters and can take their group delays into account (FlexDCA can also measure other adapters and add them to its database).

Figure 5. N4694D ECal module

Mechanical calibration kits

Part number	Description
85052B	Standard mechanical calibration kit, DC to 26.5 GHz, for 3.5 mm applications
85052D	Economy mechanical calibration kit, DC to 26.5 GHz, for 3.5 mm applications
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

All kits provide SOLT calibration except the N1024B which is limited to SLT.

Figure 6. 85058E economy mechanical calibration kit

Accessory Kits for Clock Recovery Instruments

N1076B-CR1 (re-order: N1027A-76B)

This kit provides specially matched cables that will minimize (align) clock-to-data delays and ensure accurate jitter measurements when using the N1076B external clock recovery (or recovering clocks from electrical signals with the N1078A). It is designed to be used with a N1000A DCA-X mainframe with an internal precision timebase plus any N1045A/N1046A/N1055A module.

| Qty	Part number	Description
1	N1027A-2P8	Microwave Pick-Off Tee 1.85 mm connectors, matched pair
2	N1027A-EQ6	Equalizer, 2.92 mm (m) to 2.92 mm (f), 6 dB
2	N1027A-EQ9	Equalizer, 2.92 mm (m) to 2.92 mm (f), 9 dB
2	N1027A-EQ3	Equalizer, 2.92 mm (m) to 2.92 mm (f), 3 dB
1	N1027-60015	SMA delay line, 18.2 ns
1	N1076-60015	Set of 2.92 mm delay lines, 2.37 ns matched pair plus 4.33 ns matched pair
1	8710-1615	T-20 Torx screwdriver
1	8710-1623	T-10 Torx screwdriver
1	8710-1765	7.9 mm (5/16 in) 0.9 Nm (8 lbs-in) torque wrench
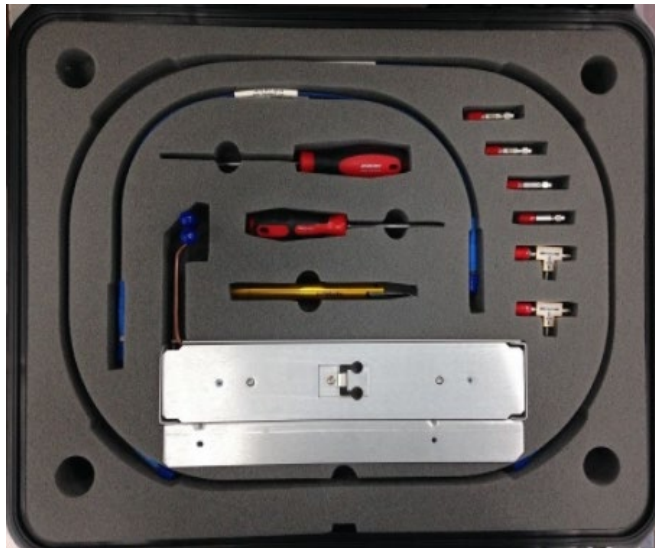
Figure 7. N1076B-CR1/N1027A-76B accessory kit

N1077A-CR1 (re-order: N1027A-77A)

This kit provides specially matched cables that will minimize (align) clock-to-data delays and ensure accurate measurements when using the N1077A external clock recovery. It is designed to be used with a DCA-X mainframe with Option ETR/PTB installed (with any DCA plug-in module) or any N109x Series DCA-M product.

| Qty	Part number	Description
1	N1077-60011	FC/PC optical cable, 50/125 µm (multimode), 1.0 m length
1	N1077-60012	FC/PC optical cable, 50/125 µm (multimode), 2.6 m length
1	N1077-60013	FC/PC optical cable, 50/125 µm (multimode), 4.75 m length
1	N1077-60008	FC/PC optical cable, 9/125 µm (single-mode), 1.0 m length
1	N1077-60009	FC/PC optical cable, 9/125 µm (single-mode), 3.5 m length
1	N1077-60010	FC/PC optical cable, 9/125 µm (single-mode), 5.6 m length
2	N1075-60017	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 1 m length
1	N1077-60005	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 12 in. length
1	N1027A-EQ6	Microwave equalizer, 0.5 GHz to 18 GHz, 6 dB, negative slope, SMA
1	N1027A-EQ9	Microwave equalizer, 0.5 GHz to 18 GHz, 9 dB, negative slope, SMA
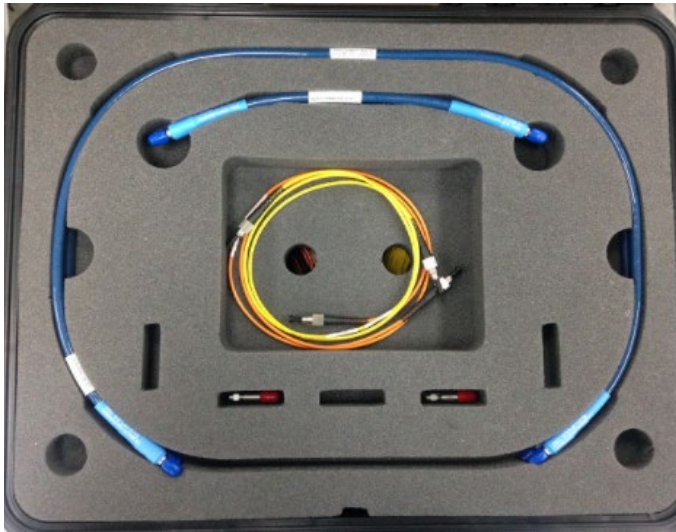
Figure 8. N1077A-CR1/N1027A-77A accessory kit

N1077B-CR1 (re-order: N1027A-77B)

This kit provides specially matched cables that will minimize (align) clock-to-data delays and ensure accurate measurements when using the N1077B external clock recovery. It is designed to be used with a DCA-X mainframe with an internal precision timebase plus any optical DCA plug-in module, or with any N1092X Series DCA-M product.

Qty	Part number	Description
1	N1027A-EQ6	Equalizer, 2.92 mm (m) to 2.92 mm (f), 6 dB
1	N1027A-EQ9	Equalizer, 2.92 mm (m) to 2.92 mm (f), 9 dB
2	N1075-60017	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 1 m length
1	N1077-60005	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 12 in. length
1	N1077-60011	FC/PC optical cable, 50/125 µm (multimode), 1.0 m length
1	N1077-60025	FC/PC optical cable, 50/125 µm (multimode), 6.25 m length

Figure 9. N1078A-CR1/N1027A-78A accessory kit

N1078A-CR1 (re-order: N1027A-78A)

This kit provides specially matched cables that will minimize (align) clock-to-data delays and ensure accurate measurements when using the N1078A external clock recovery. It is designed to be used with a DCA-X mainframe with an internal precision timebase plus any optical DCA plug-in module, or with any N1092X Series DCA-M product.

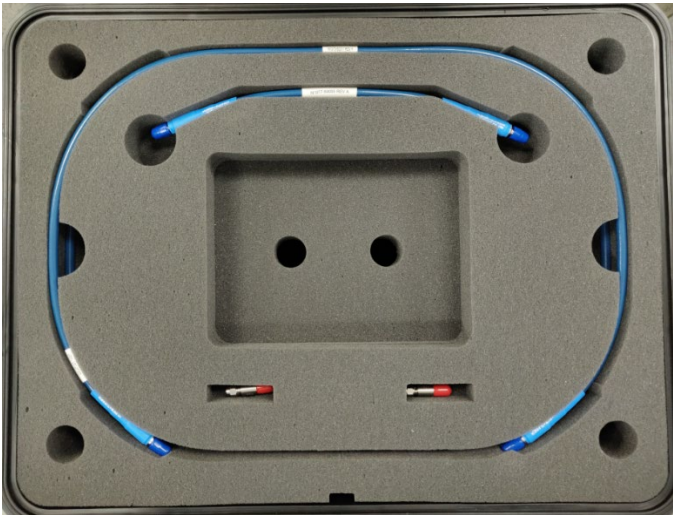| Qty	Part number	Description
1	N1027A-EQ6	Equalizer, 2.92 mm (m) to 2.92 mm (f), 6 dB
1	N1027A-EQ9	Equalizer, 2.92 mm (m) to 2.92 mm (f), 9 dB
2	N1075-60017	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 1 m length
1	N1077-60005	Coaxial cable, 2.92 mm (m) to 2.92 mm (m), 12 in. length
1	N1077-60008	FC/PC optical cable, 9/125 µm (single-mode), 1.0 m length
1	N1077-60014	FC/PC optical cable, 9/125 µm (single-mode), 5.0 m length

Figure 10. N1078A-CR1/N1027A-78A accessory kit

RF/Microwave Parts

Adapters[2]

Fits all 1.0 mm connectors (e.g., N1046A inputs):

Part number	Description
Y1910A	1.0 mm (m) to 1.0 mm (m) adapter, DC to 120 GHz
Y1910B	1.0 mm (f) to 1.0 mm (f) adapter, DC to 120 GHz
Y1910C	1.0 mm (m) to 1.0 mm (f) adapter, DC to 120 GHz
11921E	1.0 mm male to 1.85 mm male adapter
11921G	1.0 mm male to 1.85 mm female adapter

Figure 11. Y1910B adapter

Recommended for ruggedized 1.0 mm connectors (e.g., N1060A inputs):

Part number	Description
Y1900B	Ruggedized 1.0 mm female to 1.0 mm female adapter
Y1901B	Ruggedized 1.0 mm female to 1.85 mm female adapter
Y1903B	Ruggedized 1.0 mm female to 2.92 mm female adapter

Figure 12. Y1900B adapter (left) and Y1903B adapter (right)

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2. Descriptions specify gender of adapter. A male input connector on an instrument requires a female-to-female adapter for connecting a cable with male connectors.

Fits all 1.85 mm and 2.4 mm connectors (e.g., N1045A/B, N1055A inputs):

Part number	Description
N5520A	1.85 mm male to 1.85 mm male adapter
N5520B	1.85 mm female to 1.85 mm female adapter
N5520C	1.85 mm female to 1.85 mm male connector saver
11900A	2.4 mm male to 2.4 mm male adapter
11900B	2.4 mm female to 2.4 mm female adapter
11900C	2.4 mm female to 2.4 mm male connector saver
11904A	2.4 mm male to 2.92 mm male adapter
11904B	2.4 mm female to 2.92 female adapter
11904C	2.4 mm male to 2.92 mm female adapter
11904D	2.4 mm female to 2.92 mm male adapter
11901A	2.4 mm male to 3.5 mm male adapter
11901B	2.4 mm female to 3.5 female adapter
11901C	2.4 mm male to 3.5 mm female adapter
11901D	2.4 mm female to 3.5 mm male adapter
11903A	2.4 mm male to type-N male adapter
11903B	2.4 mm female to type-N female adapter
11903C	2.4 mm male to type-N female adapter
11903D	2.4 mm female to type-N male adapter

Figure 13. 11900B adapter (left) and 11901C adapter (right)

Recommended for bulkhead inputs:

Part number	Description
5061-5311	3.5 mm female to female connector saver (e.g., 86100A/B/C frames, 8610XX, 8611XX modules)
1250-4105	2.92 mm female to female connector saver (e.g., 86100D, N1000A)
11900B	2.4 mm female to female adapter (e.g., 86108B with #HBW, N1094A/B)
Y1903B	Ruggedized 1.0 mm female to 2.92 mm female adapter (e.g., N1060A)
Y1901B	Ruggedized 1.0 mm female to 1.85 mm female adapter (e.g., N1060A)
Y1900B	Ruggedized 1.0 mm female to 1.0 mm female adapter (e.g., N1060A)

Figure 14. 5061-5311 connector (left), 1250-4105 connector (center), and Y1901B adapter (right)

NMD bulkhead adapters:

Part number	Description
85130-60010	3.5 mm male to 2.4 mm female adapter
83059A	3.5 mm male to 3.5 mm male adapter
83059B	3.5 mm female to 3.5 mm female adapter
83059C	3.5 mm female to 3.5 mm male connector saver
5062-1247	3.5 mm male bulkhead to female 3.5 mm adapter

Attenuators

Part number	Description
8490G-003	1.85 mm 3 dB attenuator
8490G-006	1.85 mm 6 dB attenuator
8490G-010	1.85 mm 10 dB attenuator
8490G-020	1.85 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
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

Cables

Part number	Description
11500J	1.0 mm female-to-male cable, 16 cm, DC-110 GHz
N1027A-1C1	1.85 mm cable, male-to-male, 67 GHz, 10 cm
N1027A-3C1	2.92 mm cable, male-to-male, 2.37 ns delay, 55 cm
N1027A-3C2	2.92 mm, cable, male-to-male, 4.33 ns delay, 1.0 m
N1027A-3C3	SMA cable, male-to-male, Data Out/Data In for N1076A/B
N4910A	2.4 mm matched cable pair, 61 cm

Figure 15. 11500J cable (left) and N4910A cable (right)

Caps for input protection

Part number	Description
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

Figure 16. N1027A-1CF/1CM

DC blocks

Part number	Description
N9398G	1.85 mm male-to-female DC block 16 V 700 kHz to 67 GH
N9398F	2.4 mm male-to-female DC block 16 V 50 kHz to 50 GH
N9398C	3.5 mm male-to-female DC block 16 V 50 kHz to 26.5 GH

Figure 17. N9398F DC block

Equalizers

Part number	Description
N1027A-EF6	Equalizer, 6 dB, 2.92 mm (m/f), up to 56 GBd
N1027A-EQ3	Equalizer, 2.92 mm (m) to 2.92 mm (f), 3 dB
N1027A-EQ6	Equalizer, 2.92 mm (m) to 2.92 mm (f), 6 dB
N1027A-EQ9	Equalizer, 2.92 mm (m) to 2.92 mm (f), 9 dB

Phase trimmers

Part number	Description
N1027A-PT2	2.4 mm male-to-female phase trimmer, range > 22 ps, IL ≤ 0.8 dB at 50 GHz
N1027A-PT3	SMA female-to-female phase trimmer, range > 53 ps, IL ≤ 0.8 dB at 26 GHz

Figure 18. N1027A-PT3 phase trimmer

Pick-offs

Part number	Description
N1027A-2P1	Microwave Pick-Off Tee 1.0 mm connectors, matched pair
N1027A-2P8	Microwave Pick-Off Tee 1.85 mm connectors, matched pair
N1027A-2P2	Microwave Pick-Off Tee 2.4 mm connectors, matched pair
N1027A-2P3	Microwave Pick-Off Tee 2.92 mm connectors, matched pair

The N1027A pick-off tees are designed to work with the electrical inputs on the N1076A/B, N1077A/77B and N1078A clock recovery instruments.

Figure 19. N1027A-2P8 pick-off

Power dividers/splitters

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

Figure 20. 11667C (left) and 11636B cable (right)

Terminations

Part number	Description
85138B	2.4 mm female 50 Ω load
85141B	2.4 mm female open
85140B	2.4 mm female short
85138A	2.4 mm male 50 Ω load
85141A	2.4 mm male open
85140A	2.4 mm male short
909D-011	3.5 mm female 50 Ω load
909D-305	3.5 mm male 50 Ω load
0960-0055	3.5 mm male short

Mechanical Accessories

Filler panels

Part number	Description
86101-60017	86100D Module filler panel (1/4 bay width, quartz gray)
N1027A-AFP	N1000A Module filler panel (1/4 bay width, carbon black)

All 86100D and N1000A DCA-X mainframes ship with two filler panels to cover two slots. All mini-modules (i.e., modules that are ¼ bay wide) ship with one filler panel.

Rack mount kits

Part number	Description
1CM015A	Rackmount kit for 86100D/N1000A
1CM030A	Rackmount kit for 86100A/B/C
1CP018A	Rackmount kit with handles for 86100A/B/C
1CP020A	Rackmount kit with handles for 86100D/N1000A
N1027A-RM1	Single DCA-M rack mount kit
N1027A-RM2	Dual DCA-M side by side rack mount

Figure 21. N1027A-RM1 (left) and N1027A-RM2 (right)

Remote head accessories clips

Part number	Description
N1027A-1CL	Clips for remote head cables (4 colors, qty 4 each)
N1027A-2CL	Clip for two N1045A/B, N1046A or N1055A remote heads

Figure 22. N1027A-1CL (left) and N1027A-2CL (right)

Storage

Part number	Description
N1000-40011	Front cover for DCA-X (ships with N1000A, also fits 86100D)
N1090-00002	Front cover for DCA-M (ships with N1077A, N1092X/94X)
N1090-00015	Front cover for DCA-M (ships with N1076B/77B/78A, fits N109XX)
N1027A-1AC	Empty N1027A-45A case
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/B, N1046A module
N1027A-3MC	Module storage case for N1055A module

Figure 23. N1027A-1MC

Tools

Part number	Description
8710-2156	6 mm holding wrench (to hold 1.0 mm adapters and interfaces while torqueing a connector to them)
8710-1761	7 mm holding wrench (to hold 2.92/3.5/SMA adapters and interfaces while torqueing a connector to them.)
8710-1582	7.9 mm (5/16 in) 0.57 Nm (5 lbs-in) torque wrench (recommended for 1.85/2.4 mm DCA connectors)
8710-1765	7.9 mm (5/16 in) 0.9 Nm (8 lbs-in) torque wrench (recommended for 3.5 mm DCA connectors))
N1060-20009	8 mm holding wrench (recommended for N1060A)
8710-2819	14 mm 0.45 Nm (4 lbs-in) and 1.13 Nm (10 lbs-in) special double torque wrench (recommended for N1060A)
8710-1764	20 mm 0.9 Nm (8 lbs-in) torque wrench (recommended for DCA bulkheads)
8710-1615	T-20 Torx screwdriver
8710-1623	T-10 Torx screwdriver

Other Accessories

Demo and training devices

Part number	Description
N1040-66410	TDR/TDT, equalization and de-embedding demo board
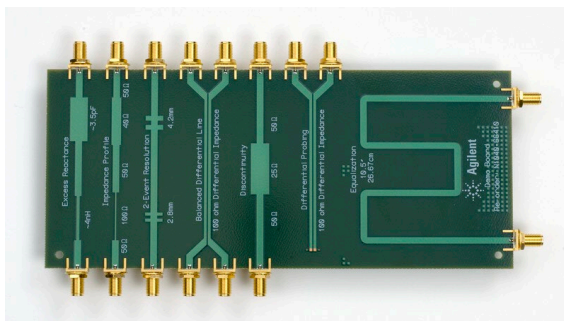
Figure 24. N1040-66410

ESD protection

Part number	Description
N9355CK01	3.5 mm DC coupled limiter (limits signals to ±0.6 Vpeak)
9300-1308	ESD heel strap
9300-1367	ESD wrist strap
9300-0980	ESD ground cord
9300-1484	ESD desk mat

Figure 25. N9355CK01 (left) and ESD heel strap, wrist strap and ground cord on desk mat (right)

USB devices

Part number	Description
E8900-D10	USB read-only licensing dongle - FLEX10

The non-writeable, no-memory dongle provides a unique host ID for Keysight licenses.

Appendix

DCA input connectors

Product	3.5 mm	2.92 mm	2.4 mm	1.85 mm	1.0 mm	Optical	Comment
N1000A		f/f CS					
N1030A/N1030B						FC/PC	
N1030A-EC1					m rug		Includes 1.0 mm to 1.85 and 2.92 mm f/f adapters
N1032A/N1032B						FC/PC	
N1040A-033		m fixed					
N1040A-060				m fixed			
N1045A/B-xxF				f fixed			
N1045A/B-xxM				m fixed			
N1046A					f fixed		Includes 1.0 mm male to 1.85 female adapters
N1055A-3xF		f fixed					
N1055A-3xM		m fixed					
N1055A-5xF				f fixed			
N1055A-5xM				m fixed			
N1060A					m rug		Includes adapters (see N1060-60005 kit)
N1076A/76B		f fixed					
N1077A/77B/78A		f fixed				FC/PC	
N1090A (EEC is optional)			f SMA (EEC)			FC/PC	
N1092A/B/D						FC/PC	
N1092C/E			f/f CS			FC/PC	
N1094A/B			f/f CS				Option 030 includes 2.4 to 2.92 mm adapters

f SMA	Female SMA input (fixed)
f/f CS	Female/female connector saver (bulkhead is male, connector saver is removable)
m/m CS	Male/male connector saver (bulkhead is female, connector saver is removable)
f fixed	Female fixed interface
m fixed	Male fixed interface
m rug	Male fixed ruggedized interface
FC/PC	Straight FC/PC bulkhead, cleanable
FC/PC nut	Straight FC/PC based on 81000FI interface (see page 24)
DCA-M clock	Use 2.92 or 3.5 mm cables to provide clocks to the N109XX series of DCA-Ms

Optical interfaces

Many DCA modules ship with 86100FI straight FC/PC interface pre-installed (see "FC/PC Nut" in table **Error! Reference source not found.** on page 23). These interfaces can be removed and replaced with 81000xI interfaces shown in Figure 24. The internal fiber tip is in a mini-HMS-10 ferrule that requires patchcords with straight physical contact connectors (e.g., DIN, E2000, FC/PC, LC, MU, SC, or ST connector).

The 81000xI interfaces are not used on N107XX Clock Recovery and N109XX DCA-M instruments.

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

81000LI – LC

81000KI – SC

81000HI – E2000
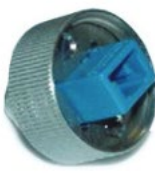
81000MI – MU

81000SI – DIN4108/47256

81000VI – ST

Figure 26. All types of 81000xI interfaces

RF/microwave connectors

NMD connector

The NMD connector is a ruggedized test-port connector. Most often, the connectors used are 3.5mm and 2.4mm male connectors. These connectors include a large threaded body that is specially designed to stabilize the test port cable when attached to the front of the analyzer or test set. The design of these connectors allows the use of standard female 3.5mm and 2.4mm cables and adapters. Since the test port connectors are male connectors, they have standard inside threads that can accommodate these female connectors. NMD stands for Network Measurements Division, an outdated term for the original HP division that produced the 8510A and 8720A analyzers.

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. 2.92 mm and 3.5 mm connectors use the same center pin. Inserting the larger SMA (m) center pin into a 2.92 mm or 3.5 mm connector can slightly degrade the connector. It is recommended that you only mate SMA (m) connectors to other connectors that you reserve for this purpose.

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 only 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, Inc.) for mode-free performance to 65 GHz. Hewlett Packard offered its 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.

To aid identification, 1.85 mm Keysight connectors have a groove in the male nut and female shoulder. The outer thread size of 1.85 mm and 2.4 connectors is larger than the tread size on SMA, 2.92 mm, and 3.5 mm connectors. This makes the area of the outer conductor's mating surface appear very large compared to the relatively smaller air dielectric.

1.0 mm connector

The 1.0 mm connector has been designed for ultra-high frequency signals (up to 110 GHz). Because of its small size it is **most at risk of being damaged** when making a connection. **Strictly follow the instructions** outlined in the N1060A Accessories Kit User Guide (literature # N1060-90001).

Connector summary

Type	Frequency range	Recommended torque	Compatible connectors
1.0 mm	≤ 110 GHz	0.45 Nm (4 lbs-in)	
1.85 mm	≤ 70 GHz	0.57 Nm (5 lbs-in)	2.4 mm
2.4 mm	≤ 50 GHz	0.9 Nm (8 lbs-in)	1.85 mm
2.92 mm	≤ 40 GHz	0.9 Nm (8 lbs-in)	3.5 mm and SMA
3.5 mm	≤ 34 GHz	0.9 Nm (8 lbs-in)	2.92 mm and SMA
SMA	≤ 24 GHz	0.9 Nm (8 lbs-in)	2.92 mm and 3.5 mm

Figure 27. Typical female input connectors

References

Literature references

Description	Publication number
DCA Family - Brochure	5992-3301EN
DCA Wide-Bandwidth Oscilloscope Family - Configuration Guide	5992-3372EN
N1000A DCA-X Mainframe and Modules - Data Sheet	5992-3271EN
N1092A/B/C/D/E DCA-M - Data Sheet	5992-3886EN
N1094A/B DCA-M - Data Sheet	5992-3700EN
N1090A DCA-M - Data Sheet	5992-3655EN
Keysight DCA Family Clock Data Recovery Solutions - Data Sheet	5992-1620EN
DCA Accessories – Technical Overview	5991-2340EN
Keysight DCA Family FlexDCA Sampling Oscilloscope Software - Technical Overview	5992-3319EN
Flexible Optical Test Optimization (FlexOTO) Software and Solutions – Flyer	3123-1111EN

Web resources

Generic: www.keysight.com/find/<product number> for any product number mentioned here

- Keysight Digital Communication Analyzer (DCA) Solutions: www.keysight.com/find/dca
- DCA-X Family: www.keysight.com/find/dca-x
- DCA-M Family: www.keysight.com/find/dca-m
- Clock Recovery Solutions: www.keysight.com/find/cdr
- FlexOTO Optical Test Optimization Solutions and N1002A: www.keysight.com/find/flexoto
- FlexDCA (main page): www.keysight.com/find/flexdca_pro
- FlexDCA (download page): www.keysight.com/find/flexdca_download

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