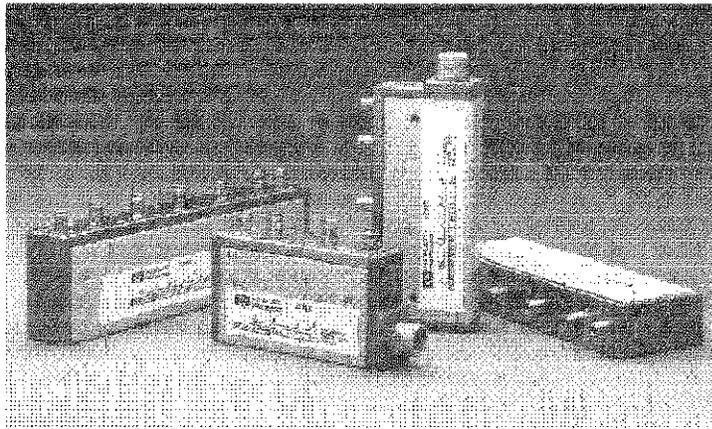


HP

HP 8766,7,8,9K

Switch

Microwave Single-Pole Multi-Throw Switches



DC to 18, 26.5 GHz

Features and description

- Exceptional reliability, long life (5,000,000 cycles minimum)
- Excellent repeatability
- Compact
- Easy HP-IB implementation for ATE applications
- Single-pole, multiple-throw models available:
 - three-throw (HP 8766K)
 - four-throw (HP 8767K)
 - five-throw (HP 8768K)
 - six-throw (HP 8769K)

This family of HP single-pole, multiple-throw switches utilize the same proven technology as the well known HP 849X family of step attenuators. These products offer the same rugged reliability, excellent repeatability (typically 0.01 dB to 18 GHz and 0.05dB to 26.5 GHz), long life (greater than 5 million switching cycles), compact-ness, and broadband performance as the

849X family. Each product consists of 2 to 5 solenoid driven switching sections connected in series. The solenoid armatures are held in place with permanent magnets able to withstand shocks over 10 g's. The sections switch within 20 milliseconds, including contact settling time, which is of importance for automatic test applications. The switches include self-interrupting contacts which minimize power consumption and simplify the driver circuit design (Figure 1). Each model is available with a wide range of solenoid voltage choices (24 volts, standard, or optionally 5 or 15 volts) to match your product or system's requirements.

Section switching

Figure 1 shows one switching section schematic. Each section utilizes one solenoid with dual coil windings, one coil to switch in the RF connector and one coil to switch in the thru line.

With a positive voltage applied to the common pin, the state (RF connector or thru line) of a particular section is determined by connecting its RF connector pin or thru pin to a negative voltage or ground. Tables 1 through 4 define the pin assignments for the different switches.

As a section is switched, the internal contacts of the activated coil open, thus shutting off current flow. At the same time, the internal contacts for the other coil close so that it can be activated when desired. Figure 1 shows a section that has been switched to the RF connector position (note the closed thru line coil contact). The switching is "break-before-make" type, thus a momentary interruption of the RF signal occurs at switching.

Although all sections can be switched simultaneously, the attenuator drive must not allow both pins of the same section (e.g. Section 1, pins 5 and 6) to be activated concurrently, or else that section would cycle rapidly. All terminals are "floating", so bipolar or unipolar power supplies may be used.

Typical Driver Circuit

Figure 1 shows an economical TTL compatible driver circuit for a single switching section utilizing an IC relay driver and an inverter. A TTL "HP" input to the driver switches in the RF connector, while a "LO" will activate the thru line for that section. This provides a complementary driver for the section which assures that only one solenoid of the pair is activated at a time. Diode protection is required to protect the IC from the solenoid voltage flyback.

Switch position can be indicated remotely by utilizing the open and closed states of the internal coil contacts. The shaded areas of Figure 1 display two indicator circuits, one providing a TTL output and one that activates an LED. These circuits will output a TTL "HP" (LED lamp "ON") if the RF connector is in the RF circuit, and will output a TTL "LO" (LED) lamp "OFF") if the thru line is in the RF circuit. Since current is drawn through the coil for these circuits, inadvertent switching is prevented by limiting the current to 5 mA.

Hewlett-Packard assumes no responsibility for the use of any circuits described herein and makes no representation or warranties, express or implied, that such circuits are free from patent infringement.

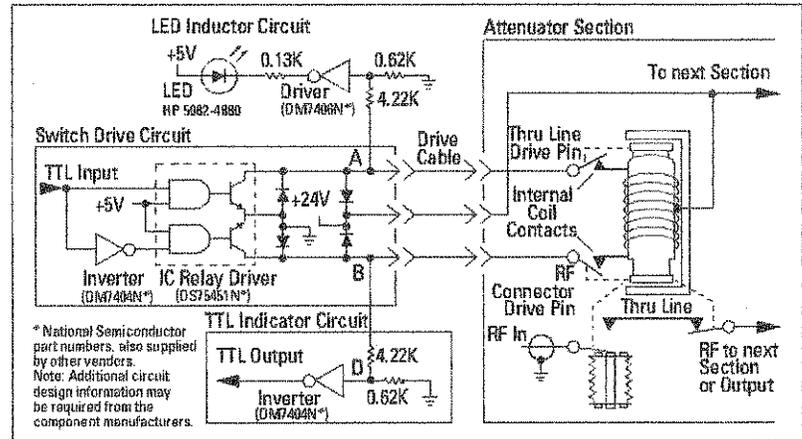


Figure 1.

HP-IB Attenuator/ Switch Driver

Employing programmable HP step attenuators and switches in an automatic test system becomes an easy task when the HP 11713A or 87130A Attenuator/Switch Driver is specified into the system. The HP 11713A has all of the necessary features to provide HP-IB control of up to ten switching sections of the HP 8766/7/8/9 series switches (e.g., five HP 8766s, two HP 8769s etc.).

The HP 11713A includes an integral power supply (with short circuit protection) that can simultaneously provide 125 millamps at 24 volts to all contacts for control of the attenuators and switches, so no external power supply is needed. Each HP 11713A is provided with two (2) plug-in drive cables for the programmable switches to simplify connection to the driver.

The HP 11713A also features convenient front panel keys so the user can manually activate the individual switch sections when in the "local" mode. Switching time for the drivers is less than 10 milliseconds.

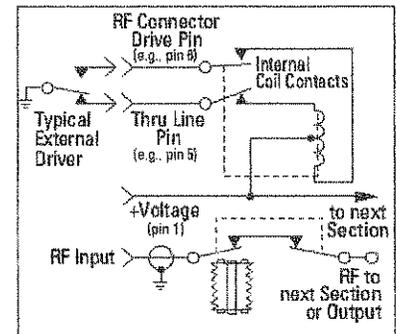


Figure 2.

The HP 87130A is a 3.5 inch high, full width System II attenuator/switch driver capable of driving up to 248 bistatic electromechanical switches or attenuator sections. The HP 87130A is controlled over HP-IB via standard commands for programmable instruments (SCPI) commands. The HP 87130A has been designed for use in both ATE switching systems and computer controlled bench top applications.

More configuration details are available on the HP 11713A and 87130A in literature piece 5963-2038E.

Isolation and Insertion Loss

Isolation and insertion loss vary with frequency and depend on the port selected as shown in the chart and tables below. The input connector "C" is always defined as the connector at the opposite end of the switch from the dc drive cable.

The output ports are numbered sequentially from the input connector. For example, if an HP 8768K is being used, use the HP 8768K table to read isolation to each port. If port three (the third connector from the input) is selected, the isolation to ports 1 and 2 will follow curve A. Isolation to port 4 will follow curve B and isolation to port 5 will follow curve C. Reading from Figure 3 at 8 GHz, the worst case isolation to ports 1 and 2 will be 30 dB; to port 4, 45 dB, and to port 5, 65 dB. Note that in selecting ports 1 or 2, isolation to disconnected ports can be varied by choosing the position of each section to "thru" or "on". The important thing to note is that, depending on the user's application, port assignments can be important to optimize performance at higher frequencies.

All isolation tables refer to Figure 3.

Specifications

Frequency Range: dc to 26.5 GHz all models or dc to 18 GHz for Option 002 (SMA Connectors)

Maximum SW

| Frequency (GHz): | dc to 8 | 8 to 12.4 | 12.4 to 18 | 18 to 26.5 |
|------------------|---------|-----------|------------|------------|
| HP 8766K | | | | |
| HP 8767K | 1.3 | 1.5 | 1.6 | 1.8 |
| HP 8768K | | | | |
| HP 8769K | 1.3 | 1.55 | 1.8 | 2.05 |

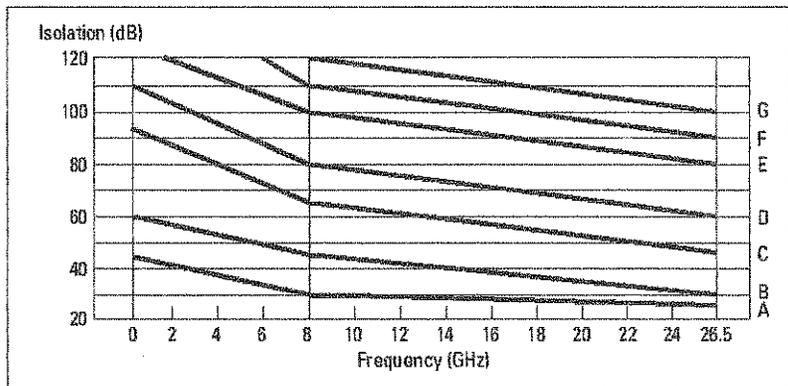
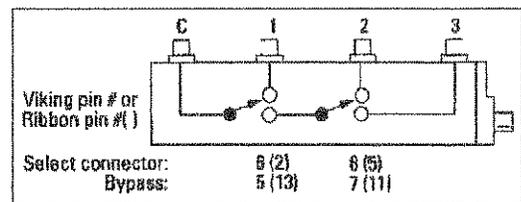


Figure 3. Isolation curves

| Port Selected | X-Activated Viking cable pin/wire # and color of ribbon pin # () | | | | Section Status | | Isolation curve (see Table 3) for port # | | |
|---------------|---|-----------------------|----------------------------|----------------------------|----------------|-----------|--|--------|--------|
| | Section 1 | | Section 2 | | 1 | 2 | 1 | 2 | 3 |
| 1 | 6 (2) YEL Conn. X X | 5 (13) VIO Thru | 8 (5) GRN Conn. X | 7 (11) VLK Thru X | On On | On Off | - | B C | D B |
| 2 | | X | X | | Off | On | A | - | B |
| 3 | | X | | X | Off | Off | A | A | - |

Note 1: Red wire, pin(1) of viking cable, or brown wire, pin(6) of ribbon cable must be connected to + 24 vac.

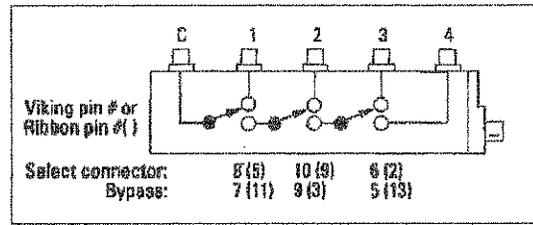
Table 1. HP 8766K with switch profile with connector and pin assignments.



| Port Selected | X = Activated Viking cable pin/wire # and color or ribbon pin # () | | | | | | Section Status | | | Isolation curve (see Table 3) for Port# | | | | | | |
|---------------|---|--------|-----------|-------|-----------|--------|----------------|-----|-----|---|-----|-----|---|---|---|---|
| | Section 1 | | Section 2 | | Section 3 | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | | | |
| 1 | 8 (5) | 7 (11) | 10 (9) | 9 (3) | 6 (2) | 5 (13) | On | On | On | - | B | D | E | | | |
| | GRN | BLK | BLU | ORN | YEL | V/O | | | | On | On | Off | - | B | E | D |
| | Conn. | Thru | Conn. | Thru | Conn. | Thru | | | | On | Off | On | - | C | B | C |
| | X | | X | | X | X | | | | On | Off | Off | - | C | C | B |
| 2 | X | | X | | X | | Off | On | On | A | - | B | C | | | |
| | X | | X | | X | X | Off | On | Off | A | - | C | B | | | |
| 3 | X | | X | | X | | Off | Off | On | A | A | - | A | | | |
| 4 | X | | X | | X | | Off | Off | Off | A | A | A | - | | | |

Note 1: Red wire, pin(1) of viking cable, or brown wire, pin(6) of ribbon cable must be connected to + 24 vdc.

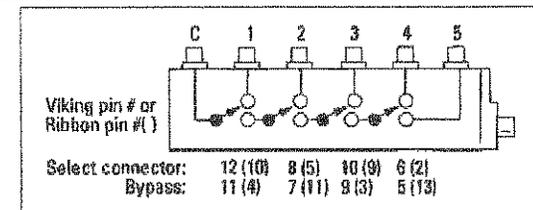
Table 2.
HP 8767K with switch profile with connector and pin assignments.



| Port Selected | X = Activated Viking cable pin/wire # and color or ribbon pin # () | | | | | | | | Section Status | | | | Isolation curve for port # | | | | | | | | |
|---------------|---|--------|-----------|--------|-----------|-------|-----------|--------|----------------|-----|-----|-----|----------------------------|-----|-----|----|---|---|---|---|---|
| | Section 1 | | Section 2 | | Section 3 | | Section 4 | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | | | | |
| 1 | 12 (10) | 11 (4) | 8 (5) | 7 (11) | 10 (9) | 9 (3) | 6 (2) | 5 (13) | On | On | On | On | - | B | D | E | F | | | | |
| | WHT | BRN | GRN | BLK | BLU | ORN | YEL | VIO | | | | | On | On | Off | On | - | B | E | D | E |
| | Conn. | Thru | Conn. | Thru | Conn. | Thru | Conn. | Thru | | | | | On | Off | On | On | - | C | B | D | E |
| | X | | X | | X | X | X | X | | | | | On | Off | Off | On | - | C | C | B | C |
| 2 | X | | X | | X | | X | | Off | On | On | On | A | - | B | D | E | | | | |
| | X | | X | | X | X | X | | Off | On | Off | On | A | - | C | B | C | | | | |
| 3 | X | | X | | X | | X | | Off | Off | On | On | A | A | - | B | C | | | | |
| 4 | X | | X | | X | X | X | | Off | Off | Off | On | A | A | A | - | A | | | | |
| 5 | X | | X | | X | | X | | Off | Off | Off | Off | A | A | A | A | - | | | | |

Note 1: Red wire, pin(1) of viking cable, or brown wire, pin(6) of ribbon cable must be connected to + 24 vdc.

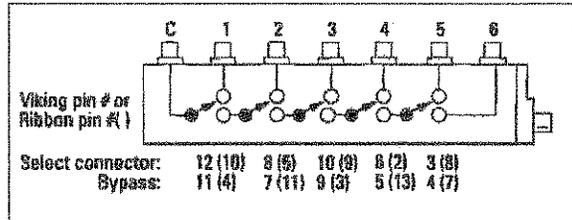
Table 3.
HP 8768K with switch profile with connector and pin assignments.



| Port Selected | X = Activated Viking cable pin/wire # and color or ribbon pin # () | | | | | | | | | | Section Status | | | | | Isolation curve for port # | | | | | |
|---------------|---|--------|-----------|--------|-----------|-------|-----------|--------|-----------|-------|----------------|-----|-----|-----|----|----------------------------|---|---|---|---|---|
| | Section 1 | | Section 2 | | Section 3 | | Section 4 | | Section 5 | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | 12 (10) | 11 (4) | 8 (5) | 7 (11) | 10 (9) | 9 (3) | 6 (2) | 5 (13) | 3 (8) | 4 (7) | | | | | | | | | | | |
| | WHT | BRN | GRN | BLK | BLU | ORN | YEL | VIO | GRY | WT/RD | | | | | | | | | | | |
| | Conn. | Thru | Conn. | Thru | Conn. | Thru | Thru | Thru | Thru | Thru | | | | | | | | | | | |
| | X | | X | | X | | X | X | X | | On | On | On | On | On | - | B | D | E | F | G |
| | X | | X | | X | | | | X | | On | On | On | Off | On | - | B | D | F | E | F |
| | X | | X | | | X | | | X | | On | On | Off | On | On | - | B | E | D | E | F |
| | X | | | X | X | | X | | X | | On | Off | On | On | On | - | C | B | D | E | F |
| X | | | X | X | X | X | X | X | | On | Off | Off | On | On | - | C | C | B | C | E | |
| X | | | X | X | X | | X | | X | On | Off | Off | Off | On | - | C | C | C | B | D | |
| X | | | X | X | X | | X | | X | On | Off | Off | Off | Off | - | C | C | C | C | B | |
| 2 | | X | X | | X | | X | | X | | Off | On | On | On | A | - | B | D | E | E | |
| | | X | X | | | X | X | | X | | Off | On | Off | On | A | - | C | B | C | F | |
| | | X | X | | | X | | X | X | | Off | On | Off | Off | A | - | C | C | C | B | |
| 3 | | X | X | | X | | X | | X | | Off | Off | On | On | A | A | - | B | C | E | |
| | | X | | X | X | | | X | X | | Off | Off | On | Off | A | A | - | A | B | D | |
| | | X | | X | X | | | X | X | | Off | Off | On | Off | A | A | - | C | C | A | |
| 4 | | X | | X | | X | X | X | X | | Off | Off | Off | Off | A | A | A | - | A | C | |
| 5 | | X | | X | | X | | X | X | | Off | Off | Off | Off | A | A | A | A | - | B | |
| 6 | | X | | X | | X | | | X | | Off | Off | Off | Off | A | A | A | A | A | - | |

Note 1: Red wire, pin(1) of viking cable, or brown wire, pin(6) of ribbon cable must be connected to + 24 voc.

Table 4.
HP 8769K with switch profile with connector and pin assignments.



Ordering Information

Maximum Insertion Loss

| | |
|--------|-----------------------|
| Port 1 | 0.2 dB +0.05 dB/GHz |
| Port 2 | 0.2 dB +0.06 dB/GHz |
| Port 3 | 0.2 dB +0.08 dB/GHz |
| Port 4 | 0.25 dB +0.095 dB/GHz |
| Port 5 | 0.25 dB +0.108 dB/GHz |
| Port 6 | 0.25 dB +0.12 dB/GHz |

RF Input Power (max):

1 watt average, 100 watts peak
(10 μ s pulse width)

Life (min):

5 million cycles per section

Repeatability

0.01 dB, typ. to 18 GHz, 0.05 dB,
typ. to 26.5 GHz (up to 5,000,000
cycles)

Environment Capabilities

Temperature, Operating:

-20° to +75°C

Temperature, Non-Operating:

-55° to +85°C

Altitude, Operating:

15,000 ft (4,570 meters)

Altitude, Non-Operating:

50,000 ft (13,700 meters)

Humidity:

Cycling 5 days, 40°C at 95% RH
with condensation

Shock, Operating:

10 g's, 6 ms, on six sides, three
blows Shock, Non-Operating: 500
g's, 1.8 ms, in six directions

Vibration, Operating:

5 g's, 34 to 2000 Hz

EMC:

Radiated interference is within the
requirements of MIL-STD-461B
method RE02, VDE 0871 and
CTSPR Publication 11

HP 8766K Single-pole, three-throw

HP 8767K Single-pole, four-throw

HP 8768K Single-pole, five-throw

HP 8769K Single-pole, six-throw

Option

002 SMA RF Connectors (for use to 18 GHz)

008 8 inch ribbon cable

011 5 volt solenoid assembly

015 15 volt solenoid assembly

016 16 inch ribbon cable

UK6 SWR and Insertion Loss Data measured with an automatic network analyzer with very small uncertainties; directly traceable to NIST standards. Calibration frequencies: 1.5 to 26.5 GHz, every 0.25 GHz.

Other combinations can be created for your applications, refer to App. Note 332- 1.

Mechanical Information

| Net weight: | HP 8766K | HP 8767K | HP 8768K | HP 8769K |
|-------------|-----------------------|-----------------------|------------------------|------------------------|
| | 178 grams (6.3 oz) | 235 grams (8.3 oz) | 292 grams (10.3 oz) | 349 grams (12.3 oz) |

Mounting position: For any orientation, holes are threaded for a metric screw (m 3 x 0.5 x 5.1 deep).^A

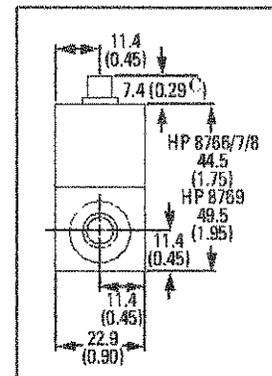
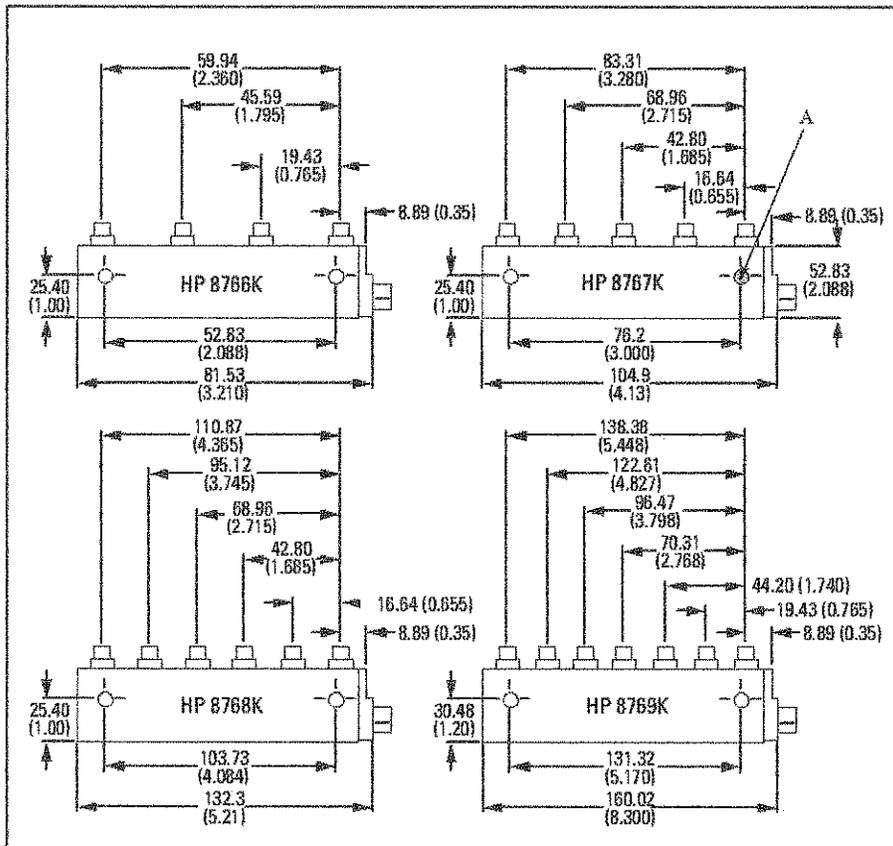
RF connectors: 3.5mm female (SMA compatible)
Option 002 SMA (for use only to 18 GHz)

Switching speed: Maximum 20 msec including settling time.

| Solenoids | Coil voltage | Switching current ^B | Nominal coil impedance |
|------------|--------------------|--------------------------------|------------------------|
| Standard | 24V (20 to 30V) | 130 mA (at 24V) | 185 Ohms |
| Option 015 | 15V (13 to 22V) | 187 mA (at 15V) | 80 Ohms |
| Option 011 | 5V (4 to 7V) | 332 mA (at 5V) | 17 Ohms |

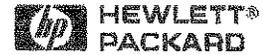
B. Current per section; approximately 8 msec duration before internal contacts open the coil circuit.

Accessory provided (except Option 008 and 016): Solenoid drive plug on 5-foot cable included. (Replacement plug and cable assembly available as HP Part Number 8120-2178, except HP 8769K P/N 5061-0969.)



C. This dimension applies to connectors on each end of the switch. Connectors between the ends are 0.05 inches taller.

Figure 4. Dimensions in millimeters and (inches)



For more information about Hewlett-Packard test and measurement products, applications, services, and for a current sales office listing, visit our web site, <http://www.hp.com/go/tmdir>. You can also contact one of the following centers and ask for a test and measurement sales representative.

United States:

Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:

Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario L4W 5G1
(905) 206 4725

Europe:

Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:

Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192, Japan
Tel: (81) 426-56-7832
Fax: (81) 426-56-7840

Latin America:

Hewlett-Packard
Latin American Region Headquarters
5200 Blue Lagoon Drive, 9th Floor
Miami, Florida 33126, U.S.A.
(305) 267 4245/4220

Australia/New Zealand:

Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130, Australia
1 800 629 485

Asia Pacific:

Hewlett-Packard Asia Pacific Ltd.
17-21/F Shell Tower, Times Square,
1 Matheson Street, Causeway Bay,
Hong Kong
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5959-7831

Low Profile Multiport

Specifications

| HP Model | 8766K | 8767K | 8768K | 8769K |
|----------------------------------|---|-------|-------|---|
| Configuration | SP3T | SP4T | SP5T | SP6T |
| Features | Unlatched Break-before-make Current interrupts Position indication capability ¹ | | | |
| Impedance | 50 Ω | | | |
| Frequency Range | dc to 26.5 GHz | | | |
| Insertion Loss (dB) | Signal Path Common to Port 1: 0.2 dB + 0.05 dB x f (GHz) Common to Port 2: 0.2 dB + 0.06 dB x f (GHz) Common to Port 3: 0.2 dB + 0.08 dB x f (GHz) Common to Port 4: 0.25 dB + 0.095 dB x f (GHz) Common to Port 5: 0.25 dB + 0.108 dB x f (GHz) Common to Port 6: 0.25 dB + 0.12 dB x f (GHz) | | | |
| SWR (Through Line) | <1.3 to 0 GHz <1.5 to 12.4 GHz <1.6 to 18 GHz <1.8 to 26.5 GHz | | | <1.3 to 8 GHz <1.55 to 12.4 GHz <1.8 to 18 GHz <2.05 to 26.5 GHz |
| Isolation (dB) | See chart on page 107 | | | |
| Input Power | 1 W | | | |
| Average Peak ² | 100 W (10 μ s max) | | | |
| Switching Time (max) | 30 ns | | | |
| Repeatability (max) ³ | 0.01 dB to 18 GHz 0.05 dB to 26.5 GHz | | | |
| Life (min) | 5,000,000 cycles | | | |
| RF Connectors | 3.5 mm (f) | | | |
| DC Connectors | Viking cable connector | | | |

Options

| Supply Voltage, Current, and Impedance | Std. | Opt. 011 | Opt. 015 |
|--|--------------------------------|----------------------|---------------------|
| Supply Voltage Range | 20 to 30 Vdc | 4.5 to 7 Vdc | 13 to 22 Vdc |
| Supply Voltage (nom) | 24 Vdc | 5 Vdc | 15 Vdc |
| Current (nom) | 130 mA | 252 mA | 187 mA |
| Impedance (nom) | 185 Ω , 65 nH | 17 Ω , 5.5 nH | 80 Ω , 30 nH |
| RF Connectors | Opt. 002: SMA (f) ⁴ | | |
| DC Connectors | Opt. 008: 8-inch ribbon cable | | |
| | Opt. 018: 16-inch ribbon cable | | |
| Calibration Documentation | See ordering information | | |


 Refer to the following URL for standard model only:
<http://www.hp.com/go/lowprofile>
 Contact HP Direct or your local HP sales representative to confirm data sheet.

¹Provides position sensing when used with HP 87130A/70611A switch driver or customer supplied external circuitry.

²Not to exceed 1 W average (non-switching).

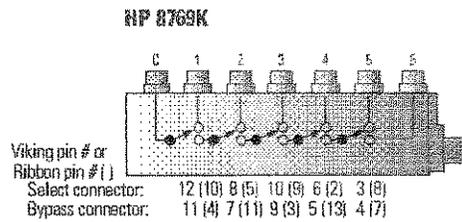
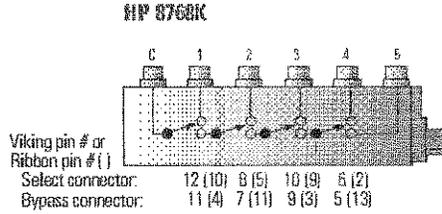
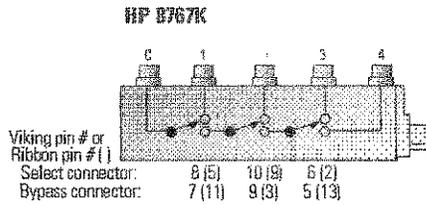
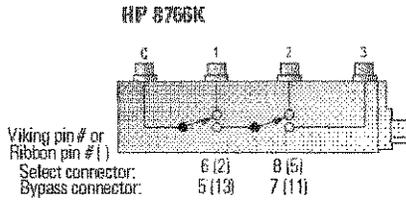
³Measured at 25 °C.

⁴Use to 18 GHz only.

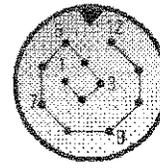


Low Profile Multiport

Simplified Schematics

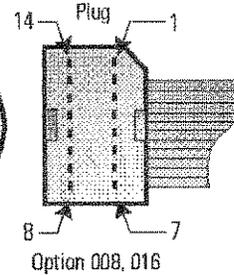


Viking Plug Detail^{1,2}



STD

DIP Plug³



¹DC drive interface cable has color coded tinned leads at opposite end.

²Supply voltage is Pin 1 (red wire).

³Supply voltage is Pin 6.

Dimensions are in millimeters (inches) nominal, unless otherwise specified.



Low Profile Multiport

Signal Path Control Data

The tables below can be used to better understand how to select a signal path for each switch. The standard drive connector for each switch is a Viking connector with a 5 ft. cable. Alternately, a flat ribbon cable with a 14-pin DIP plug is available as an option. As an example, to connect the path from port C to port 2 of the standard HP 8767K, it is required that the supply voltage be applied

to pin 1 (red lead) and that pin 10 (blue lead) and pin 7 (black lead) are grounded. This will "bypass" port 1 and "select" port 2. Note that section 3 can be selected or bypassed; however, isolation performance will be affected (see next page for further information). Additional information related to signal path control can be found in the product data sheet.

HP 8766K SP3T Switch

| Switching Section | 1 | | 2 | |
|---|--------|--------|--------|--------|
| Section State | Select | Bypass | Select | Bypass |
| Std. Viking Pin | 6 | 5 | 8 | 7 |
| Std. Viking Wire Color | Yellow | Violet | Green | Black |
| Opt. 008/016 Dual In-line Pin Connector | 2 | 13 | 5 | 11 |
| Common to Port 1 | X | | | |
| Common to Port 2 | | X | X | |
| Common to Port 3 | | X | | X |

HP 8767K SP4T Switch

| Switching Section | 1 | | 2 | | 3 | |
|---|--------|--------|--------|--------|--------|--------|
| Section State | Select | Bypass | Select | Bypass | Select | Bypass |
| Std. Viking Pin | 8 | 7 | 10 | 9 | 6 | 5 |
| Std. Viking Wire Color | Green | Black | Blue | Orange | Yellow | Violet |
| Opt. 008/016 Dual In-line Pin Connector | 5 | 11 | 9 | 3 | 2 | 13 |
| Common to Port 1 | X | | | | | |
| Common to Port 2 | | X | X | | | |
| Common to Port 3 | | X | | X | X | |
| Common to Port 4 | | X | | X | | X |

HP 8768K SP5T Switch

| Switching Section | 1 | | 2 | | 3 | | 4 | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|
| Section State | Select | Bypass | Select | Bypass | Select | Bypass | Select | Bypass |
| Std. Viking Pin | 12 | 11 | 8 | 7 | 10 | 9 | 6 | 5 |
| Std. Viking Wire Color | White | Brown | Green | Black | Blue | Orange | Yellow | Violet |
| Opt. 008/016 Dual In-line Pin Connector | 10 | 4 | 5 | 11 | 9 | 3 | 2 | 13 |
| Common to Port 1 | X | | | | | | | |
| Common to Port 2 | | X | X | | | | | |
| Common to Port 3 | | X | | X | X | | | |
| Common to Port 4 | | X | | X | | X | X | |
| Common to Port 5 | | X | | X | | X | | X |

HP 8769K SP6T Switch

| Switching Section | 1 | | 2 | | 3 | | 4 | | 5 | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|
| Section State | Select | Bypass |
| Std. Viking Pin | 12 | 11 | 8 | 7 | 10 | 9 | 6 | 5 | 4 | 3 |
| Std. Viking Wire Color | White | Brown | Green | Black | Blue | Orange | Yellow | Violet | Gray | White/Red |
| Opt. 008/016 Dual In-line Pin Connector | 10 | 4 | 5 | 11 | 9 | 3 | 2 | 13 | 8 | 7 |
| Common to Port 1 | X | | | | | | | | | |
| Common to Port 2 | | X | X | | | | | | | |
| Common to Port 3 | | X | | X | X | | | | | |
| Common to Port 4 | | X | | X | | X | X | | | |
| Common to Port 5 | | X | | X | | X | | X | X | |
| Common to Port 6 | | X | | X | | X | | X | | X |

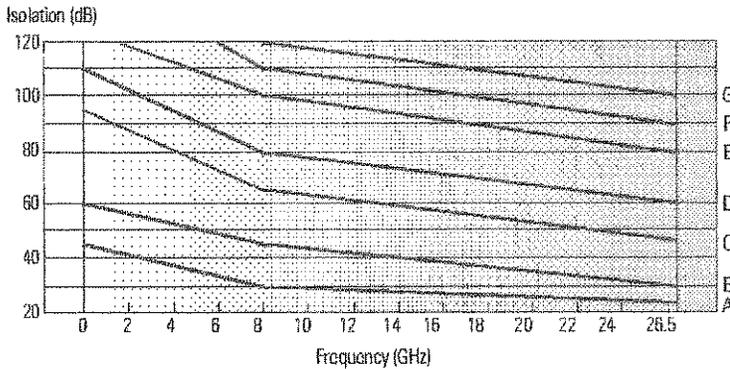
 Sections identified by this cross-hatch symbol can be selected or bypassed; however, isolation performance will be affected (see next page for further information).

Low Profile Multiport

Isolation Calculation Characteristics

Isolation and insertion loss vary with frequency and depend on the port selected as shown in the chart and tables below. The input connector "C" is always defined as the connector at the end of the switch opposite the dc drive cable. The output ports are numbered sequentially from the input connector. For example, if an HP 8768K is being used, use the HP 8768K table to determine the isolation to each port. If port three (the third connector from the input) is selected, the isolation

to ports 1 and 2 will follow curve A. Isolation to port 4 will follow curve B and isolation to port 5 will follow curve C. At 8 GHz, the worst case isolation to ports 1 and 2 will be 30 dB; to port 4, 45 dB, and to port 5, 65 dB. Note: in selecting ports 1 or 2, isolation to disconnected ports can be varied by choosing the position of each section to "bypass" or "select". Depending on the user's application, port assignments can be critical for optimizing performance at higher frequencies.



HP 8766K SP3T Switch

| Section | Section Status | | Isolation Curve for Port () | | |
|------------------|----------------|--------|------------------------------|---|---|
| | 1 | 2 | 1 | 2 | 3 |
| Common to Port 1 | Select | Select | - | B | D |
| Common to Port 1 | Select | Bypass | - | C | B |
| Common to Port 2 | Bypass | Select | A | - | B |
| Common to Port 3 | Bypass | Bypass | A | A | - |

HP 8767K SP4T Switch

| Section | Section Status | | | Isolation Curve for Port () | | | |
|------------------|----------------|--------|--------|------------------------------|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| Common to Port 1 | Select | Select | Select | - | B | D | E |
| Common to Port 1 | Select | Select | Bypass | - | B | E | D |
| Common to Port 1 | Select | Bypass | Select | - | C | B | D |
| Common to Port 1 | Select | Bypass | Bypass | - | C | C | B |
| Common to Port 2 | Bypass | Select | Select | A | - | B | C |
| Common to Port 2 | Bypass | Select | Bypass | A | - | C | B |
| Common to Port 3 | Bypass | Bypass | Select | A | A | - | A |
| Common to Port 4 | Bypass | Bypass | Bypass | A | A | A | - |



Low Profile Multiport

Isolation Calculation Characteristics

HP 8768K SP5T Switch

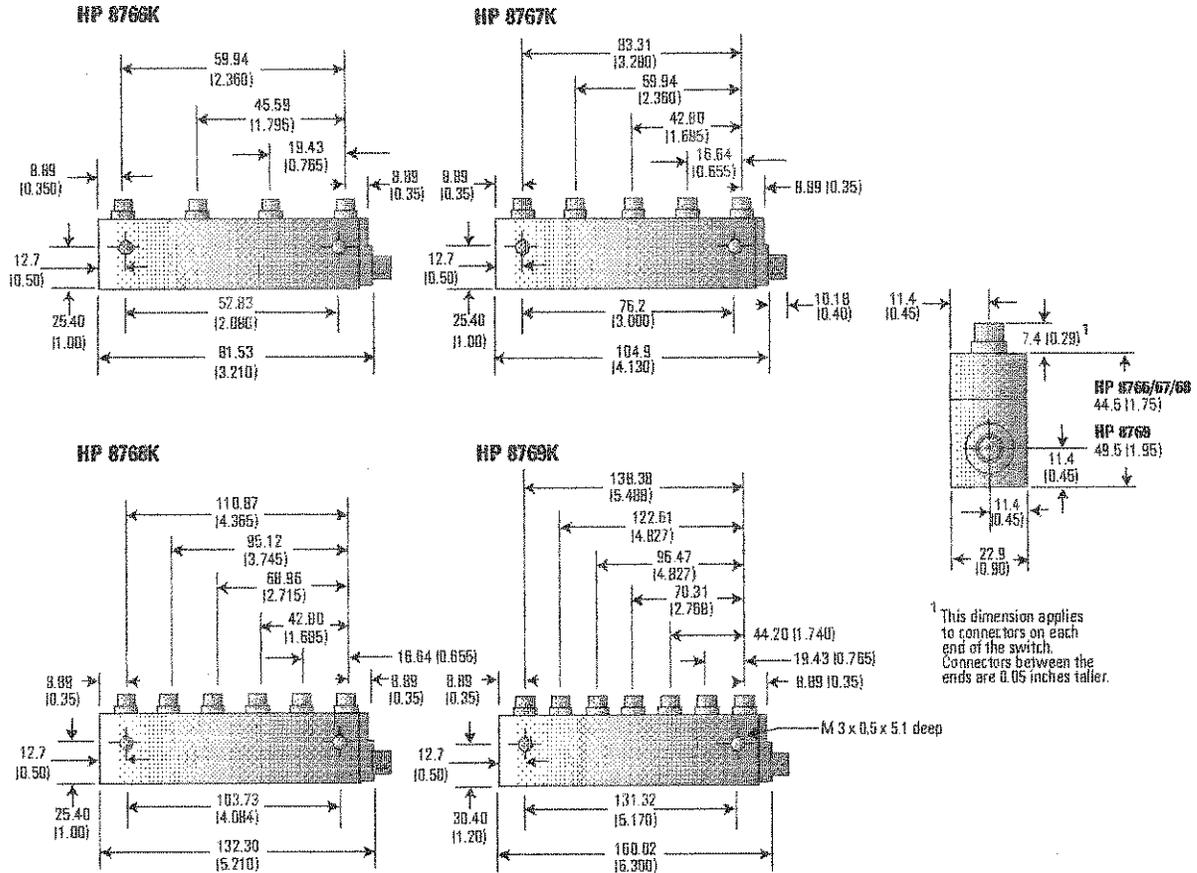
| Section | Section Status | | | | Isolation Curve for Port () | | | | |
|------------------|----------------|--------|--------|--------|------------------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 |
| Common to Port 1 | Select | Select | Select | Select | - | B | D | E | F |
| Common to Port 1 | Select | Select | Bypass | Select | - | B | E | D | E |
| Common to Port 1 | Select | Bypass | Select | Select | - | C | B | D | E |
| Common to Port 1 | Select | Bypass | Bypass | Select | - | C | C | B | C |
| Common to Port 2 | Bypass | Select | Select | Select | A | - | B | D | E |
| Common to Port 2 | Bypass | Select | Bypass | Select | A | - | C | B | C |
| Common to Port 3 | Bypass | Bypass | Select | Select | A | A | - | B | C |
| Common to Port 4 | Bypass | Bypass | Bypass | Select | A | A | A | - | A |
| Common to Port 5 | Bypass | Bypass | Bypass | Bypass | A | A | A | A | - |

HP 8769K SP6T Switch

| Section | Section Status | | | | | Isolation Curve for Port () | | | | | |
|------------------|----------------|--------|--------|--------|--------|------------------------------|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| Common to Port 1 | Select | Select | Select | Select | Select | - | B | D | E | F | G |
| Common to Port 1 | Select | Select | Select | Bypass | Select | - | B | D | F | E | F |
| Common to Port 1 | Select | Select | Bypass | Select | Select | - | B | E | D | E | F |
| Common to Port 1 | Select | Bypass | Select | Select | Select | - | C | B | D | E | F |
| Common to Port 1 | Select | Bypass | Bypass | Select | Select | - | C | C | B | C | F |
| Common to Port 1 | Select | Bypass | Bypass | Bypass | Select | - | C | C | C | B | D |
| Common to Port 1 | Select | Bypass | Bypass | Bypass | Bypass | - | C | C | C | C | B |
| Common to Port 2 | Bypass | Select | Select | Select | Select | A | - | B | D | E | E |
| Common to Port 2 | Bypass | Select | Bypass | Select | Select | A | - | C | B | C | F |
| Common to Port 2 | Bypass | Select | Bypass | Bypass | Bypass | A | - | C | C | C | B |
| Common to Port 3 | Bypass | Bypass | Select | Select | Select | A | A | - | B | C | E |
| Common to Port 3 | Bypass | Bypass | Select | Bypass | Select | A | A | - | A | B | D |
| Common to Port 3 | Bypass | Bypass | Select | Bypass | Bypass | A | A | - | D | C | A |
| Common to Port 4 | Bypass | Bypass | Bypass | Select | Bypass | A | A | A | - | A | C |
| Common to Port 5 | Bypass | Bypass | Bypass | Bypass | Select | A | A | A | A | - | B |
| Common to Port 6 | Bypass | Bypass | Bypass | Bypass | Bypass | A | A | A | A | A | - |

Low Profile Multiport

Outline Drawings



All connectors are 3.5 mm (f). Dimensions are in millimeters (inches) nominal, unless otherwise specified.

Ordering Information

HP 8766/67/68/69 Series Ordering Example

| Type | Supply Voltage | HP Connector | DC Connector | Calibration Documentation |
|---------|----------------|-----------------|-----------------------------|--|
| 6: SP3T | Std: 24 Vdc | Std: 3.5 mm (f) | Std: Viking cable connector | UK6: Commercial calibration test data with certificate |
| 7: SP4T | 01: 15 Vdc | 002: SMA (f) | 008: 8-inch ribbon cable | UK6: Commercial calibration test data with certificate |
| 8: SP5T | 015: 15 Vdc | | 015: 16-inch ribbon cable | UK6: Commercial calibration certificate |
| 9: SP6T | | | | |