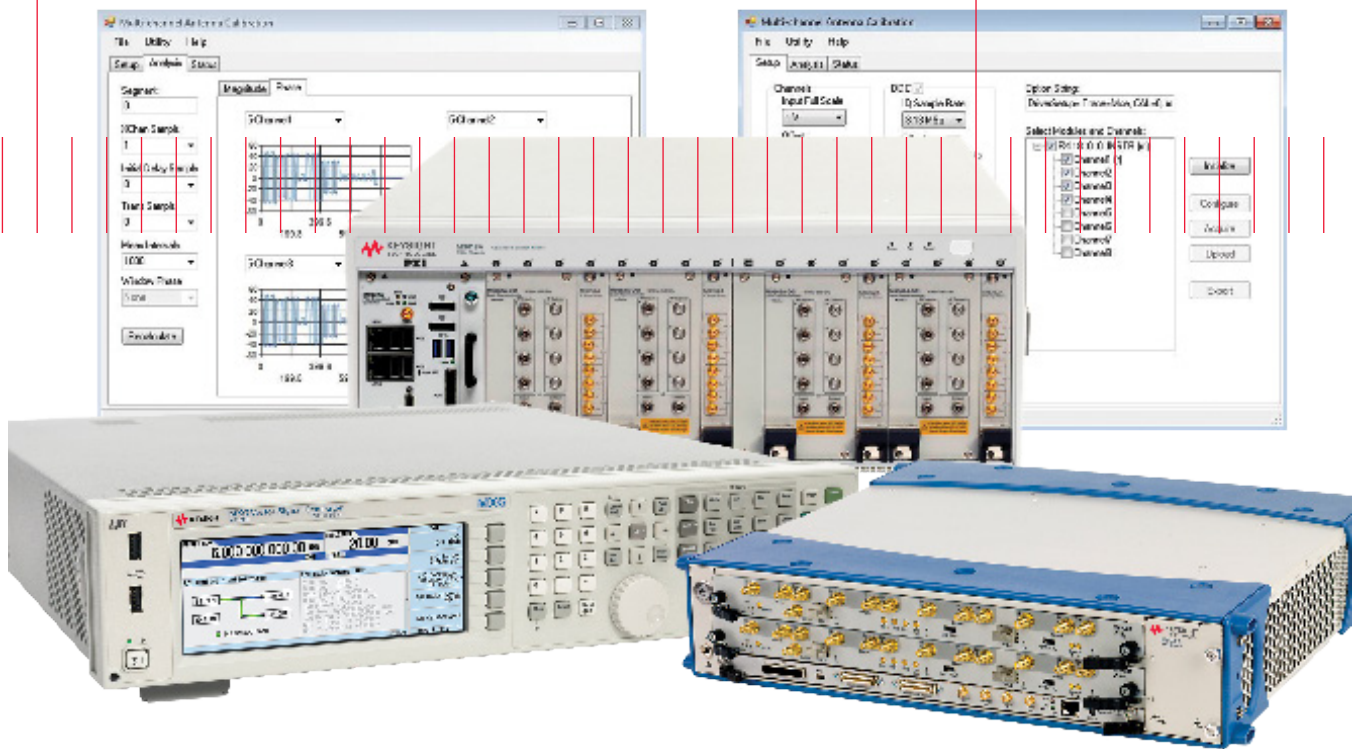


Keysight Technologies Multi-Channel Antenna Calibration, Reference Solution

Configuration
Guide



OVERVIEW

This configuration guide contains information to help you configure your Multi-Channel Antenna Calibration (MAC), Reference Solution and tailor the system to meet your requirements.

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A. Configure the M9703A AXIe digitizer (occupies 1 AXIe slot)

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated below.
 Not all M9703A product options are shown below. See www.keysight.com/find/M9703A for more detail.

Step 1. Start with M9703A AXIe digitizer base configuration (select quantity required)

- Qty 1 The M9703A includes:
 Number of digitizer channels: 8
 Bandwidth: 650 MHz
 Sample rate: 1 GSa/s
 Memory, per channel: 64 MSa
 Software, example programs, and product information on CD
 Return to Keysight warranty 3 years

Step 2. Choose sample rate

- | | | | | |
|----------------------------------|-------|------------|-----------|--|
| <input type="radio"/> | | M9703A-SR1 | 1 GSa/s | Included in base configuration of M9703A |
| <input checked="" type="radio"/> | Qty 1 | M9703A-SR2 | 1.6 GSa/s | |

Step 3. Add DDC

- Qty 1 M9703A-DDC Real-time DDC

Step 4. Choose frequency range

- | | | | | |
|----------------------------------|-------|------------|--------------------|--|
| <input type="radio"/> | | M9703A-F05 | 650 MHz maximum | Included in base configuration of M9703A |
| <input checked="" type="radio"/> | Qty 1 | M9703A-F10 | 1 GHz path enabled | |

Step 5. Choose memory

- | | | | | |
|----------------------------------|-------|------------|------------------------|--|
| <input type="radio"/> | | M9703A-M10 | 1 GB, 64 MS/channel | Included in base configuration of M9703A |
| <input type="radio"/> | | M9703A-M40 | 4 GB, 256 MS/channel | |
| <input checked="" type="radio"/> | Qty 1 | M9703A-M16 | 16 GB, 1024 MS/channel | |

Step 6. Add specification optimization

Increases dynamic range

- | | | | |
|-----------------------|--|------------|-----------------------------------|
| <input type="radio"/> | | M9703A-FRF | High frequency specs optimization |
|-----------------------|--|------------|-----------------------------------|

B. Configure the M9362AD01 PXIe quad downconverter (occupies 3 PXIe slots)

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated below.

Step 1. Start with M9362AD01 base configuration (add and configure two M9362AD01 for each M9703A)

- Qty 2 The M9362AD01 includes:
 Number of downconverter channels: 4 each
 Bandwidth: 1.5 GHz
 Software, example programs, and product information on CD
 Return to Keysight warranty 3 years

Step 2. Choose frequency range

- | | | | |
|----------------------------------|-------|---------------|-------------------|
| <input checked="" type="radio"/> | Qty 2 | M9362AD01-F26 | 10 MHz – 26.5 GHz |
| <input type="radio"/> | | M9362AD01-F40 | 10 MHz – 40 GHz |

C. Add the M9352A PXIe hybrid IF amplifier/attenuator (occupies 1 PXIe slot)

Step 1. Add one M9352A-H01 amplifier for each M9362AD01 quad downconverter

- | | | |
|----------------------------------|-------|---|
| <input checked="" type="radio"/> | Qty 2 | The M9352A-H01 includes:
Number of amplifier channels: 4 each
Bandwidth: 1 GHz
Software, example programs, and product information on CD
Return to Keysight warranty 1 year |
|----------------------------------|-------|---|

D. Select and configure the LO for the M9362AD01 PXIe quad downconverter

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated below. Not all N5183B or E8257D product options are shown below. See www.keysight.com/find/N5183B or www.keysight.com/find/E8257D for more detail.

Step 1. Select LO base configuration

- | | | | |
|----------------------------------|-------|---------------------------------------|--|
| <input checked="" type="radio"/> | Qty 1 | N5183B MXG microwave signal generator | Standard product includes installation guide, electronic documentation set (CD-ROM), adapters, country specific power cord and return to Keysight 3 year warranty. |
| <input type="radio"/> | | E8257D PSG microwave signal generator | |
| <input type="radio"/> | | Other microwave signal generator | |

Step 2. Choose frequency range

For N5183B:

- | | | | |
|----------------------------------|-------|------------|------------------|
| <input type="radio"/> | | N5183B-520 | 9 kHz – 20 GHz |
| <input checked="" type="radio"/> | Qty 1 | N5183B-532 | 9 kHz – 31.8 GHz |
| <input type="radio"/> | | N5183B-540 | 9 kHz – 40 GHz |

For E8257D:

- | | | | |
|-----------------------|--|------------|------------------|
| <input type="radio"/> | | E8257D-520 | 9 kHz – 20 GHz |
| <input type="radio"/> | | E8257D-532 | 9 kHz – 31.8 GHz |
| <input type="radio"/> | | E8257D-540 | 9 kHz – 40 GHz |

Step 3. Select other options as needed

For N5183B:

- | | | | |
|----------------------------------|-------|------------|--------------------------|
| <input type="radio"/> | | N5183B-1E1 | Step attenuator |
| <input type="radio"/> | | N5183B-1EA | High output power |
| <input checked="" type="radio"/> | Qty 1 | N5183B-UNY | Low phase noise |
| <input type="radio"/> | | N5183B-UNZ | Fast frequency switching |

For E8257D:

- | | | | |
|-----------------------|--|------------|--------------------------------|
| <input type="radio"/> | | E8257D-1E1 | Step attenuator |
| <input type="radio"/> | | E8257D-1EA | High output power |
| <input type="radio"/> | | E8257D-UNX | Ultra-low phase noise |
| <input type="radio"/> | | E8257D-UNY | Enhanced ultra-low phase noise |

E. Select and configure a RF/microwave source for antenna calibration

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated ● below. Not all N5183B or E8257D product options are shown below. See www.keysight.com/find/N5183B or www.keysight.com/find/E8257D for more detail.

Step 1. Select source base configuration			
<input checked="" type="radio"/>	Qty 1	N5183B MXG microwave signal generator	Standard product includes installation guide, electronic documentation set (CD-ROM), adapters, country specific power cord and return to Keysight 3 year warranty.
<input type="radio"/>		E8257D PSG microwave signal generator	
<input type="radio"/>		Other microwave signal generator	
Step 2. Choose frequency range			
For N5183B:			
<input type="radio"/>		N5183B-520	9 kHz – 20 GHz
<input checked="" type="radio"/>	Qty 1	N5183B-532	9 kHz – 31.8 GHz
<input type="radio"/>		N5183B-540	9 kHz – 40 GHz
For E8257D:			
<input type="radio"/>		E8257D-520	9 kHz – 20 GHz
<input type="radio"/>		E8257D-532	9 kHz – 31.8 GHz
<input type="radio"/>		E8257D-540	9 kHz – 40 GHz
Step 3. Select other options as needed			
For N5183B:			
<input type="radio"/>		N5183B-1E1	Step attenuator
<input type="radio"/>		N5183B-1EA	High output power
<input checked="" type="radio"/>	Qty 1	N5183B-UNY	Low phase noise
<input checked="" type="radio"/>	Qty 1	N5183B-UNZ	Fast frequency switching
<input type="radio"/>		1CM010A	2U rack mount kit
For E8257D:			
<input type="radio"/>		E8257D-1E1	Step attenuator
<input type="radio"/>		E8257D-1EA	High output power
<input type="radio"/>		E8257D-UNX	Ultra-low phase noise
<input type="radio"/>		E8257D-UNY	Enhanced ultra-low phase noise
<input type="radio"/>		1CM014A	4U rack mount kit

F. Select and configure AXIe chassis

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated ● below. Not all M9502A and M9505A product options are shown below. See www.keysight.com/find/M9502A or www.keysight.com/find/M9505A for more detail.

Step 1. Select AXIe chassis to fit number of M9703A AXIe digitizers selected		
<input checked="" type="radio"/>	Qty 1	The M9502A AXIe chassis (supports up to 2 M9703As for a total of 16 channels) includes: Number of AXIe slots: 2 AXIe filler module Software, example programs, and product information on CD Return to Keysight warranty 3 years
<input type="radio"/>		The M9505A AXIe chassis (supports up to 5 M9703As for a total of 40 channels) includes: Number of AXIe slots: 5 AXIe filler modules Software, example programs, and product information on CD Return to Keysight warranty 3 years
<input type="radio"/>		The M9514A AXIe chassis (supports up to 13 M9703As for a total of 104 channels) includes: Number of AXIe slots: 13 Software, example programs, and product information on CD Return to Keysight warranty 3 years AXIe filler modules must be ordered separately
Step 2. Select rack mount hardware (optional)		
<input type="radio"/>	Y1225A	Rack mount kit for M9502A
<input type="radio"/>	Y1226A	Rack mount kit for M9505A
<input type="radio"/>	Y1229A	Rack mount kit for M9514A
Step 3. Select AXIe filler modules for M9514A (required if using M9514A)		
Order one filler module for each empty slot		
<input type="radio"/>	Y1221A	AXIe filler module: single slot
Step 4. Select power cable for M9514A (required if using M9514A)		
<input type="radio"/>	Y1235A	1-phase without neutral, 250 VAC, NEMA L6-30
<input type="radio"/>	Y1236A	3-phase WYE with neutral, 240/415 VAC, IEC 60309
<input type="radio"/>	Y1237A	3-phase DELTA with neutral, 250 VAC, NEMA L15-30
<input type="radio"/>	Y1238A	3-phase WYE with neutral, unterminated

G. Select and configure PXIe chassis (17 instrument slots)

Recommended options for Multi-Channel Antenna Calibration, Reference Solution indicated below. Not all M9018A product options are shown below. See www.keysight.com/find/M9018A for more detail.

Step 1. Select PXIe chassis to fit number of slots required for attenuators and downconverters selected		
<input checked="" type="radio"/>	Qty 1	The M9018A PXIe chassis includes: Standard (non-EMC) PXI blank filler panel kit Software, example programs, and product information on CD Return to Keysight warranty 3 years
Step 2. Select rack mount kit (optional)		
<input type="radio"/>	Y1215B	Flush mount kit for M9018A
<input type="radio"/>	Y1216A	Recess mount kit for M9018A
<input type="radio"/>	Y1217A	Rack rail kit for M9018A
Step 3. Select EMC filler panels (optional)		
<input type="radio"/>	Y1213A	PXI EMC filler panel kit - 5 slots

H. Select and configure embedded or external controller (PC host)

Select one of the following: M9037A (H1), M9536A (H2), or external PC (H3)

H1. For M9037A high-performance PXIe embedded controller (occupies 1 PXIe system slot)¹

Recommended options for Multi-Channel Antenna Calibration, Reference Solution that includes both an AXIe and PXIe chassis, indicated below. See www.keysight.com/find/pxie-multichassis for alternate configuration methods.

Step 1. Select M9037A PXIe embedded controller		
<input checked="" type="radio"/>	Qty 1	The M9037A includes: Intel i7-4700EQ quad-core processor, 2.4 GHz, 8 thread, 4 GB RAM and 240 GB SSD Two DisplayPort, four USB 2.0, two USB 3.0, GP-IB, two Ethernet, PXI Trigger Front Panel x8 PCIe for connecting a second PXIe or AXIe chassis Software, example programs, and product information on CD Return to Keysight warranty 3 years
Step 2. Choose memory		
<input type="radio"/>		M9037A-M04 Standard 4 GB
<input checked="" type="radio"/>	Qty 1	M9037A-M08 Memory upgrade from 4 GB to 8 GB RAM
<input type="radio"/>		M9037A-M16 Memory upgrade from 4 GB to 16 GB RAM
Step 3. Choose an operating system		
<input type="radio"/>		M9037A-WE3 Microsoft Windows Embedded Standard 7 (32-bit)
<input checked="" type="radio"/>	Qty 1	M9037A-WE6 Microsoft Windows Embedded Standard 7 (64-bit)
Step 4. Select accessories (optional)		
<input type="radio"/>		Y1206A USB keyboard and mouse
<input type="radio"/>		Y1260A GP-IB cable
<input type="radio"/>		Y1262A DisplayPort cable
<input type="radio"/>		Y1264A Spare SSD with carrier: WES 7/32
<input type="radio"/>		Y1265A Spare SSD with carrier: WES 7/64

H2. For M9536A AXIe embedded controller (occupies slot #1 of the AXIe chassis)

Recommended options for Multi-Channel Antenna Calibration, Reference Solution that only uses an AXIe chassis (with no PXIe chassis), indicated below.

Step 1. Select M9536A AXIe embedded controller		
<input type="radio"/>		The M9536A includes: Intel Xeon L5518 quad-core processor, 2.13 GHz, 8 GB RAM and 160 GB SSD One VGA, three USB 2.0, two Ethernet, serial port Software, example programs, and product information on CD Return to Keysight warranty 3 years
Step 2. Upgrade memory (optional)		
<input type="radio"/>		M9536A-M16 Memory upgrade from 8 GB to 16 GB RAM
Step 3. Choose an operating system		
<input type="radio"/>		M9536A-WE3 Microsoft Windows Embedded Standard 7 (32-bit)
<input checked="" type="radio"/>	Qty 1	M9536A-WE6 Microsoft Windows Embedded Standard 7 (64-bit)
Step 4. Select accessories (optional)		
<input type="radio"/>		Y1206A USB keyboard and mouse
<input type="radio"/>		Y1207A Spare SSD: WES 7/32
<input type="radio"/>		Y1208A Spare SSD: WES 7/64

1. The M9037A embedded controller occupies the M9018A system slot and the empty space to the left of the system slot.

H3. For an external controller ²

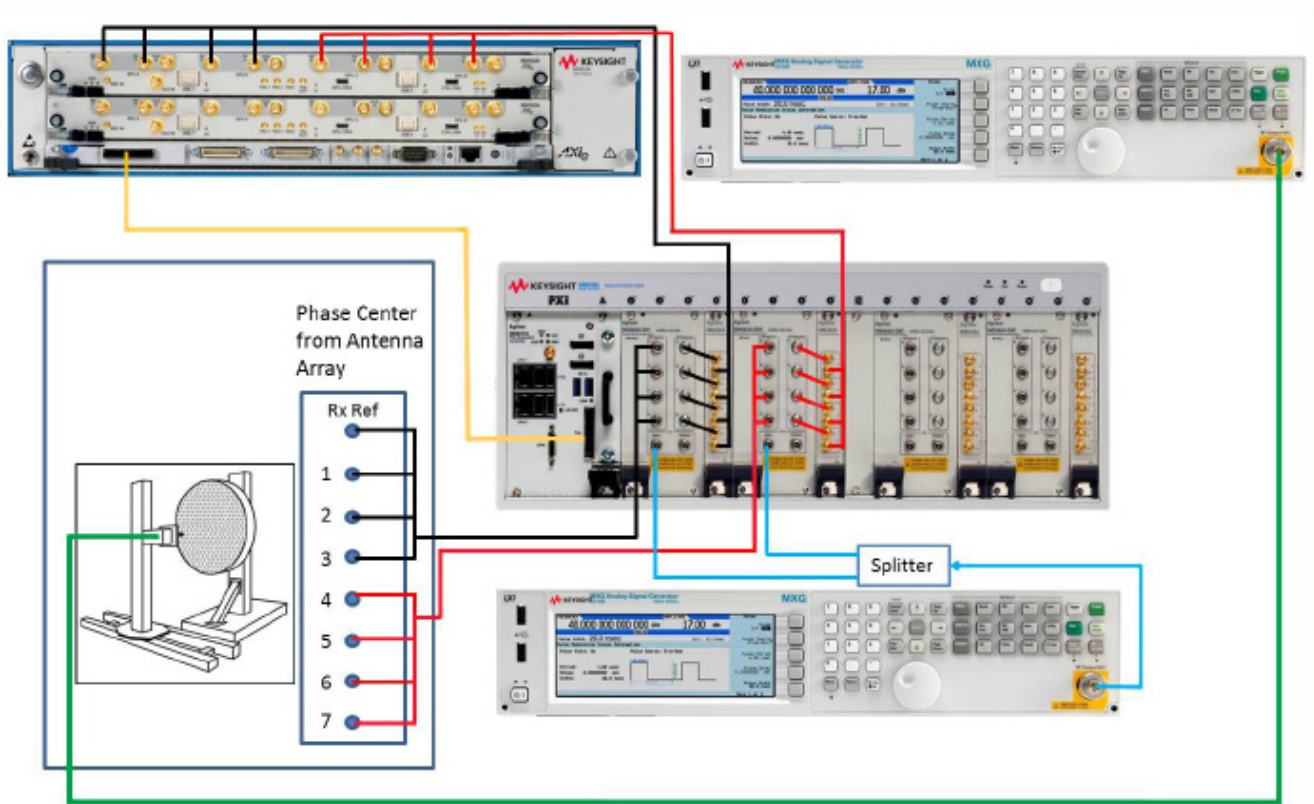
It is recommended that the external PC controller have at least two PCIe slots, one for each primary chassis (AXIe and PXIe). See www.keysight.com/find/pxie-multichassis for alternate configuration methods.

Step 1. Select external PC		
<input type="radio"/>		Select external PC with quad core processor, 8 GB RAM, Windows 7 64-bit, recommended
Step 2. Select hardware for AXIe chassis		
<input type="radio"/>	M9048A	PCIe desktop adaptor
<input type="radio"/>	Y1202A	2m PCIe cable
Step 3. Select hardware for PXIe chassis		
<input type="radio"/>	M9048A	PCIe desktop adaptor
<input type="radio"/>	Y1202A	2m PCIe cable
<input type="radio"/>	M9021A	PCIe cable interface (installed in PXIe system slot)

I. Select solution start-up kit and example software

Step 1. Choose solution level start-up kit and example software			
<input checked="" type="radio"/>	Qty 1	Y1299A-003	Multi-channel antenna calibration, reference solution kit Includes documentation and example software

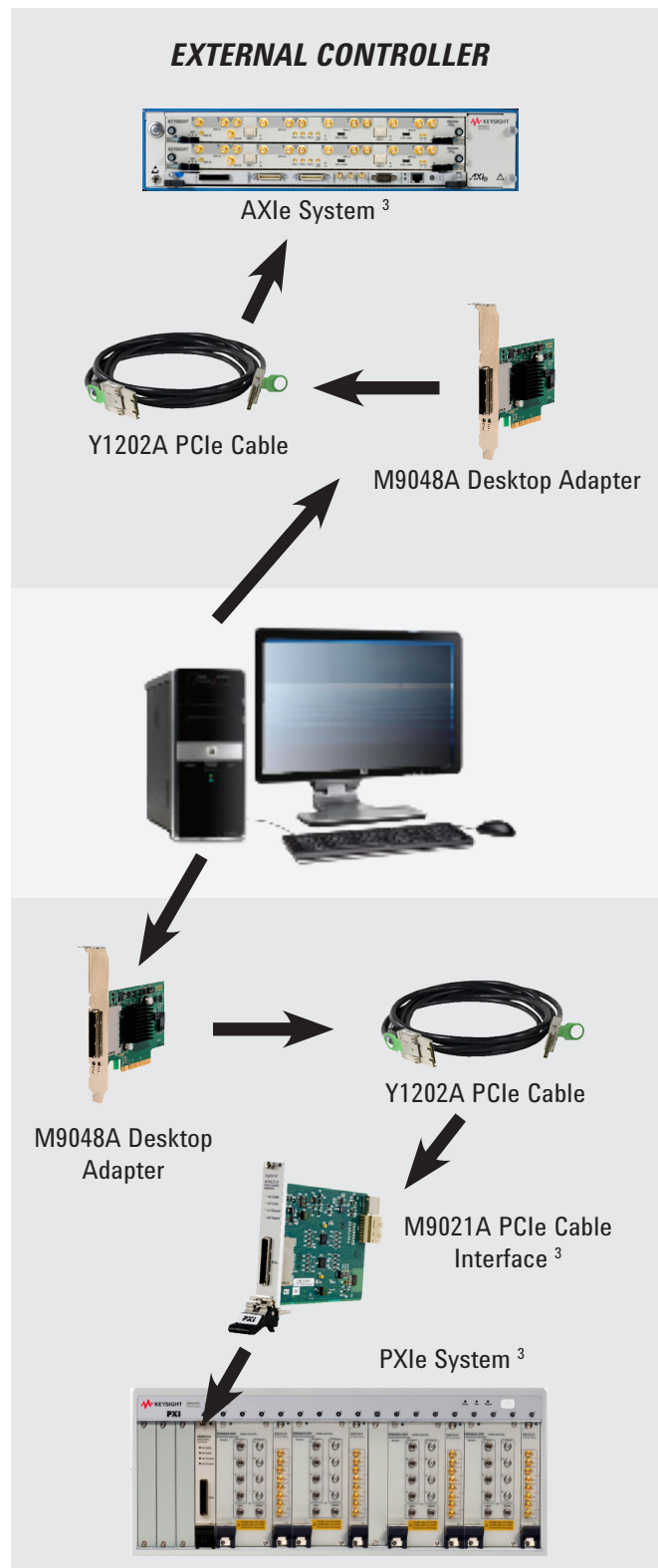
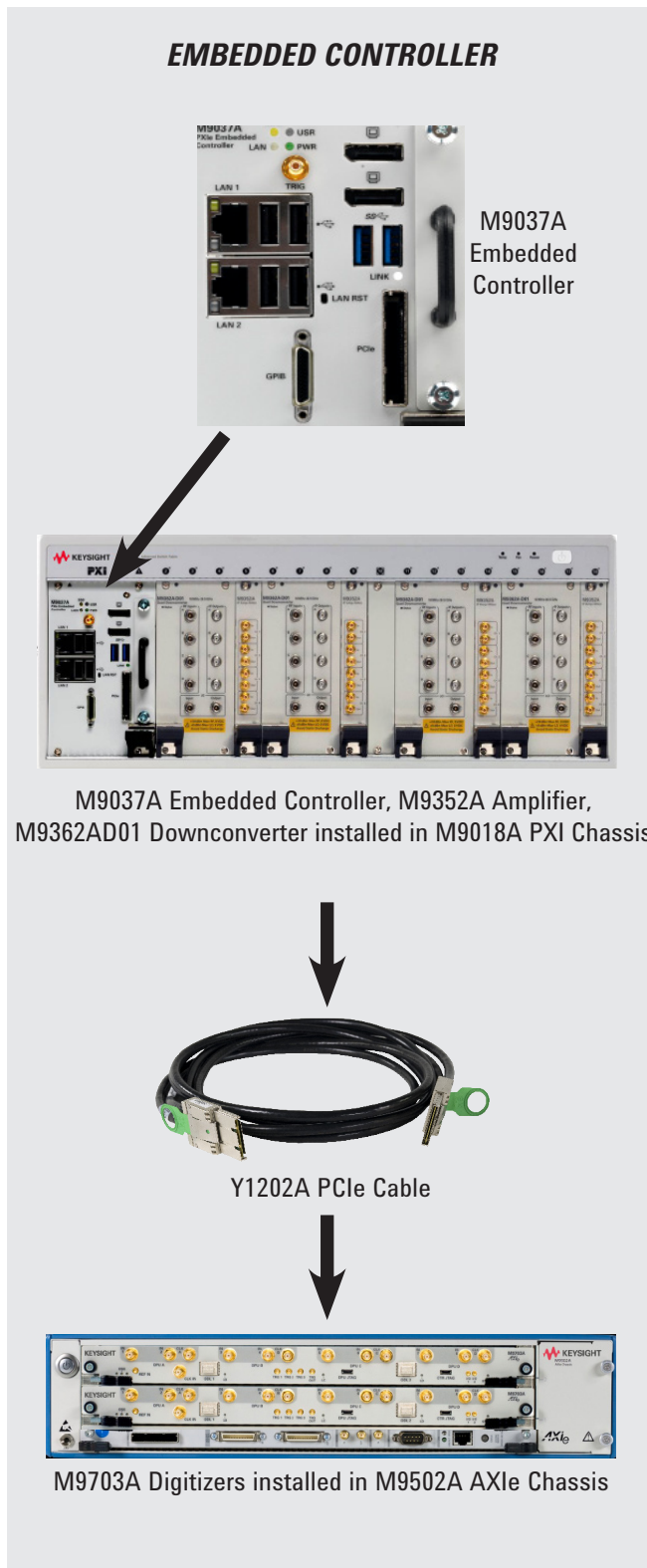
J. Reference solution block diagram



2. For a list of qualified external controllers, please see Tested Computer List Technical Note, literature number 5990-7632EN. See physical connection diagram on page 9.

K. Physical computer and PCIe connections

See multi-chassis configuration website for alternate configuration methods or if multiple PXIe chassis are required www.keysight.com/find/pxie-multichassis



3. An external controller may be used to connect to an AXIe or AXIe and PXIe chassis. If connecting to both, two M9048A desktop adapter modules and Y1202A cables will be needed. Other configurations are possible. See www.keysight.com/find/pxie-multichassis for more information.

L. Select services

●	R-51B-001-C	Return to Keysight warranty - 1 year	Included with M9352A, M9048A
●	R-51B-001-3Z	Return to Keysight warranty - 3 years	Included with E8257D, M9018A, M9021A, M9037A, M9362AD01, M9502A, M9505A, M9536A, M9703A, N5183B
○	R-51B-001-5Z	Return to Keysight warranty - 5 years	Available for E8257D, M9018A, M9021A, M9037A, M9362AD01, M9502A, M9505A, M9536A, M9703A, N5183B
○	E8257D-UK6	Commercial calibration certificate with test data	Calibration certificate with measurement results available only at time of purchase.
○	M9703A-UK6	Commercial calibration certificate with test data	Calibration certificate with measurement results available only at time of purchase.
○	N5183B-UK6	Commercial calibration certificate with test data	Calibration certificate with measurement results available only at time of purchase.
○	R-51B-001-3X	Express warranty - 5 day turnaround For 3 years	Available for M9018A in the US, Japan, China and many EU countries
○	R-51B-001-5X	Express warranty - 5 day turnaround For 5 years	Available for M9018A in the US, Japan, China and many EU countries

Global warranty

Keysight Technologies, Inc. provides the peace of mind that today's high tech industry requires. Your investment is protected by Keysight's global reach in more than 100 countries (either directly or through distributors). The warranty gives you convenient standard coverage for the country in which the product is used, eliminating the need to ship equipment back to the country of purchase. Keysight's warranty service provides:

- All parts and labor necessary to return your investment to full specified performance
- Recalibration for products supplied originally with a calibration certificate
- Return shipment

Express warranty

Reduce downtime with the fastest repair service in the industry. The express warranty upgrades the global warranty to provide:

- 5 day typical turnaround repair service in the US, Japan, China and many EU countries or up to a 10 day improvement in turnaround time in the rest of the world
- Priority return shipment

Calibration services

The modular products are factory calibrated and shipped with an ISO-9002, NIST-traceable calibration certificate. A one year calibration cycle is recommended.

Product Information: www.keysight.com/find/contactus

Or call: 1 800 829-4444 US

Repair and Calibration: www.keysight.com/find/infoline

For all modular products: www.keysight.com/find/modular

M. Related literature

For more detailed product and specification information refer to the following literature and web pages:

- Multi-channel antenna calibration, reference solution brochure (literature no. **5991-4537EN**)
- Tested computer list technical note (literature no. **5990-7632EN**)
- Increase multi-antenna array test throughput with the Keysight M9703A digitizer application brief (literature no. **5991-1351EN**)
- How to use the M9703A digitizer-based solution to perform multi-antenna array measurements application note (literature no. **5991-2543EN**).
- E8257D Microwave analog signal generator data sheet (literature no. **5989-0698EN**)
- M9018A PXIe 18-slot chassis data sheet (literature no. **5990-6583EN**)
- M9037A PXIe high-performance embedded controller data sheet (literature no. **5991-3661EN**)
- M9048A PCIe desktop PC adaptor flyer (literature no. **5991-0356EN**)
- M9352A PXI hybrid amplifier/attenuator data sheet (literature no. **5990-9964EN**)
- M9362AD01 PXI quad downconverter data sheet (literature no. **5990-9968EN**)
- M9502A/M9505A AXIe 2 and 5 slot chassis data sheet (literature no. **5990-6584EN**)
- M9514A AXIe 14 slot chassis data sheet (literature no. **5991-3980EN**)
- M9536A AXIe embedded controller data sheet (literature no. **5990-7756EN**)
- M9703A AXIe high-speed digitizer data sheet (literature no. **5990-8507EN**)
- N5183B Microwave analog signal generator data sheet (literature no. **5991-3131EN**)

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www.keysight.com/find/modular

www.keysight.com/find/solution-mac

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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Germany	0800 6270999
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United Kingdom	0800 0260637

For other unlisted countries:
www.keysight.com/find/contactus
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