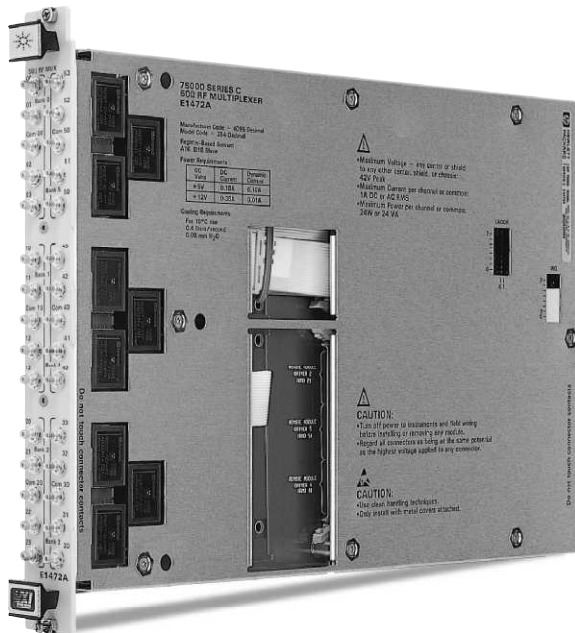


# Agilent E1472A

## Six 1x4, 50 $\Omega$ RF Multiplexer

### Data Sheet

- 1-Slot, C-size, register based
- Six 1x4 multiplexers
- Switch signals up to 1.3 GHz
- SMB male connectors for high performance
- Controls E1473A/E1475A RF expanders
- Tree-switching for high isolation, low VSWR



Agilent E1472A

## Description

The Agilent E1472A 50  $\Omega$  RF Multiplexer is a **C-size, 1-slot, register-based VXI module**. It is the ideal choice to route test signals from your application to your test instruments (i.e., oscilloscope and spectrum, network, distortion analyzers, or other RF equipment). The E1472A is functionally identical to the E1474A except for output impedance.

The RF multiplexer can be used as six multiplexers or combined with others to form a larger tree-switched multiplexer or a limited stubless matrix. You can easily and inexpensively expand the E1472A via the E1473A 50 $\Omega$  RF multiplexer expander or via the E1475A 75 $\Omega$  RF multiplexer expander.

The E1472A can easily be programmed with SCPI commands to scan multiple channels, where each channel is switched to its common, one at a time. This module is arranged as six independent banks of channels (Bank 0 through Bank 5), each acting as a 1x4 one-wire multiplexer. Only one channel in each bank can be connected to its common at any time. The multiplexer relays are arranged in a tree-switched configuration, providing high isolation and low VSWR. Each channel consists of a nonlatching armature relay.

Refer to the Agilent Technologies Website for instrument driver availability and downloading instructions, as well as for recent product updates, if applicable.



**Agilent Technologies**  
Innovating the HP Way

## Configuration

Each channel consists of a non-latching armature relay. At power-on or reset, channels 00, 10, ... 50 are connected to COM 00, 10, ... 50, respectively, and all other channels are open (unterminated).

The RF multiplexer can be used as six multiplexers or combined with others to form a larger tree-switched multiplexer or a limited stubless matrix as shown in the accompanying diagram.

To expand the E1472A refer to the E1473A 50Ω RF multiplexer expander or the E1475A 75Ω RF multiplexer expander. The E1472A can control other external relays requiring 5V, 12V, or 24V drive.

## Cables and Connectors

Various 50 Ω cables are available from Agilent for connecting to the SMB connectors on the front panel of the multiplexer. Adapters and other connectors are also available. Connectors are also available from Johnson Components.

Johnson Components:

U.S.A. Tel.: 1-800-247-8256  
Outside U.S.A. Tel.: (507) 835-6222  
Fax.: (507) 835-8356

## Product Specifications

### Input

Maximum voltage (center or shield-to-center, shield or chassis): 42 V

Maximum current (per channel or common):

DC: 1 A  
AC rms: 1 A

Maximum power (per channel or common):

DC: 24 W  
AC: 24 VA

### DC

Maximum thermal offset: 6 μV

Closed channel resistance (typical): <1 Ω initial

Insulation resistance (between any two terminals): >10E8 Ω ≤40 °C, ≤65% RH

### AC

Note: For AC performance,  $Z_L = Z_S = Z_0$ , ≤40 °C, RH ≤95% for C-size, RH ≤65% for B-size

Characteristic impedance (Z<sub>0</sub>): 50 Ω

Insertion loss:

<10 MHz: <0.1 dB  
<100 MHz: <0.4 dB  
<500 MHz: <0.9 dB  
<1.3 GHz: <1.5 dB  
<3 GHz (typ): <8.0 dB

Crosstalk (channel-to-channel):

<10 MHz: <-90 dB  
<100 MHz: <-80 dB

Crosstalk (channel-to-channel, one channel closed or channel-to-common) (terminated):

<200 MHz: n/a  
<500 MHz: <-62 dB  
<1.3 GHz: <-50 dB  
<3 GHz (typ): n/a

VSWR:

<10 MHz: <1.05  
<100 MHz: <1.15  
<200 MHz: n/a  
<500 MHz: <1.35  
<1.3 GHz: <1.5  
<3 GHz: n/a

Risetime: <300 ps

Signal delay: <3 ns

Capacitance:

Center-shield: n/a  
Chassis-shield: n/a

### General Characteristics

Relays: Non-latching armature

Power up/down state: All open

Minimum relay life:

No load: 5x10E6 operations  
Rated load: 10E5 operations

### General Specifications

#### VXI Characteristics

VXI device type: Register based, A16, slave only

Size: C

Slots: 1

Connectors: P1/2

Shared memory: None

VXI busses: None

C-size compatibility: n/a

## Instrument Drivers

See the Agilent Technologies Website ([http://www.agilent.com/find/inst\\_drivers](http://www.agilent.com/find/inst_drivers)) for driver availability and downloading.

Command module firmware:	Downloadable
Command module firmware rev:	A.02
I-SCPI Win 3.1:	Yes
I-SCPI Series 700:	Yes
C-SCPI LynxOS:	Yes
C-SCPI Series 700:	Yes
Panel Drivers:	Yes
VXI plug&play Win Framework:	Yes
VXI plug&play Win95/NT Framework:	Yes
VXI plug&play HP-UX Framework:	No

## Module Current

	$I_{PM}$	$I_{DM}$
+5 V:	0.1	0.1
+12 V:	0.36	0.01
-12 V:	0	0
+24 V:	0	0
-24 V:	0	0
-5.2 V:	0	0
-2 V:	0	0

## Cooling/Slot

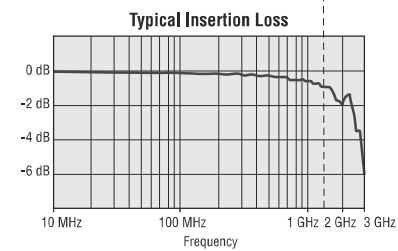
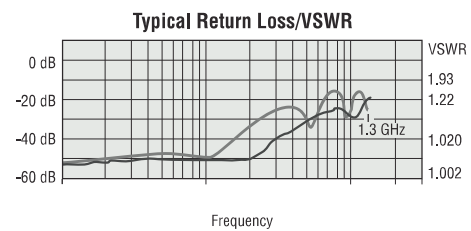
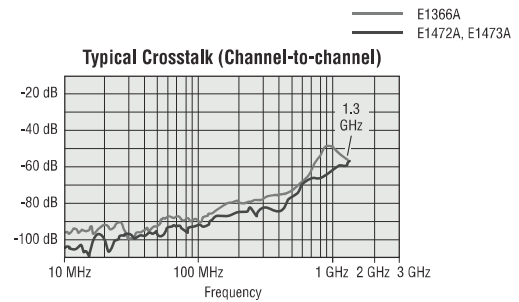
Watts/slot:	6.00
$\Delta P$ mm H <sub>2</sub> O:	0.10
Air Flow liter/s:	0.50

## Ordering Information

Description	Product No.
Six 1x4 50 $\Omega$ RF Multiplexer	E1472A
Service Manual	E1472A 0B3
3 yr. Retn. to Agilent to 1 yr. OnSite Warr.	E1472A W01



Agilent E1472A front panel detail



## Related Literature

*2000 Test System and VXI Catalog CD-ROM*,  
Agilent Pub. No. 5980-0308E (detailed specifications for VXI products)

*2000 Test System and VXI Catalog*,  
Agilent Pub. No. 5980-0307E (overview of VXI products )

*1998 Test System and VXI Products Data Book*,  
Agilent Pub. No. 5966-2812E

## Online

Internet access for Agilent product information, services and support  
[www.agilent.com/find/tmdir](http://www.agilent.com/find/tmdir)

VXI product information  
[www.agilent.com/find/vxi](http://www.agilent.com/find/vxi)

Defense Electronics Applications  
[www.agilent.com/find/defense\\_ATE](http://www.agilent.com/find/defense_ATE)

Agilent Technologies VXI Channel Partners  
[www.agilent.com/find/vxichanpart](http://www.agilent.com/find/vxichanpart)

Agilent Technologies' HP VEE Application Website  
[www.agilent.com/find/vee](http://www.agilent.com/find/vee)

Agilent Technologies Data Acquisition and Control Website  
[www.agilent.com/find/data\\_acq](http://www.agilent.com/find/data_acq)

Agilent Technologies Instrument Driver Downloads  
[www.agilent.com/find/inst\\_drivers](http://www.agilent.com/find/inst_drivers)

Agilent Technologies Electronics Manufacturing Test Solutions  
[www.agilent.com/go/manufacturing](http://www.agilent.com/go/manufacturing)

**Get assistance with all your test and measurement needs at  
[www.agilent.com/find/assist](http://www.agilent.com/find/assist)  
or check your local phone book for the Agilent office  
near you.**

## Agilent Technologies' test and measurement service/support commitment

Agilent strives to maximize the value our test and measurement products give you, while minimizing your risk and service/support problems. We work to ensure that each product is realistically described in the literature, meets its stated performance and functionality, has a clearly stated global warranty, and is supported at least five years beyond its production life. Our extensive self-help tools include many online resources ([www.agilent.com](http://www.agilent.com)).

Experienced Agilent test engineers throughout the world offer practical recommendations for product evaluation and selection. After you purchase an Agilent product, they can provide no-charge assistance with operation verification and basic measurement setups for advertised capabilities. To enhance the features, performance, and flexibility of your test and measurement products—and to help you solve application challenges—Agilent offers free or extra-cost product options and upgrades, and sell expert engineering, calibration, and other consulting services.

### Phone and fax

United States:  
Agilent Technologies  
(tel) 1 800 452 4844

Canada:  
Agilent Technologies Canada Inc.  
(tel) 1 877 894 4414

Europe:  
Agilent Technologies  
Test & Measurement  
European Marketing Organisation  
(tel) (31 20) 547 2000

Japan:  
Agilent Technologies Japan Ltd.  
(tel) (81) 426 56 7832  
(fax) (81) 426 56 7840

Latin America:  
Agilent Technologies  
Latin American Region Headquarters, U.S.A.  
(tel) (305) 267 4245  
(fax) (305) 267 4286

Australia/New Zealand:  
Agilent Technologies Australia Pty Ltd.  
(tel) 1 800 629 485 (Australia)  
(fax) (61 3) 9272 0749  
(tel) 0 800 738 378 (New Zealand)  
(fax) (64 4) 802 6881

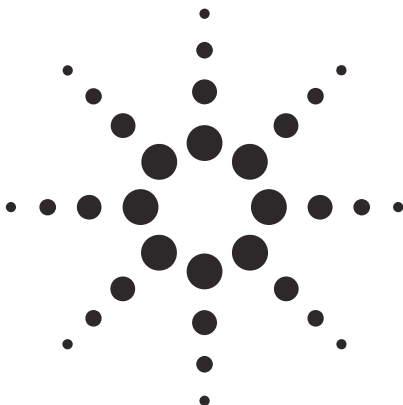
Asia Pacific:  
Agilent Technologies, Hong Kong  
(tel) (852) 3197-7777  
(fax) (852) 2506-9284

Data Subject to Change  
© Agilent Technologies 2000  
Printed in the U.S.A. 04/2000  
Publication No.: 5965-5611E



**Agilent Technologies**

Innovating the HP Way

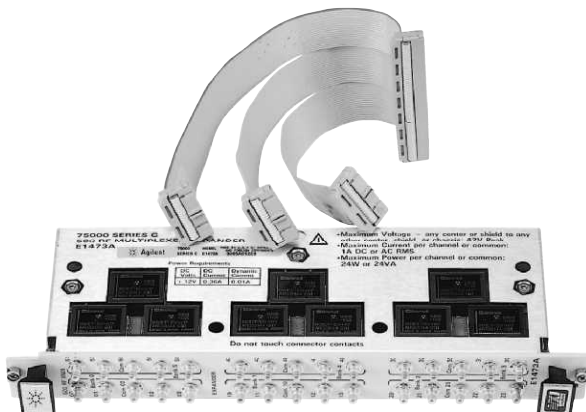


# Agilent E1473A

## Six 1x4, 50 $\Omega$ RF Multiplexer Expander

### Data Sheet

- 1-Slot, C-size, register based
- Six 1x4 multiplexers
- Switch signals up to 1.3 GHz
- SMB male connectors for high performance
- Requires the E1472A/E1474A RF MUXes
- Can be externally mounted up to 8 meters away



Agilent E1473A

## Description

The Agilent E1473A 50 $\Omega$  RF Multiplexer Expander is a **C-size, 1-slot, register-based VXI module**. It is the ideal choice to inexpensively increase system switching capacity to switch test signals from your application to your test instruments such as oscilloscope and spectrum, network, distortion analyzers, or other RF equipment.

The E1473A expander is connected to, and requires, either an E1472A or E1474A RF multiplexer in the same system. Up to two E1473A multiplexer expanders can be connected to one multiplexer, providing a total of eighteen 1x4 multiplexer banks. You can mix and match the E1473A 50 $\Omega$  and E1475A 75 $\Omega$  expanders with the E1472A 50 $\Omega$  and E1474A 75 $\Omega$  multiplexers.

Refer to the Agilent Technologies Website for instrument driver availability and downloading instructions, as well as for recent product updates, if applicable.

## Configuration

The Agilent E1473A can be installed in a VXI C-size slot, adjacent to the E1472A (or E1474A), or rack mounted externally up to eight meters from the VXI mainframe using remote extender cables. The adjacent slot can be used by another module, making the multiplexer expander a slotless device. Remote installation of the E1473A expander close to the device under test allows the test cable length to be kept as short as possible, reducing signal delay and insertion loss.



If the expander is to be physically located away from the mainframe, order the Cable Extension Kit (P/N E1473-80002). Each kit includes two 0.8 meter cables, each controlling three of the six expander banks. Up to ten extender cables can be daisy-chained. Therefore, to remotely install one E1473A expander at a distance of eight meters, controlling all six multiplexer banks, requires ten E1473-80002 kits.

The switching sections of the E1473A 50  $\Omega$  RF multiplexer expander and the E1472A 50  $\Omega$  RF multiplexer are identical. Only one channel in each bank can be connected to its common at any time. The multiplexer relays are arranged in a tree-switched configuration, providing high isolation and low VSWR. Each channel consists of a nonlatching armature relay. At power-on or reset, channels 00, 10, . . . 50 are connected to COM 00, 10, . . . 50, respectively, and all other channels are open (unterminated).

## Cables and Connectors

Various 50  $\Omega$  cables are available from Agilent for connecting to the SNB connectors on the front panel of the multiplexer. Adapters and other connectors are also available. Connectors are also available from Johnson Components:

U.S.A. Tel.: 1-800-247-8256  
 Outside U.S.A. Tel.: (507) 835-6222  
 Fax.: (507) 835-8356

## Product Specifications

### Input

Maximum voltage (center or shield-to-center, shield or chassis): 42 V

Maximum current (per channel or common):

DC: 1 A  
 AC rms: 1 A

Maximum power (per channel or common):

DC: 24 W  
 AC rms: 24 VA

### DC

Maximum thermal offset: 6  $\mu$ V

Closed channel resistance (typical): <1  $\Omega$  initial

Insulation resistance (between any two terminals): >10E8  $\Omega$   $\leq$ 40  $^{\circ}$ C,  $\leq$ 65% RH

### AC

(Note: For AC performance,  $Z_L=Z_S=Z_O$ ,  $\leq$ 40  $^{\circ}$ C,  $\leq$ 95% for C-size, RH  $\leq$ 65% for B-size)

Characteristic impedance

( $Z_0$ ): 50  $\Omega$

Insertion loss:

<10 MHz: <0.1 dB  
 <100 MHz: <0.4 dB  
 <500 MHz: <0.9 dB  
 <1.3 GHz: <1.5 dB  
 <3 GHz (typ): <8.0 dB

Crosstalk (channel-to-channel):

<10 MHz: <-90 dB  
 <100 MHz: <-80 dB

Crosstalk (channel-to-channel, one channel closed or channel-to-common) (terminated):

<200 MHz: n/a  
 <500 MHz: <-62 dB  
 <1.3 GHz: <-50 dB  
 <3 GHz (typ): n/a

VSWR:

<10 MHz: <1.05  
 <100 MHz: <1.15  
 <200 MHz: n/a  
 <500 MHz: <1.35  
 <1.3 GHz: <1.5  
 <3 GHz: n/a

Risetime:

<300 ps

Signal delay:

<3 ns

Capacitance:

Center-shield: n/a  
 Chassis-shield: n/a

## General Characteristics

Relays: Non-latching armature

Power up/down state: All open

Minimum relay life:

No load: 5x10E6 operations  
 Rated load: 10E5 operations

## General Specifications

### VXI Characteristics

VXI device type: Register based, A16, slave only

Size: C

Slots: 1

Connectors: P1

Shared memory: None

VXI busses: None

C-size compatibility: n/a

## Instrument Drivers

See the Agilent Technologies Website ([http://www.agilent.com/find/inst\\_drivers](http://www.agilent.com/find/inst_drivers)) for driver availability and downloading.

Command module firmware:	Downloadable
Command module firmware rev:	A.02
I-SCPI Win 3.1:	Yes
I-SCPI Series 700:	Yes
C-SCPI LynxOS:	Yes
C-SCPI Series 700:	Yes
Panel Drivers:	Yes, with E1472A
VXI plug&play Win Framework:	Yes
VXI plug&play Win95/NT Framework:	Yes
VXI plug&play HP-UX Framework:	No

## Module Current

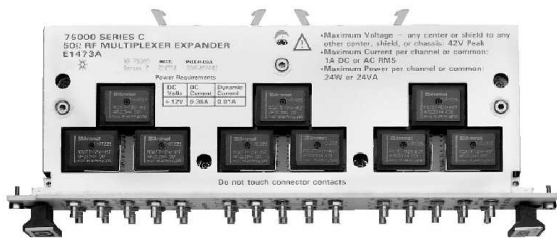
	$I_{PM}$	$I_{DM}$
+5 V:	0	0
+12 V:	0.36	0
-12 V:	0	0
+24 V:	0	0
-24 V:	0	0
-5.2 V:	0	0
-2 V:	0	0

## Cooling/Slot

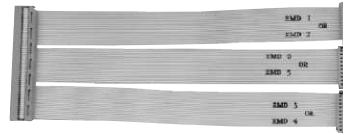
Watts/slot:	1.00
$\Delta P$ mm H <sub>2</sub> O:	0.02
Air Flow liter/s:	0.10

## Ordering Information

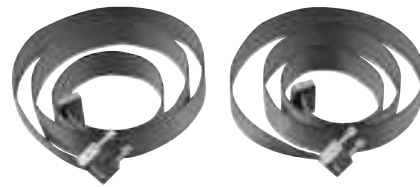
Description	Product No.
Six 1x4 50 $\Omega$ RF Multiplexer Expander	E1473A
Service Manual	E1473A 0B3
3 yr. Retn. to Agilent to 1 yr. OnSite Warr.	E1473A W01
RF MUX Cable Kit for E1473A RF Expander	E1473-80002



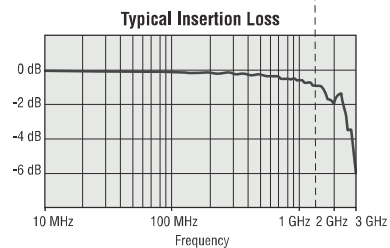
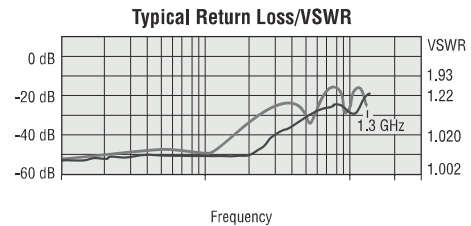
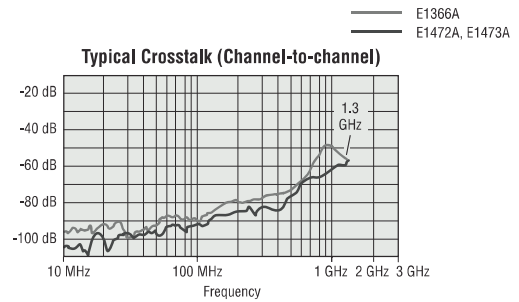
Agilent E1473A expander module top view



Module-to-backplane cables



Remote expander cables



## Related Literature

*2000 Test System and VXI Catalog CD-ROM*,  
Agilent Pub. No. 5980-0308E (detailed specifications for VXI products)

*2000 Test System and VXI Catalog*,  
Agilent Pub. No. 5980-0307E (overview of VXI products )

*1998 Test System and VXI Products Data Book*,  
Agilent Pub. No. 5966-2812E

## Online

Internet access for Agilent product information, services and support  
[www.agilent.com/find/tmdir](http://www.agilent.com/find/tmdir)

VXI product information  
[www.agilent.com/find/vxi](http://www.agilent.com/find/vxi)

Defense Electronics Applications  
[www.agilent.com/find/defense\\_ATE](http://www.agilent.com/find/defense_ATE)

Agilent Technologies VXI Channel Partners  
[www.agilent.com/find/vxichanpart](http://www.agilent.com/find/vxichanpart)

Agilent Technologies' HP VEE Application Website  
[www.agilent.com/find/vee](http://www.agilent.com/find/vee)

Agilent Technologies Data Acquisition and Control Website  
[www.agilent.com/find/data\\_acq](http://www.agilent.com/find/data_acq)

Agilent Technologies Instrument Driver Downloads  
[www.agilent.com/find/inst\\_drivers](http://www.agilent.com/find/inst_drivers)

Agilent Technologies Electronics Manufacturing Test Solutions  
[www.agilent.com/go/manufacturing](http://www.agilent.com/go/manufacturing)

**Get assistance with all your test and measurement needs at  
[www.agilent.com/find/assist](http://www.agilent.com/find/assist)  
or check your local phone book for the Agilent office  
near you.**

## Agilent Technologies' test and measurement service/support commitment

Agilent strives to maximize the value our test and measurement products give you, while minimizing your risk and service/support problems. We work to ensure that each product is realistically described in the literature, meets its stated performance and functionality, has a clearly stated global warranty, and is supported at least five years beyond its production life. Our extensive self-help tools include many online resources ([www.agilent.com](http://www.agilent.com)).

Experienced Agilent test engineers throughout the world offer practical recommendations for product evaluation and selection. After you purchase an Agilent product, they can provide no-charge assistance with operation verification and basic measurement setups for advertised capabilities. To enhance the features, performance, and flexibility of your test and measurement products—and to help you solve application challenges—Agilent offers free or extra-cost product options and upgrades, and sell expert engineering, calibration, and other consulting services.

### Phone and fax

United States:  
Agilent Technologies  
(tel) 1 800 452 4844

Canada:  
Agilent Technologies Canada Inc.  
(tel) 1 877 894 4414

Europe:  
Agilent Technologies  
Test & Measurement  
European Marketing Organisation  
(tel) (31 20) 547 2000

Japan:  
Agilent Technologies Japan Ltd.  
(tel) (81) 426 56 7832  
(fax) (81) 426 56 7840

Latin America:  
Agilent Technologies  
Latin American Region Headquarters, U.S.A.  
(tel) (305) 267 4245  
(fax) (305) 267 4286

Australia/New Zealand:  
Agilent Technologies Australia Pty Ltd.  
(tel) 1 800 629 485 (Australia)  
(fax) (61 3) 9272 0749  
(tel) 0 800 738 378 (New Zealand)  
(fax) (64 4) 802 6881

Asia Pacific:  
Agilent Technologies, Hong Kong  
(tel) (852) 3197-7777  
(fax) (852) 2506-9284

Data Subject to Change  
© Agilent Technologies 2000  
Printed in the U.S.A. 04/2000  
Publication No.: 5965-5615E



**Agilent Technologies**

Innovating the HP Way