

Microwave Switch (Option 018/HP 44476B)

The module brings multi-port 50 Ω coaxial switching to your test system. The module can mount any two HP 3331XX coaxial switches. The HP coaxial relays come in 3-, 4-, and 5-port configurations—different switches for a variety of applications. HP coaxial switches that can be used are:

HP Coaxial Switch	Port	Frequency
HP 33311B/Opt 011	3	dc to 18 GHz
HP 33311C/Opt 011	3	dc to 26.5 GHz
HP 33312B/Opt 011	4	dc to 18 GHz
HP 33312C/Opt 011	4	dc to 26.5 GHz
HP 33313B/Opt 011	5	dc to 18 GHz
HP 33313C/Opt 011	5	dc to 26.5 GHz

1.3 GHz 50 Ω Multiplexer (Option 019/HP 44478A)

1.3 GHz 75 Ω Multiplexer (Option 020/HP 44478B)

These modules bring bi-directional switching of signals from dc to 1.3 GHz, with high-channel isolation (>55 dB @ 1 GHz). Each module consists of 2 groups of 1 \times 4 multiplexers. All test connections are made to BNCs on the module's edge. Off-channels can be resistively terminated.

Specifications for:

Option 010/HP 44470A Multiplexer

Option 011/HP 44471A General Purpose Relay

Option 013/HP 44473A Matrix Switch and

Option 017/HP 44477A Form-C Relay Switch Modules

Input Characteristics

Maximum Voltage (terminal-terminal or terminal-chassis):

250 V dc, 250 Vac rms, 350 Vac peak

Maximum Current: 2 A dc, 2 A ac rms

Maximum Power: 60 W dc, 500 VA ac

Thermal Offset: < 3 μ V

dc Isolation (40°C, 60% RH)

Channel-channel, open channel: > 10¹¹ Ω

ac Isolation/Performance

(50 Ω termination)	100 kHz	1 MHz	10 MHz
Insertion Loss (dB)	< 0.30	< 0.35	< 0.90
Crosstalk (dB)	< -73	< -53	< -33

Specifications for Option 012/HP 44472A VHF Switch Module

Input Characteristics

Maximum Voltage

Center-center, center-low: 250 Vdc, 30 Vac rms, 42 Vac peak

Low-chassis, low-low: 42 V dc

Maximum Current (per channel): 30 mA dc, 300 mA ac rms

Thermal Offset: < 15 μ V per channel

Characteristic Impedance: 50 Ω

ac Isolation/Performance

	30 MHz	100 MHz	300 MHz
Crosstalk (dB)			
Channel-Channel	< -100	< -85	< -65
Group-Group	< -85	< -85	< -50
Insertion Loss (dB)	< 0.5	< 0.75	< 1.25
VSWR	< 1.06	< 1.12	< 1.43

All channels break-before-make within a group of 4 channels.

Specifications for Option 014/HP 44474A

Digital I/O Module

I/O Lines

Maximum Voltage: +30 Vdc (line-chassis)

Output Characteristics: V (high) \geq 2.4 V; V (low) \leq 0.4 V

I (low) Maximum: 125 mA @ V (low) \leq 1.25 V; fused at 250 mA

Input Characteristics: V (high) \geq 2 V; V (low) \leq 0.8 V

External Increment: Advances HP 3488A to next programmed configuration on falling edge of TTL pulse

Channel Closed: Indicates completion of new configuration; TTL pulse

Specifications for Option 016/HP 44476A

Microwave Switch Module

Frequency Range: dc to 18 GHz

Isolation: > 90 dB

Impedance: 50 Ω

Insertion Loss: < 0.05 dB

SWR: 1.40

Specifications for Option 018/HP 44476B

Microwave Switch Module

Refer to HP 3331XX product specifications.

Specifications for Option 019/HP 44478A and Option 020/HP 44478B 1.3 GHz Multiplexers

Input Characteristics

Maximum Voltage: 42 V dc + ac peak

Maximum Current per Channel: 1 A DC or AC rms

Maximum Power per Channel: 24 W, 24 VA, or 44 dBm

Impedance: 50 Ω (Opt 019/HP 44478A)

75 Ω (Opt 020/HP 44478B)

ac Performance

	\leq 10 MHz	\leq 100 MHz	\leq 500 MHz	\leq 1.3 GHz
Insertion Loss (dB)				
\leq (40° C, 95% RH)	< 0.3	< 0.7	< 1.5	< 3.0
\leq (25° C, 40% RH), (Typ.)	< 0.2	< 0.5	< 1.1	< 1.9
Crosstalk (dB)				
Channel-Channel				
Channel-Common	< -90	< -80	< -65	< -55
Group-Group, Module-Module	< -90	< -80	< -70	< -60
VSWR	< 1.2	< 1.25	< 1.35	< 1.65

General Specifications

Environmental: Temperature: 0° to 55° C (32° to 130° F); humidity: 95%, 0° to 40° C (32° to 105° F)

Power: 86 to 132 V/195 to 250 V, switch-selectable; 48 to 440 Hz; 18 VA

Interface: HP-IB

Size: 89 mm H (without feet) \times 425 mm W \times 292 mm D (3.5 in \times 16.75 in \times 11.5 in). Allow 76 mm (3 in) additional depth for wiring.

Weight: Net, 8.5 kg (18.75 lb); shipping, 16 kg (35.25 lb)

Connectors: Removable screw terminal connector. Each terminal accepts 18 to 26 gauge (16 to 40 mils) wire, with strain relief for wiring.

Opt 012/HP 44472A VHF switch: BNC connectors

Opt 016/HP 44476A and Opt 018/HP 44476B microwave switch: SMA connectors

Ordering Information

HP 3488A Switch/Control Unit \$1,895

Switch Modules-Includes Terminal Connectors

Opt 010/HP 44470A 10-Channel Relay Multiplexer Module + \$550

Opt 011/HP 44471A 10-Channel General Purpose Relay Module + \$550

Opt 012/HP 44472A Dual 4-Channel VHF Switch Module + \$780

Opt 013/HP 44473A 4 \times 4 Matrix Switch Module + \$670

Opt 014/HP 44474A 16-Bit Digital Input/Output Module + \$550

Opt 015/HP 44475A Breadboard Module + \$220

Opt 016/HP 44476A Microwave Switch Module + \$2,540

Opt 017/HP 44477A Form-C Relay Module + \$550

Opt 018/HP 44476B Microwave Switch Module + \$550

Opt 019/HP 44478A 1.3 GHz 50 Ω Mux + \$1,000

Opt 020/HP 44478B 1.3 GHz 75 Ω Mux + \$1,080

Rackmounting and Manuals

Opt 401 Side Handle Kit (HP p/n 5061-1171) + \$50

Opt 907 Front Handle Kit (HP p/n 5061-1170) + \$60

Opt 908 Rack Flange Kit (HP p/n 5061-1168) + \$40

Opt 909 Rack Flange with Handles (HP p/n 5061-1169) + \$90

Opt 910 Extra Operating and Service Manuals + \$110

Opt W30 Three-Year Hardware Support + \$60