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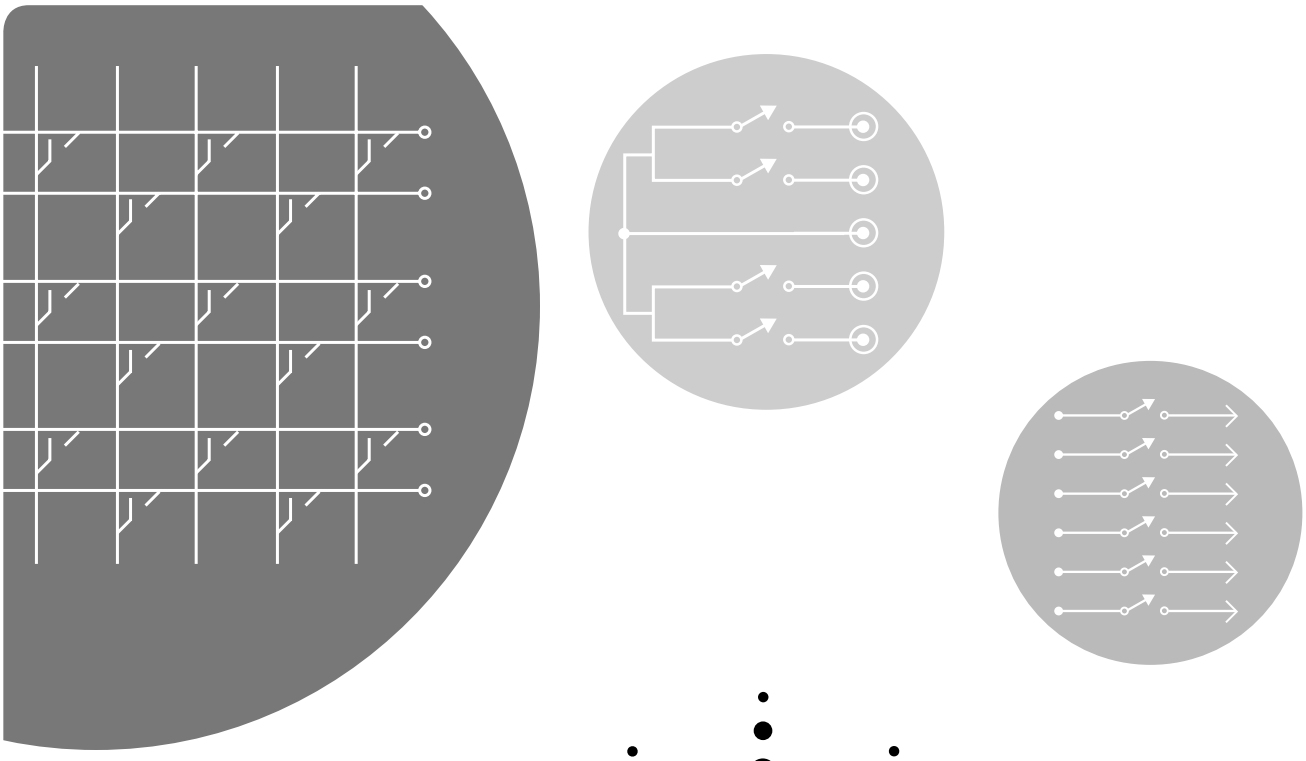
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Defining the Meaning of Quality in ATE

Agilent Technologies
3499 Switch/Control System

Data Sheet

Agilent Technologies

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High speed, high density, highly usable.

The Agilent 3499 gets high marks in ATE environments worldwide.



Performance Overview

There are three modular mainframes in the 3499 family:

- 3499B - two-slots, up to 80 channels
- 3499A - five-slots, up to 200 channels
- 3499C – 9/14 slots, up to 360 channels

The 3499C can accommodate up to nine plug-in modules that can occupy up to fourteen physical slots, thus providing a cost efficient configuration for modules that are one, two or three slots wide. All mainframe configurations of the Agilent can scan at rates up to 350 channels per second, or open/close 200 channels in less than 0.1 second.

You can choose from different plug-in modules to switch:

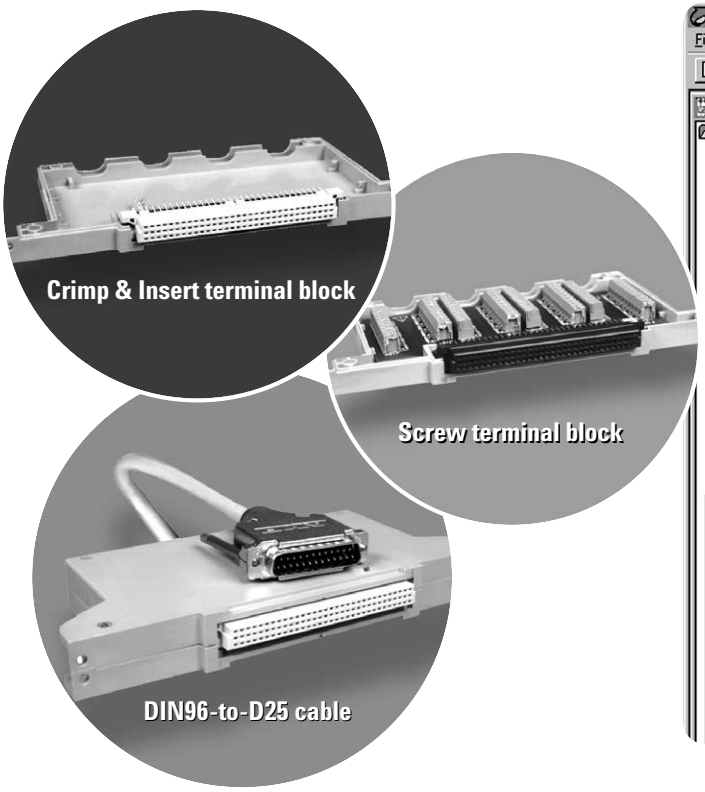
- electronic signals from DC to 20 GHz,
- voltages to 1,000 V, or currents to 8 A
- optical signals from 1270 to 1670 nm

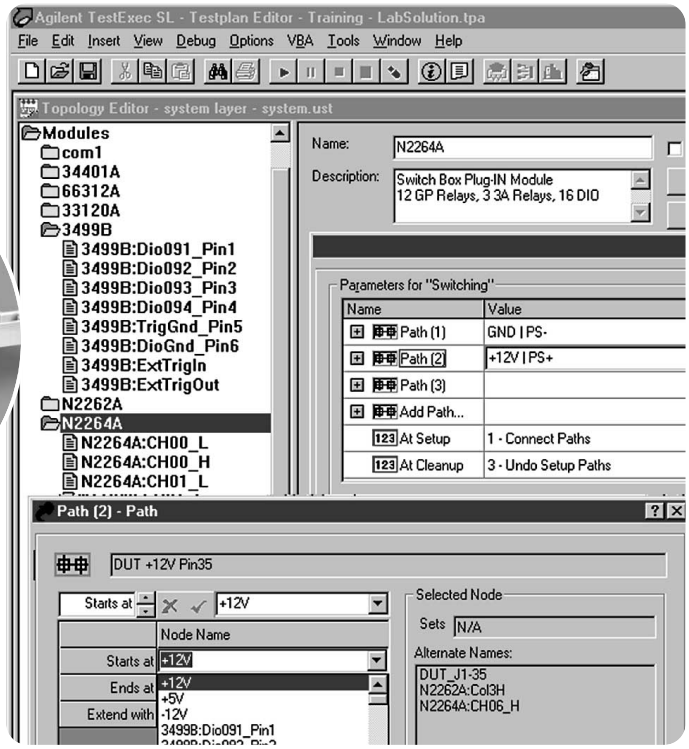
All units have an efficient user interface that works equally well on the manufacturing floor and in desktop applications. High-performance switching modules, multifunction modules, built-in relay cycle counters and straightforward connections all contribute to the performance and day-to-day usability of the 3499. Here's what it means in the real world...

Improved Throughput

While traditional switching mainframes open/close relays in sequence, the Agilent 3499A/B/C systems use innovative parallel driving circuits to open/close switches simultaneously, significantly increasing test throughput. The systems also provide high-density modules with up to 40 channels per module.

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Total Flexibility

The 3499A/B/C mainframes accommodate a full range of modules, including multiplexers, fiber-optical multiplexers, general-purpose relays, matrices, digital I/O, VHF modules, RF modules, microwave modules, Form-C relays, and multifunction modules. By combining these mainframes and modules, a test system can be set up with fewer modules in less space, and the cost and complexity of the system can be reduced.

Fast Set-Up

An easy-to-use interface and industry-standard connections mean fast set-up and integration with the 3499. Usability features include:

- Standard RS-232 and GPIB interfaces
- SCPI (Standard Commands for Programmable Instruments)
- Simplified configuration procedures
- Self-guiding front panel interface
- Easy-to-use module connection accessories

Simplify control of switch modules with Agilent TestExec SL software (available separately). Operate switches using user-defined signal names rather than writing SCPI commands. TestExec SL includes example setups for the most popular 3499 modules.

Cost-Sensitive Test

With three mainframes and many modules to choose from, you can make sure the 3499 meets your exact needs. Build the system you need today, add more modules later as your needs change. That means you buy only the test capability you need. Newly designed high-density switch modules further reduce the cost-of-test by combining a large number of channels on a single module. And with up to 40 switching channels per module, the 3499 reduces per-channel cost while saving rack and floor space. You get a simpler system with fewer modules, reducing the cost of buying, owning and maintaining your system.

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Go Configure

Broad configuration flexibility using a wide choice of plug-in modules accounts for the wide adoption of the Agilent 3499 worldwide. The following tables make the point. The 3499 is built for the unpredictable, ever-shifting needs of ATE.



Agilent 3499A/B/C Mainframe Specifications	
Items	Specifications
General	
Display	Vacuum fluorescent
Rear Panel Connectors	GPIB; RS-232; 8-pin mini DIN Connector (5 pins for Digital I/O, 3 pins for external trigger)
Power Supply	**3499A/B:** 100 to 240 VAC universal input (47 Hz to 63 Hz); 100-127 VAC (400Hz); 40 VA maximum. **3499C:** 100 to 240 VAC universal input; 47 Hz to 63 Hz; 65 VA maximum.
Operating Environment	0 °C to 55 °C, <80%RH (0 °C to 40 °C)
Storage Environment	-40 °C to +70 °C
Net Weight	**3499A:** 3.8 kg (8.4 lbs); **3499B:** 2.5 kg (5.5 lbs); **3499C:** 7.4 kg (16.4 lbs).
Dimensions	**3499A:** H 89mm x W 426mm x L 348mm **3499B:** H 89mm x W 213mm x L 348mm **3499C:** H 222mm x W 426mm x L 354mm **Note:** Modules with terminal blocks extend an additional 8.5cm beyond the rear of the mainframe.
Safety	Conforms to CSA, UL-1244, IEC 1010 Cat I
RFI and ESD	CISPR 11, IEC 80 1/2/3/4
Warranty	1 year
System	
Slot Capacity	**3499A:** 5 slots **3499B:** 2 slots. **3499C:** 9 logical slots/14 physical slots
Memory	**3499A/B** mainframe with controller board 1.0 (Firmware REV1.0/2.0/3.0): Capable of storing 10 instrument setups and 10 errors in SCPI mode or 40 instrument setups and 1 error in 3488A mode. For **3499A/B/C** mainframe with Controller board 2.0 (Firmware REV 4.0 or later): Capable of storing 50 instrument setups and 10 errors in SCPI mode or 40 instrument setups and 1 error in 3488A mode.
Relay Setting Time	Automatically selected by the mainframe for each module.
Trigger Source	External trigger (real panel Mini-DIN connector); GPIB bus (GET,*TRG) or RS-232 (*TRG).
External Trigger	Trigger pulse width: >2 µs; External trigger delay: <2ms
Built-in 4 digital I/O Input	TTL compatible;V_0 (L): <0.8V @ I_0 = -100mA; V_0 (H): >2.4V @I_0 = 1mA; Vout (H) < = 42V.
Scan Speed	350 chans/sec (equipped with N2266A)
Digital I/O Block Transfer Rate	20K bytes/sec (long word)

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Available plug-in modules include multiplexers, RF multiplexers, fiber-optical multiplexers, general-purpose relays, matrices, digital input/output, Form-C, breadboard and multifunction modules. Please refer to the following table for plug-in module selection.

Plug-in Module Specifications

Module	Description	Max. Voltage	Max. Current per Chan.	Initial Closed Channel Resistance	Thermal Offset per Chan.	Bandwidth	Connection Type	Relay Cycle Counter	Page
Multiplexer Modules									
N2260A	40-channel	200V	1A	<1 Ω	<3µV	10MHz	T or C	Yes	6
N2266A	40-channel	200V	0.5A	<1 Ω	<50µV	40MHz	T or C	Yes	6
N2270A	10-channel	1000V	1A	<1 Ω	<200µV	5 MHz	Crimp & Insert	Yes	14
44470A	10-channel	250V	2A	<1 Ω	<3µV	10MHz	T		20
44470D	20-channel	250V	2A	<1 Ω	<3µV	10MHz	T		20
General-purpose Relay Modules									
N2261A	40-channel	200V	1A	<0.5 Ω	<3µV	10MHz	T or C	Yes	7
N2267A	8-channel	250V	8A	<0.08 Ω	<3µV	20MHz	Crimp & Insert	Yes	12
44471A	10-channel	250V	2A	<1 Ω	<3µV	10MHz	T		20
44471D	20-channel	250V	1A	<1 Ω	<3µV	10MHz	T		20
44477A	7-channel	250V	2A	<1 Ω	<3µV	10MHz	T		20
Matrix Modules									
N2262A	4 x 8 matrix	200V	1A	<1 Ω	<3µV	10MHz	T or C	Yes	8
44473A	4 x 4 matrix	250V	2A	<1 Ω	<3µV	10MHz	T		20
Digital I/O Modules									
N2263A	32-bit TTL	42V	0.6A	NA	NA	NA	T or C		9
44474 A	16-bit TTL	30V	0.125A	NA	NA	NA	T		20
Multifunction Modules									
N2264A	12 GP	200V	1A	<0.5 Ω	<3µV	10MHz	T or C	Yes	10
	3 GP	125V	5A	<0.1 Ω	<3µV	10MHz	T or C	Yes	10
	16-bit DIO	42V	0.6A	NA	NA	NA	T or C		10
N2265A	4 x 4 matrix	200V	1A	<1 Ω	<3µV	10MHz	T or C	Yes	11
	16-bit DIO	42V	0.6A	NA	NA	NA	T or C		11

Note: GP = General-purpose, DIO = Digital I/O, T = Terminal Block, C = Cable.

Fiber-optical Multiplexer Modules (typical specs)

Modules	Description	Insertion loss	Stability	Repeatability	Wavelength	Connector Switching Time			
N2280A	Quad 1 x 2	0.5 dB	± 0.03dB	± 0.005dB	1310/1550 nm	SC/APC	15 ms		17
N2281A	Dual 1 x 4	0.5 dB	± 0.03dB	± 0.0065dB	1310/1550 nm	SC/APC	20 ms		17
N2282A	Single 1 x 8	0.5 dB	± 0.02dB	± 0.005/0.01dB	1270/1670 nm	SC/APC	250 ms		17

RF & Microwave Modules

Modules	Description	Insertion loss	Cross talk	SWR	Bandwidth	Impedance	Connector		
N2268A	Dual 1 x 4	<0.35dB	<-64dB	<1.20	3.5 GHz	50 Ω	SMA		13
N2272A	Single 1 x 9	<0.5dB	<-75dB	<1.20	1.0 GHz	50 Ω	BNC		15
N2276A	Dual 1 x 6	<0.36dB	<-100dB	<1.20	20 GHz	50 Ω	SMA		16
N2276B	Relay driver can support 2 microwave switches. Technical specs depend on the mounted relays.								16
44472A	Dual 1 x 4	<0.75dB	<-85dB	<1.12	300 MHz	50 Ω	BNC		20
44478A	Dual 1 x 4	<1.1dB	<-70dB	<1.35	1.3 GHz	50 Ω	BNC		19
44478B	Dual 1 x 4	<1.1dB	<-70dB	<1.35	1.3 GHz	75 Ω	BNC		19
44476A	Triple 1 x 2	<0.25dB	<-90dB	<1.15	18 GHz	50 Ω	SMA		18
44476B	Relay driver can support 2 microwave switches. Technical specs depend on the mounted relays.								18

Module Connection Accessories

N2290A	Screw terminal block for N2260A, N2266A
N2291A	Screw terminal block for N2261A
N2292A	Screw terminal block for N2262A
N2293A	Screw terminal block for N2263A
N2294A	Screw terminal block for N2264A
N2295A	Screw terminal block for N2265A
N2297A	1.5 m cable for connecting DUT to N2260/1/3/4/5/6A, one DIN96-to-Twin-D50.
N2298A	1.5 m cable for connecting to DUT to N2262A, one DIN96-to-D25.
N2299A	1.5 m cable for connecting to N2260/1/3/4/5/6A, one DIN96-to-Quad D25.
N2327A	Crimp & Insert Connection kit for N2267A
N2320A	Crimp & Insert Connection kit for N2270A

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2-wire, 40-channel Multiplexer Modules

Agilent N2260A, N2266A

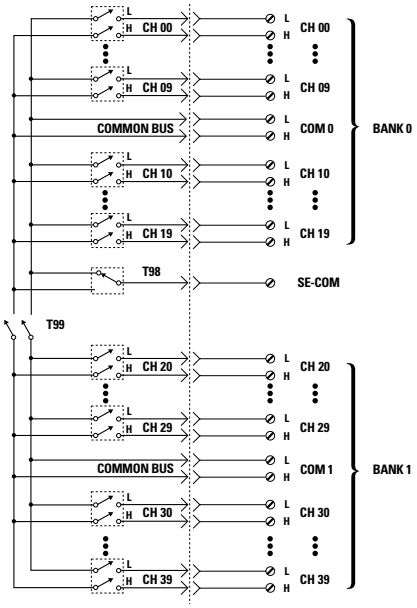
- **High speed switching**
- **Reconfigurable to 1, 2, and 4-wire mode**
- **Built-in relay cycle counters**

The N2260A and N2266A are high-density reconfigurable multiplexer (MUX) modules for high-throughput production test. They can be operated in either SCPI or 3488A mode. In SCPI mode, they can be configured in any of the following ways:

- one 80-channel, 1-wire MUX
- one 40-channel, 2-wire MUX
- dual independent 20-channel 2-wire MUXs
- one 20-channel 4-wire MUX.

Up to five N2260/66As can be included in an 3499A mainframe to build a 1- to 200-channel, 2-wire MUX. Screw terminal block, crimp & insert terminal block, and DIN96-to-D50/25 cables are available for ease of wiring. The N2266A can scan at up to 350 channels/second. Low thermal offset voltage makes the N2260A ideal for low-level signal switching.

N2260A/66A MUX Module **Terminal Block**



Specifications

General Specifications

Relays:	
N2266A	Reed non-latching relay
N2260A	Armature latching relay
Thermal Offset:	
N2266A	<50µV
N2260A	<3 µV
Relay Life:	
N2266A	10^8 @ 1V, 1mA
N2260A	
Mechanical:	10^8
Electrical:	$5x10^5$ @ 1A
Maximum Scan Rate:	
N2266A	350 Chan./sec
N2260A	80 Chan./sec

Input Characteristics

Maximum Current:	
N2266A	0.5A DC or AC peak
N2260A	1A
Maximum Voltage:	200V (AC peak for N2266A)
Maximum Power:	
N2266A	10W DC or AC peak
N2260A	60W or 62.5VA
Initial Closed Channel Resistance:	<1 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	$>10^{10}$ Ω
HI-LO:	
<(40°C, 50% RH)	$>10^{10}$ Ω
Channel-Chassis:	
<(40°C, 50% RH)	$>10^{10}$ Ω

Note: All voltage and current are in DC or AC RMS if not specified.

AC Isolation/Performance

Capacitance (with 1 channel closed):	
Open Channel, Channel-Channel	
N2266A	<7pF
N2260A	<7pF
HI-LO	
N2266A	<50pF
N2260A	<75pF
Channel-Chassis	
N2266A	<140pF
N2260A	<150pF
Insertion Loss (with 50 Ohm termination):	
N2266A	
100kHz	<0.20dB
1MHz	<0.30dB
10MHz	<2.0 dB
40MHz	<3.0 dB
N2260A	
100kHz	<0.20dB
1MHz	<0.25dB
Crosstalk (with 50 Ohm termination):	
N2266A	
100kHz	<-75dB
1MHz	<-55dB
10MHz	<-33dB
N2260A	
100kHz	<-70dB
1MHz	<-50dB

Module Accessories

N2290A	Screw terminal block for N2260A, N2266A
N2296A	Crimp & insert terminal block
N2297A	DIN96-to-Twin-D50 cable
N2299A	DIN96-to-Quad-D25 cable

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40-channel General-purpose Relay Module

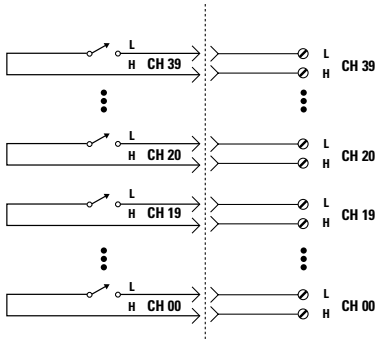
Agilent N2261A

- **40 independent relays in one module**
- **High-speed switching in parallel operation**
- **Built-in relay cycle counters**

The N2261A general-purpose relay module provides 40 independent single-pole-single-throw (SPST) latching relays. Each channel can switch up to 200 V, 1 A, and 60 W or 62.5 VA. The innovative parallel driving circuits allow 10 channels to be operated simultaneously for high throughput. It can be operated in either SCPI mode or 3488A mode.

A pair of signals can be switched together by using a pair of channels on two N2261A modules. The N2261A can be operated in single-channel break-before-make (BBM) or multiple-channel open/close mode. Screw terminal block, crimp & insert terminal block and DIN96-to-D25/50 cables are available to simplify wiring.

N2261A GP Relay Module **Terminal Block**



Specifications

General Specifications

Relays:	Armature latching relay
Thermal Offset:	<3µV
Relay Life	
Mechanical:	10^8
Electrical:	$5x10^5$ (at 1A load)
Maximum Scan Rate:	80 Chan/sec

Input Characteristics

Maximum Voltage:	200V
Maximum Current:	
Per channel	1A
Per module	20A
Maximum Power:	
Per channel	60W or 62.5VA
Per module	1200W or 1250 VA
Initial Closed Channel Resistance:	<0.5 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	$>10^{10}$ Ω
Channel-Chassis:	
<(40°C, 50% RH)	$>10^{10}$ Ω

AC Isolation

Capacitance (with 1 channel closed):	
Open Channel,	
Channel-Channel	<10pF
Channel-Chassis	<20pF
Insertion Loss (with 50 Ω termination):	
100kHz	<0.10dB
1MHz	<0.20dB
10MHz	<0.50dB
Crosstalk (with 50 Ω termination):	
100kHz	<-70dB
1MHz	<-50dB
10MHz	<-30dB

Module Accessories

N2291A	Screw terminal block
N2296A	Crimp & insert terminal block
N2297A	DIN-to-Twin-D50 cable
N2299A	DIN-to-Quad-D25 cable

Note: All voltage and current are in DC or AC RMS if not specified.

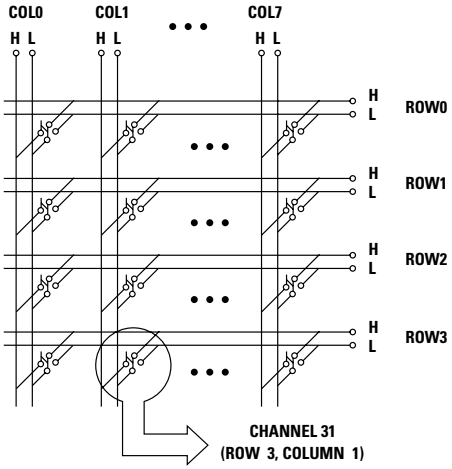
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4 x 8 Matrix Module

Agilent N2262A

- **Multiple inputs connecting to multiple outputs**
- **High-speed switching in parallel operation**
- **Built-in relay cycle counters**

The N2262A 4x8 matrix module contains 32 cross points organized in a 4-row by 8-column configuration. It provides a convenient way to connect a group of test instruments to multiple test points on DUTs. Each cross point in the module switches two wires for the high and low measurement. Multiple matrix modules can be connected for applications that require large matrices. For example, four N2262As can be combined as a 16x8 matrix. N2262As can be used in conjunction with other modules (such as multiplexer modules) to provide a wide variety of switching combinations. More than one switch can be closed at the same time, allowing any combination of rows to be connected to columns. Up to eight channels can be operated in parallel for high-speed switching. Three module accessories are available to simplify wiring.



Specifications

General Specifications

Relays:	Armature latching relay
Thermal Offset:	<3µV
Relay Life	
Mechanical:	10^8
Electrical:	$5x10^5$ (at 1A load)

Input Characteristics

Maximum Voltage:	200V
Maximum Current:	
Per channel	1A
Per module	4A
Maximum Power:	
Per channel	60W or 62.5VA
Per module	240W or 250 VA
Initial Closed Channel Resistance:	<1Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	$>10^{10}$ Ω
HI-LO:	
<(40°C, 50% RH)	$>10^{10}$ Ω
Channel-Chassis:	
<(40°C, 50% RH)	$>10^{10}$ Ω

AC Isolation

Capacitance (with 1 channel closed):	
Open Channel, Channel-Channel	<7pF
HI-LO	<30pF
Channel-Chassis	<50pF
Insertion Loss (with 50 Ω termination):	
100kHz	<0.10dB
1MHz	<0.20dB
10MHz	<0.60dB
Crosstalk (with 50 Ω termination):	
100kHz	<-73dB
1MHz	<-53dB
10MHz:	<-28dB

Module Accessories

N2292A	Screw terminal block
N2296A	Crimp & insert terminal block
N2298A	DIN96-to-D25

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32-Bit Digital Input/Output Module

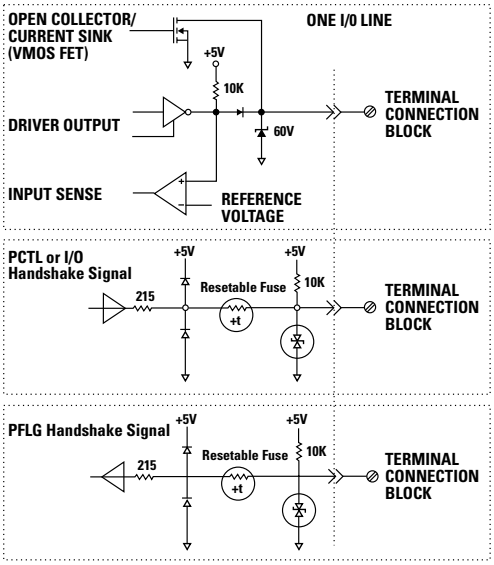
Agilent N2263A

- **TTL compatible, sinking up to 0.6 A**
- **Input /output configurable byte-by-byte**
- **Three I/O control modes: static, strobe, and handshake**

The N2263A provides 32-bit bi-directional lines and three handshake and control lines. The 32-bit I/O lines are TTL compatible input/output, or TTL compatible input and open collector output up to 42 V. The 32-bit I/O lines can be addressed individually (byte-by-byte), either as a 32-bit port, four independent 8-bit ports, or as two independent 16-bit ports. A Zener diode is used in each channel for input voltage over-protection (> 42 V DC), including ESD protection. Each I/O line can sink up to 0.6 A to control external devices, including:

- High-voltage/high current relays
- Microwave relays and attenuators (8710xx , 876xx and 849xx)
- Solenoid coils

The polarities of the I/O and handshake lines can be operated in positive or negative logic mode. With the three control lines (PCTL, I/O, and PFLG), you can define five handshake modes for communication with peripherals. Screw terminal block, crimp & insert terminal block, and DIN96-to-D25/50 cables are available for simple wiring.



Specifications

I /O Lines

Maximum Voltage(line-chassis):	+42V DC
Maximum Sink Current(per bit):	0.6A

Output Characteristics:

V_{out} (high)	≥ 2.4V @ I ≤ 10mA output
V_{out} (low)	≤ 0.8V @ I ≤ 600mA input

Input Characteristics:

V_{in} (high)	≥ 2.0V
V_{in} (low)	≤ 0.8V

Handshake Lines

Maximum Voltage(line-chassis):	+5V DC
Output Characteristics:	
V_{out} (high)	≥ 2.4V @ I ≤ 400µA output
V_{out} (low)	≤ 0.5V @ I ≤ 1mA input
I_{out} (low)	<25 mA (when shorted to + 5V)
Input Characteristics:	
V_{in} (high)	≥ 2.0V
V_{in} (low)	≤ 0.8V

Module Accessories

N2293A	Screw terminal block
N2296A	Crimp & insert terminal block
N2297A	DIN96-to-Twin-D50 cable
N2299A	DIN96-to-Quad-D25 cable

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Multifunction Module

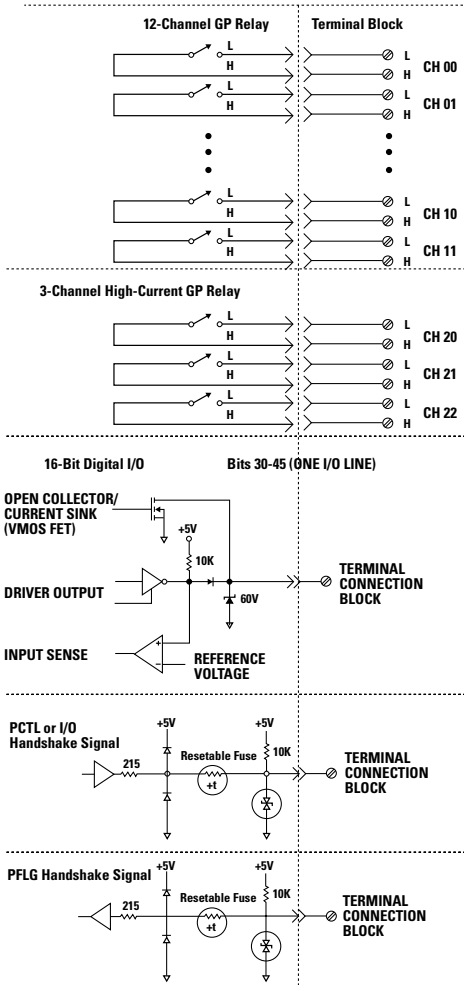
Agilent N2264A

- **12 + 3 GP + 16-bit digital I/O in one module**
- **High-speed switching in parallel operation**
- **Built-in relay cycle counters**

The Agilent N2264A multifunction module combines 12 general-purpose relays, three high-current relays, and 16-bit digital input/output in one module, saving cost and space. Its three high-current channels are especially useful in automated test systems for cellular phone test or battery test, where only two or three low-resistance channels are needed. Four connection accessories simplify wiring.

The 12 general-purpose channels are non-latching relays that can switch up to 200 V, 1 A, 60 W or 62.5 VA. The three high-current channels are non-latching relays switching up to 5 A, 125 V DC, or 200 V AC RMS. The 16-bit digital I/O provides 16 bi-directional data lines (bits) plus three lines used for control and handshaking. The 16-bit I/O lines are TTL compatible input/output, or TTL compatible input and open collector output. The 16 I/O bits can be addressed individually, as two independent 8-bit ports, or as one 16-bit port. A Zener diode is used in each channel for input overvoltage protection (>42 V DC), including ESD protection. Each I/O line can sink up to 0.6 A to control external devices.

N2264A Multifunction Module



Specifications

12-channel General-purpose Relay

General Specifications

Relays:	Armature non-latching relay
Thermal Offset:	<3µV
Relay Life	
Mechanical:	10^8
Electrical:	$5x10^5$ (at 1A load)
Maximum Scan Rate:	80 Chans./ sec

Input Characteristics

Maximum Voltage:	200V
Maximum Current:	
Per channel	1A
Maximum Power:	
Per channel	60W; 62.5VA
Initial Closed Channel Resistance:	<0.5 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	$>10^{10}$ Ω

AC Isolation

Capacitance (with 1 channel closed):	
Open Channel, Channel-Channel	<10pF
Channel-Chassis	<20pF

For 16-bit Digital I/O specifications, please refer to the Agilent N2263A.

3-channel High-current Relay

General Specifications

Relays:	Armature non-latching relay
Relay Life	
Mechanical:	$5x10^7$
Electrical:	10^5 (at 5A load)
Thermal Offset:	<3µV
Time to close one channel:	16ms

Input Characteristics

Maximum Voltage:	125V DC or 200 V AC
Maximum Current:	5A
Maximum Power:	150W; 1250 VA
Initial Closed Channel Resistance:	<0.1 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	$>10^{10}$ Ω
Channel-Chassis:	
<(40°C, 50% RH)	$>10^{10}$ Ω

Module Accessories

N2294A	Screw terminal block for N2264A
N2296A	Crimp & insert terminal block
N2297A	DIN96-to-Twin-D50 cable
N2299A	DIN96-to-Quad-D25 cable

Note: All voltage and current are in DC or AC RMS if not specified.

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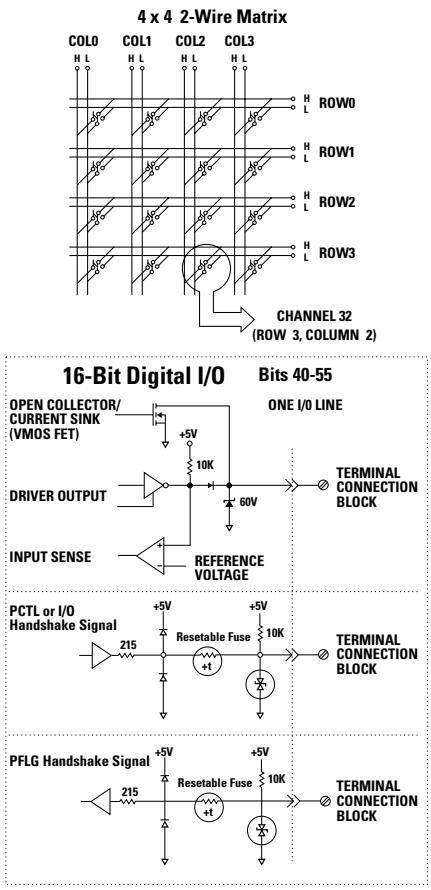
Multifunction Module

Agilent N2265A

- **4x4 matrix and 16-bit digital I/O in one module**
- **High speed switching in parallel operation**
- **Built-in relay cycle counters**

The N2265A multifunction module combines a 4x4 two-wire matrix and 16-bit digital I/O in one module to save floor space while reducing costs. It includes four connection accessories to simplify wiring. The 4x4 matrix (including 16 crosspoints) provides the most convenient way to connect a group of test instruments to multiple test points on DUTs. Each crosspoint in a module switches two wires for the high and low measurement. The N2265A includes 16 bi-directional data lines (bits) plus three handshake lines. The 16-bit I/O lines are TTL compatible input/output, or TTL compatible input and open collector output. The 16 I/O bits can be addressed individually, as two 8-bit ports, or one 16-bit port. A Zener diode is used in each channel for input over voltage protection (>42 V DC) and ESD protection. Each I/O line can sink up to 0.6 A to control external devices.

N2265A Multifunction Module



Specifications

4 x 4 Matrix

General Specifications	
Relays:	Armature latching relay
Relay Life	
Mechanical:	10^8
Electrical:	$5x10^5$ (at 1A load)
Maximum Scan Rate:	80 Chans./ sec

Input Characteristics	
Maximum Voltage:	200V
Maximum Current:	
Per channel:	1A
Per module:	4A
Maximum Power:	
Per channel:	60W or 62.5VA
Per module:	240W or 250 VA
Initial Closed Channel Resistance:	<1 Ω

DC Isolation	
Open Channel, Channel-Channel: <(40°C, 50% RH)	$>10^{10}$ Ω
HI-LO: <(40°C, 50% RH)	$>10^{10}$ Ω
Channel-Chassis <(40°C, 50% RH)	$>10^{10}$ Ω

AC Isolation	
Capacitance (with 1 channel closed): Open Channel, Channel-Channel	<7pF
HI-LO	<25pF
Channel-Chassis	<40pF
Insertion Loss (with 50 Ω termination):	
100kHz	<0.10dB
1MHz	<0.20dB
10MHz	<0.60dB
Crosstalk (with 50 Ω termination):	
100kHz	<-76dB
1MHz	<-56dB
10MHz	<-33dB

16-bit Digital I/O

I/O Lines	
Output Characteristics:	
V_{in}	≤ +42V DC @ I_{sink} ≤ 0.6A
V_{out} (high)	≥ 2.4V @ I ≤ 10mA output:
V_{out} (low)	≤ 0.8V @ I ≤ 0.6A input
Input Characteristics:	
V_{in} (high)	≥ 2.0V
V_{in} (low)	≤ 0.8V

Handshake Lines	
V_{in}	≤ 5V DC
V_{out} (high)	≥ 2.4V @ I≤ 400µA output
V_{out} (low)	≤ 0.5V @ I ≤ 1mA input
V_{in} (high)	≥ 2.0V
V_{in} (low)	≤ 0.8V

Module Accessories	
N2295A	Screw terminal block
N2296A	Crimp & insert terminal block
N2297A	DIN96-to-Twin-D50 cable
N2299A	DIN96-to-Quad-D25 cable

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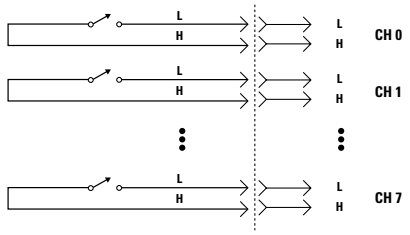
8-channel General-purpose Relay Module

Agilent N2267A

- **Switching up to 8 A, 250 V**
- **Built-in overheat protection for high reliability**

The N2267A is designed for high-current (up to 8 A continuous), low-resistance switching applications, such as AC/DC power supply testing. It can also be used to switch on/off AC (up to 250 V) or DC (up to 125 V) power supplies and current sources. Each channel can carry 8 A current at the same time. For thermal protection and reliability, the N2267A has built-in temperature control circuitry that uses sensor ICs and a cooling fan. An over-temperature warning signal is also available to activate an external LED or buzzer. A crimp & insert connector (N2327A) is available. A protection network area is provided on the module's PCB, for switching inductive loads such as electric motors, solenoids, contacts, chokes, electromagnets and incandescent lamps. To protect relays from overvoltage damage, the RC network or the varistors must be placed on this module, which can effectively absorb the surge voltage.

N2267A GP Relay Module Connection Kit



Specifications

General Specifications

Relays:	Non-latching relay
Thermal Offset:	<3µV
Relay Life	
Mechanical:	5 x 10^7 (180cpm)
Electrical:	10^5
Maximum Scan Rate:	20 Chans./ sec

Input Characteristics

Maximum Current:	
(per channel)	8A
(per module)	64A
Maximum Voltage:	125 VDC, 250VAC
Maximum Power:	
Per channel	150W or 2000VA
Per module	1200W or 16000 VA
Initial Closed Channel Resistance:	<0.08 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	>10^{10} Ω
Channel-Chassis:	
<(40°C, 50% RH)	>10^{10} Ω

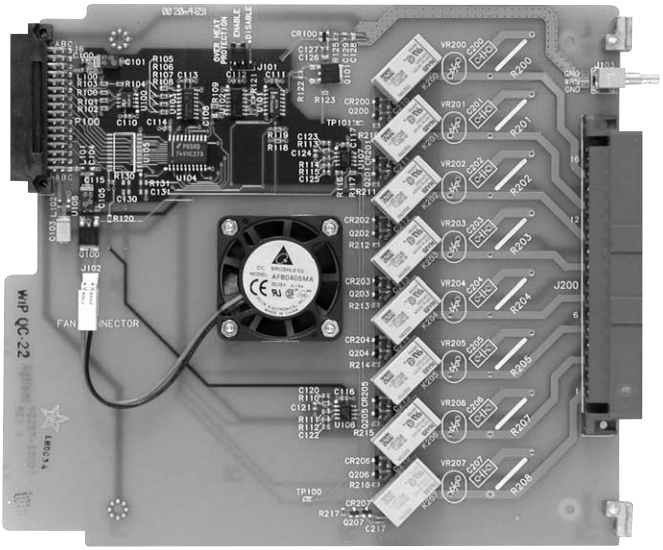
AC Isolation

Capacitance (with 1 channel closed):	
Open Channel, Channel-Channel	<10pF
Channel-chassis	<10pF
Insertion Loss (with 50 Ω termination):	
100kHz	<0.10dB
1MHz	<0.20dB
Crosstalk (with 50 Ω termination):	
100kHz	<-75dB
1MHz	<-55dB

Module Accessories

N2327A	Crimp & insert connection kit for N2267A

Note: All voltage and current are in DC or AC RMS if not specified.



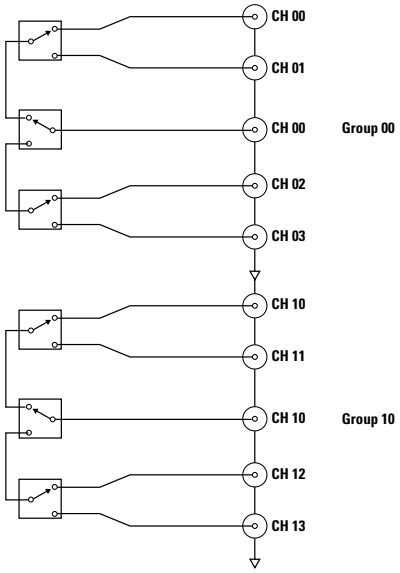
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Dual 1 x 4 RF Multiplexer (3.5 GHz, 50 Ω)

Agilent N2268A

- **Ideal for wireless communication test**
- **Insertion loss <1.7 dB at 3.5 GHz**

The N2268A multiplexer module has two 1x4 independent multiplexers with SMA connectors, delivering high performance, very low insertion loss, high isolation, and excellent VSWR performance. This high-density RF multiplexer module is an economical RF signal switching solution. Its 3.5 GHz bandwidth guarantees signals will not be degraded when switched from source to destination. Each group of four channels is isolated from the other and from the chassis to prevent ground loops. The wide-bandwidth performance enables quality dynamic-range RF signal measurements using oscilloscopes, spectrum analyzers, network analyzers, and GSM/CDMA test sets. Typical test applications include switching signals of Bluetooth transceivers and L1/L2 GPS receivers, 1.8/1.9 GHz wireless communication devices (such as GSM, CDMA, 3G, DCS1800, and PCS1900 base stations), and mobile phones. It can be also used to route satellite signals.



Specifications

Input Characteristics

Maximum Scan Rate:	20 Chans./ sec
Maximum Voltage:	30V, DC+AC peak
Maximum Current:	0.5A, DC+AC peak
Maximum Power: (per channel)	10W
Characteristic Impedance:	50 Ω

DC Performance

Thermal Offset:	<3μV (<2μV, typ.)
Initial Closed Channel Resistance:	<1 Ω
Insulation Resistance (between terminals): <(40°C, 50% RH)	$>10^{10}$ Ω

Capacitance

Center-Center	<0.06pF
Center-Shield	<20pF
Rise Time:	<150psec
Signal Delay:	<1.5nsec

AC Performance

Insertion Loss	
1 GHz	<0.9dB
2 GHz	<1.2dB
2.5 GHz	<1.4dB
3.5 GHz	<1.7dB
Crosstalk (Channel-Channel, Channel-Common)	
1 GHz	<-64dB
2 GHz	<-64dB
2.5 GHz	<-50dB
3.5 GHz	<-50dB
VSWR	
1 GHz	<1.20
2 GHz	<1.35
2.5 GHz	<1.35
3.5 GHz	<1.35

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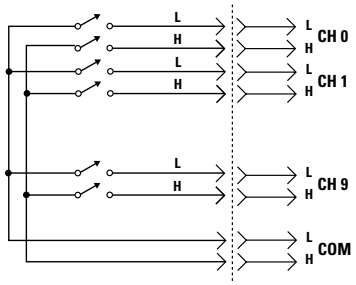
10-channel 1000V Multiplexer

Agilent N2270A

- **Switching up to 1 A, 1000 V**
- **Ideal for breakdown and leakage testing**

The N2270A 2-wire multiplexer can be used to source external voltage up to 1000 V from the common end to any of 10 DUTs, or to monitor voltage from different sources using a voltmeter. It can be used in a scanner application where only one channel is closed at a time, or in distribution applications where several channels are simultaneously closed. Applications include capacitor breakdown voltage testing as well as high-resistance measurements of transformers, capacitors, relays, connectors, PCBs, and cables. A crimp & insert connection kit is designed to work with N2270A. High-voltage signals can be wired to the N2320A, which can be plugged into the connector on a N2270A.

N2270A MUX Module Connection Kit



Specifications

General Specifications

Relays:	Non-latching reed relay
Thermal Offset:	<200µV
Relay Life:	10^8 @ 1V, 10mA
Maximum Scan Rate:	100 Chans./ sec

Input Characteristics

Maximum Current:	1 A
Maximum Voltage:	1000V
Maximum Power:	10W
Initial Closed Channel Resistance:	<1 Ω

DC Isolation

Open Channel, Channel-Channel:	
<(40°C, 50% RH)	> 10^{10} Ω
Channel-Chassis:	
<(40°C, 50% RH)	>10^{10} Ω

AC Isolation

Capacitance (with 1 channel closed):	
Open Channel, Channel-Channel	
HI-LO	≤7pF
Channel-Chassis	≤50pF
Insertion Loss (with 50 Ω termination):	
100kHz	<0.10dB
1MHz	<0.20dB
Crosstalk (with 50 Ω termination):	
100kHz	<-70dB
1MHz	<-50dB

Module Accessories

N2320A	Crimp & insert connection kit for N2270A

Note: All voltage and current are in DC or AC RMS if not specified.

The N2270A occupies 2 slots.



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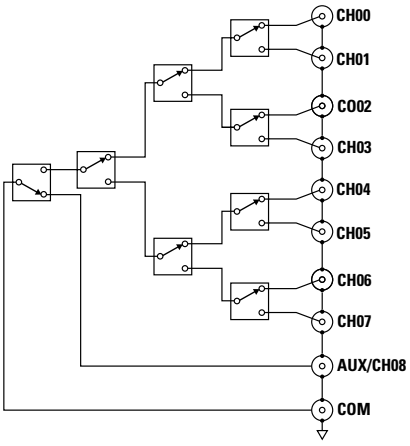
1 x 9 RF (1GHz) Multiplexer Module

Agilent N2272A

- **Ease of channel density extension**
- **Ideal for high density RF signal routing**
- **Ease of wiring with BNC connectors**

The N2272A RF high-density module provides a 1x9 multiplexer that can be widely used in RF test and measurement system. It consists of a series of eight RF latching relays in a tree structure. The module's low insertion loss, high isolation and excellent VSWR performance guarantee that the RF signals will not be degraded when routed from source to destination. In order to decrease the degradation when cascading, the auxiliary channel (channel 08) with smaller insertion loss and lower VSWR, is provided. In order to extend the channel count, channel 08 can be connected to the COM channel of the next N2272A module. It can also be used as a standard channel. BNC connectors on the module's front panel are provided for ease of wiring.

The N2272A can only be operated in SCPI mode when installed in 3499A/B mainframes with firmware 3.0 or later.



Specifications

Input Characteristics	
Total Channels:	9
Maximum Voltage:	24V
Maximum Current::	1A
Maximum Power:	24W
Characteristic Impedance:	50 Ω
Connector:	BNC
Relay life	
Mechanical	$5x10^6$
Electrical (24V@1A DC)	10^5

DC Performance	
Thermal Offset:	<8µV
Initial Closed Channel Resistance:	<0.8 Ω
Insulation Resistance (between terminals): <(25°C, 50% RH)	$>10^{10}$ Ω
Capacitance:	
Center-Center	<0.006pF
Center-Shield	<60pF
Rise Time:	<500psec
Signal Delay:	<2.5nsec

AC Performance	100 MHz	300MHz	800 MHz	1 GHz
Insertion Loss	<0.5dB	<0.8dB	<1.8dB	<2.5dB
Crosstalk (Channel-Channel)	<-75dB	<-65dB	<-55dB	<-50dB
VSWR	<1.20	<1.30	<1.35	<1.55

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Dual 1x6 Microwave (20GHz) Multiplexer

Agilent N2276A/B

- **Quick set-up microwave switching to save integration time**
- **Modular microwave switching to fit each application**
- **Can also drive two external microwave attenuators**

The 3-slot N2276A module (option 206) provides dual 1 x 6 microwave multiplexers, with excellent insertion loss, isolation and VSWR performance. With option 204, the N2276A becomes a dual 1 x 4 microwave multiplexers, while keeping all the other features. The modular N2276A can exactly fit your application channel density needs, minimizing the redundant channel, thus offering the most cost effective microwave switching. The SMA connectors on module's front panel are provided for high performance connections. The N2276A can also drive two external microwave attenuators (Agilent 84904/6/7/K/L).

The N2276B module is a microwave multiplexer/attenuator driver, deleting the microwave relays from the N2276A. Offering the most flexibility, it can drive any two 1x4 or 1x6 microwave relays (Agilent 87104A/B/C, Agilent 87106A/B/C). A custom microwave multiplexer module can be built with the N2276B and microwave relays, eliminating the external power supply or digital I/O that are used in previous customer-built microwave switching. Two 1.5m ribbon cables are included for connecting to external microwave relays. It can also drive two external microwave attenuators (Agilent 84904/6/7/K/L).

The N2276A/B can be used in the testing of cellular phone, cordless phone, mobile radios, cellular base station, broadband wireless communication transceivers, RFICs, and high-speed digital circuits.

The N2276A/B can only be operated in SCPI mode when installed in 3499A/B mainframes with firmware 3.0 or later.

Specifications

Total Channels (N2276A)	Dual 1 x 4 (option 204) Dual 1 x 6 (option 206)
Connector	SMA
Frequency range	DC to 20 GHz
Insertion loss	0.3 dB + 0.015 dB * frequency (GHz)
Isolation	>100dB @12 GHz; >80dB@15 GHz; >70dB @20 GHz
VSWR	<1.2@4 GHz; < 1.35 @12.4 GHz; <1.45@18 GHz; <1.7@20 GHz
Repeatability (5M cycle @25C°)	< 0.03dB
Switching time	25ms
Switch life	5 M cycles

Module Accessories

87104A/B/C	SP4T microwave relays (4, 20, 26.5 GHz)
87106A/B/C	SP6T microwave relays (4, 20, 26.5 GHz)
84904/6/7/K/L	0-11dB, 0-90dB, 0-70dB microwave attenuators (26.5, 40 GHz)



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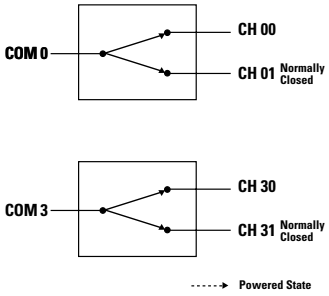
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1x2, 1x4 and 1x8 Optical Multiplexer Module

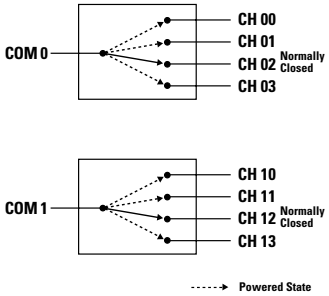
Agilent N2280A, N2281A and N2282A

- **Ideal for optical and electronic hybrid test system**
- **Modular optical switching to fit each test application**
- **High repeatability for accurate signal routing**

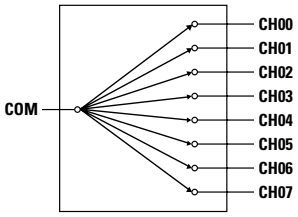
N2280A MUX Module



N2281A MUX Module



N2282A MUX Module





The N2280A (Quad 1 x 2), N2281A (Dual 1 x 4) and N2282A (1 x 8) optical modules bring the flexibility of modular optical switching based on the Agilent 3499 switching family. The optical switching modules, combined with other 3499 family electronic modules, provide a total switching solution in hybrid test systems. With this modular optical switching, test engineers can set up an ATE system with just enough optical switching channels to fit the current application, and add more channels later as the application grows. The collimating lenses optical relays in the N2280A/81A/82A minimize the switching insertion loss, and improve the switching repeatability and stability. These three modules are ideal for SONET/SDH test, fiber-optical component test, and fiber-optical network monitoring. They can also be used in fiber-optical network configuration and multi-source selection/measurement. Two channels in different modules can be synchronously switched with the "CARD PAIR" command. These modules are optically passive operate independently of data rate, data format and optical signal direction; therefore, are transparent to signaling formats. The SC/APC connectors provide reliable and easy connection. A N2280A/81A/82A module occupies two slots in a 3499A/B mainframe. The N2282A can only be operated in SCPI mode when installed in 3499A/B mainframes with firmware 3.0 or later. The N2282A extends an additional 8.5cm beyond the rear of the mainframe.

Specifications

Relay Life:	>10^7(cycle) Optical
Fiber type:	9/125
Wavelength Range:	
N2280A/N2281A	1310/1550nm
N2282A	1270/1670nm
Insertion loss (SM):	
N2280A/N2281A	≤ 0.8dB
N2282A	≤ 0.7dB
Return loss[1] (SM):	
N2280A/N2281A	≥ 55dB
N2282A	≤ 57dB
Polarization dependent loss (SM):	
N2280A/N2281A	≤ 0.07dB
N2282A	≤ 0.04dB
Insertion loss stability[2]:	
N2280A/N2281A	≤ ±0.05dB
N2282A	≤ ±0.025dB

Repeatability:	
N2280A	≤ ±0.005dB
N2281A	≤ ±0.0065dB
N2282A(Sequential)	≤ ±0.01dB
N2282A(Random)	≤ ±0.05dB
Crosstalk:	
N2280A/N2281A	≤ -60dB
N2282A	≤ -90dB
Optical input power:	≤ 300mW
Switching time:	
N2280A	≤ 20ms
N2281A	≤ 25ms
N2282A	≤ 250ms
Connectors:	SC/APC

Note 1: Excluding connectors.

Note 2: After one-hour warm-up. Drift of any channel relative to an assigned reference channel at ±3°C deviation of ambient temperature over a seven-day period.

1 Excluding connectors, 0.2dB typical connector insertion loss.

2 Excluding connectors.

3 Drift of any channel relative to an assigned reference channel at ±3°C deviation of ambient temperature over a seven-day period.

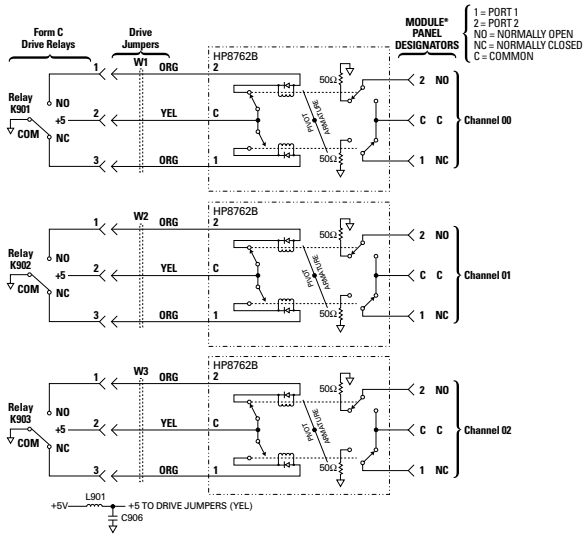
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Microwave Multiplexer Module

Agilent 44476A

- **Switching signals from DC to 18 GHz**
- **Triple 1-to-2 microwave multiplexers**

The 44476A includes three independent SPDT 50 Ω coaxial relays with excellent electrical performance from DC to 18 GHz. For general-purpose microwave switching applications, the module can be used to switch separate signal sources for a multi-band receiver/transmitter testing application. The 3 mm SMA connector on the module edge simplifies wiring.



* NOTE: Terminal designations inside the dashed boxes refer to the HP8762B only. Module panel designators outside the dashed boxes are those silkscreenedon the HP44476A panel. Any reference in this manual to a port refers to the module panel designators.

Specifications

Input Characteristics

Frequency Range:	DC to 18 GHz
Characteristic Impedance:	50 Ω
Input Power Rating: (Also less than ± 7 V DC)	1 W average
	100 W peak
Repeatability (after 10^6 operation):	0.03 dB
Connector:	SMA

AC Isolation / Performance

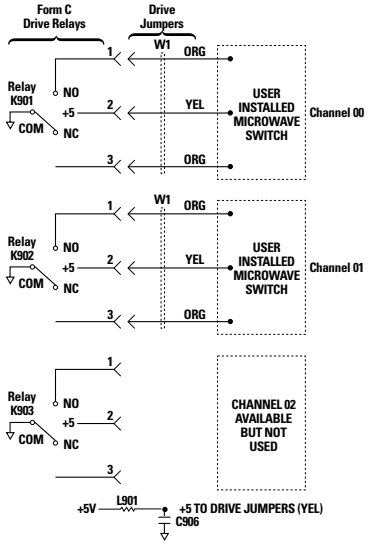
Isolation:	
DC-18GHz	>90 dB
Insertion Loss:	
DC-2 GHz	<0.25 dB
DC-18GHz	<0.50 dB
VSWR (3 mm SMA):	
DC-2GHz	<1.15 dB
DC-12.4GHz	<1.25 dB
DC-18.0GHz	<1.40 dB

Microwave Relay Driver Module

Agilent 44476B

- **Supporting varieties of microwave coaxial relays**
- **Two set mounting holes for coaxial relays**

The 44476B brings multi-port 50/75 Ω coaxial switching flexibility to your test system. It has two set mounting panels, so any two Agilent 876XX coaxial switches can be mounted. The coaxial switches come in three-, four-, and five-port configurations. This flexibility allows you to use the different switches for a variety of applications, constructing transfer switches, switch matrices and more. Using the 876XX in conjunction with the 44476B allows you to extend your automated three-port switching to 26.5 GHz. Coaxial relays must be ordered separately when using with this module. The coaxial switches that can be used are listed below. Option 011 designates the switches for a coil voltage of 5 V DC.



Agilent Technologies

Coaxial Switch	Port	Frequency
8762A/Option 011	3	DC to 4 GHz
8762B/Option 011	3	DC to 18 GHz
8762C/Option 011	3	DC to 26.5 GHz
8762F/Option 011	3	DC to 4 GHz
8763B/Option 011	4	DC to 18 GHz
8763C/Option 011	4	DC to 26.5 GHz
8764B/Option 011	5	DC to 18 GHz
8764C/Option 011	5	DC to 26.5 GHz

Note: For details of Agilent 876XX specifications, please refer to publication number 5968-4314.

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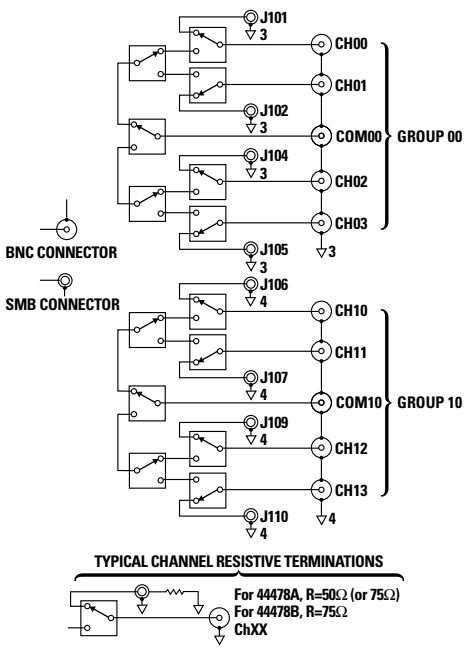
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Dual 1 x 4 RF Multiplexer (1.3 GHz, 50/75 Ω)

Agilent 44478A/B

- **Switching up to 1 A, 24 W or 24 VA**
- **Insertion loss less than 1.9 dB at 1.3 GHz**

The 44478A/B multiplexer module is an ideal choice for broadband switching of high-frequency or fast pulse signals. Dual 1-to-4 multiplexers provide bi-directional switching of signals from DC to 1.3 GHz. High channel isolation (>55 dB at 1 GHz) assures quality dynamic-range measurements using spectrum, network, or distortion analyzers. Each 1-to-4 multiplexer consists of seven relays in a "tree" structure, which provides high isolation and low VSWR (voltage standing wave ratio). All the connectors on the module's edge are female BNC for ease of wiring. Off-channels can be terminated in resistors to maintain proper operation of DUT circuitry. Simply plug a 50/75 Ω SMB-type resistive termination onto the on-board male SMB connectors provided for each channel.



Specifications

Input Characteristics

Maximum Scan Rate:	43 Chans./ sec
Maximum Voltage:	42V, DC+AC peak
Maximum Current:	1A
Maximum Power: (Per channel)	24W, 24VA or 44dBm
Characteristic Impedance:	
44478A:	50 Ω
44478B:	75 Ω

DC Performance

Thermal Offset:	<6μV (<2μV, Typ.)
Initial Closed Channel Resistance:	<1 Ω
Insulation Resistance (between terminals): <(25°C, 40% RH)	$>10^{10}$ Ω

Capacitance:

Center-Center:	<0.006pF
Center-Shield:	<60pF
Rise Time:	<300psec
Signal Delay:	<3nsec

AC Performance

Insertion Loss	
≤(40°C, 95% RH)	
10MHz	<0.3dB
100MHz	<0.7dB
500 MHz	<1.5dB
1.3GHz	<3.0dB
≤(25°C, 40% RH)	
10MHz	<0.2dB
100MHz	<0.5dB
500 MHz	<1.1dB
1.3GHz	<1.9dB
Crosstalk	
Channel-Channel, Channel-Common	
10MHz	<-90dB
100MHz	<-80dB
500 MHz	<-65dB
1.3GHz	<-55dB
Group-Group, Module-Module	
10MHz	<-90dB
100MHz	<-80dB
500 MHz	<-70dB
1.3GHz	<-60dB
VSWR	
10MHz	<1.20
100MHz	<1.25
500 MHz	<1.35
1.3GHz	<1.55

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MODULES

Agilent 44470A, 44470D, 44471A, 44471D, 44472A, 44473A, 44474A, 44475A, 44477A Modules

44470A 10-channel Multiplexer Module (2 A, 250 V)

44470D 20-channel Multiplexer Module (2 A, 250 V)

44471A 10-channel General-purpose Module (2 A, 250 V)

44471D 20-channel General-purpose Module (1 A, 250 V)

The 44470A, 44470D, 44471A, and 44471D are designed for low-channel count applications, with higher switching capability (current or voltage) than N2260A or N2261A modules.

44472A Dual 1x4 RF Multiplexer Module (300 MHz, 50 Ω)

The 44472A RF multiplexer module offers broadband switching capability for high-frequency and pulse signals. Two independent 50 Ω characteristic impedance 1x4 switches are provided for signal from DC to 300 MHz. BNC connectors on the module allow for easy connection.

44473A 4 x 4 Matrix Module (2 A, 250 V)

44474A 16-Bit Digital I/O Module (TTL compatible)

44475A Breadboard Module

The 44475A breadboard provides a means to customize, with two areas (104mm x 74mm and 79mm x 74mm) for customer-designed circuitry.

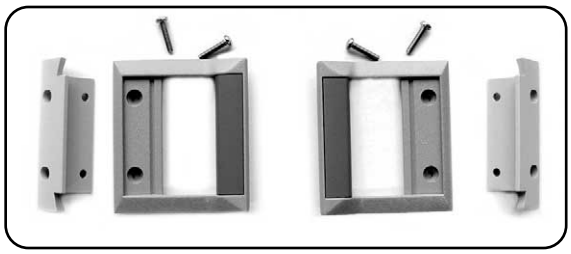
44477A 7-channel Form-C Relay Module (2 A, 250 V)

The 44477A is a 7-channel Form-C relay module for general-purpose switching and control of external devices.

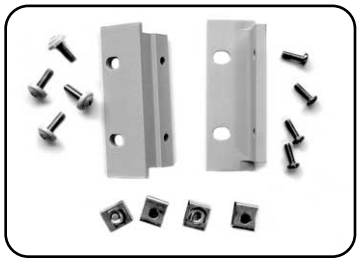
All of the above modules, designed for 3488A mainframes, work in the 3499A/B/C.

Rack Mounting Kits

3499A

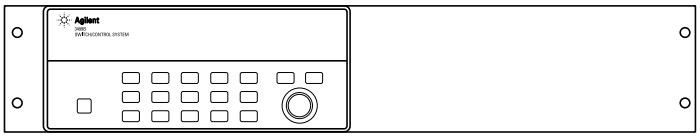


Agilent 3499A Rack Mount Kit with Handles (Opt. 1CP)



Agilent 3499A Rack Mount Kit (Opt. 1CM)

3499B



To rackmount an Agilent 3499B with a fill panel, order Option 1CM.

3499C

To rackmount the 3499C without handles, order the Agilent standard cabinet accessory 5063-9216.

To rackmount the 3499C with handles, order the Agilent standard cabinet accessory 5063-9223.

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Ordering Information

Agilent Technologies Products
Mainframes

3499A 5-Slot Switch/Control Mainframe, includes hard copy manual and power cord. Plug-in modules are ordered separately and are required for operation.

3499A-0B0 Delete Hard Copy User's Manual

3499A-1CP Rack Mount Kit with Handles

3499A-1CM Rack Mount Kit

3499A-0B1 Add additional User's Manual

3499B 2-Slot Switch/Control Mainframe, includes hard copy manual and power cord. Plug-in modules are ordered separately and are required for operation.

3499B-0B0 Delete Hard Copy User's Manual

3499B-1CM Rack Mount Kit with half-rack filler panel

3499B-0B1 Add additional User's Manual

3499C 9/14-Slot Switch/Control Mainframe. User's manual is not included. Must order 3499C-0B1 for hardcopy of the User's Manual.

Plug-in modules are ordered separately and are required for operation.

3499C-0B1 Hardcopy of User's Manual

For rackmount kit w/o handles, order the Agilent standard cabinet accessory 5063-9216

For rackmount kit with handles, order the Agilent standard cabinet accessory 5063-9223.

Mainframe Filler Panels

3499C-FP1 1-slot width filler panel for 3499A/B/C mainframes

3499C-FP2 2-slot width filler panel for 3499A/B/C mainframes

Plug-in modules, screw terminal blocks NOT included

N2260A 40-channel Multiplexer Module

N2261A 40-channel General Purpose Relay Module

N2262A 4 x 8 Matrix Module

N2263A 32-bit Digital I/O Module

N2264A 12 + 3 GP + 16-bit Digital I/O Module

N2265A 4 x 4 Matrix + 16-bit Digital I/O Module

N2266A 40-channel High-speed Multiplexer Module

N2267A 8-channel 8 A General Purpose Relay Module

N2268A Dual 1 x 4 RF (3.5 GHz) Multiplexer Module

N2270A 10-channel 1000 V Multiplexer Module

N2272A 1 x 9 RF (1GHz) Multiplexer Module

N2276A Dual 1 x 6 Microwave Multiplexer Module

N2276A-204 Dual 1 x 4 Multiplexer

N2276A-206 Dual 1 x 6 Multiplexer

N2276B Microwave Multiplexer Driver Module

N2280A Quad Optical 1 x 2 Multiplexer Module, SC/APC

N2281A Dual Optical 1 x 4 Multiplexer Module, SC/APC

N2282A 1 x 8 Optical Multiplexer Module, SC/APC

N2289A Mini-DIN-to-D9 cable for built-in DIO in 3499A/B

N2290A Screw terminal block for N2260A and N2266A

N2291A Screw terminal block for N2261A

N2292A Screw terminal block for N2262A

N2293A Screw terminal block for N2263A

N2294A Screw terminal block for N2264A

N2295A Screw terminal block for N2265A

N2297A DIN96-to-Twin-D50 cable for N2260-5A

N2298A DIN96-to-D25 cable for N2262A

N2299A DIN96-to-Quad-D25 cable for N2260-5A

N2320A Crimp & Insert Connection kit for N2270A

N2327A Crimp & Insert Connection kit for N2267A

Plug-in modules (Agilent 3488A family), screw terminal blocks included

44470A 10-channel Relay Multiplexer Module

44470D 20-channel Relay Multiplexer Module

44471A 10-channel GP Relay Module

44471D 20-channel GP Relay Module

44472A Dual 1 x 4 RF (300MHz) Multiplexer Module (50Ω)

44473A 4x4 Matrix Switch Module

44474A 16-bit Digital I/O Module

44475A Breadboard Module

44476A Microwave Multiplexer Module

44476B Microwave Switch Driver Module

44477A 7-channel Form-C Relay Module

44478A Dual 1x4 RF (1.3 GHz) Multiplexer (50Ω)

44478B Dual 1x4 RF (1.3 GHz) Multiplexer (75Ω)

44480A Connector Kit for 44470A

44480B Connector Kit for 44470D

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Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

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Printed in the USA, July 30, 2004
5988-6103EN



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