



Attenuator and Switch Driver

model
11713A



Technical Data August 1983

An integrated approach for easy control of
programmable attenuators and switches.



The 11713A combines the features of an HP-IB* programmable switch actuator with a 24 volt power supply. It is designed to drive one or two external step attenuators and one or two electro-mechanical switches. The power supply and switchable contacts can also be used

as a general purpose driver for up to ten external relays. Control is accomplished through manual front panel pushbuttons as well as by automatic HP-IB commands. The two drive cables provided allow convenient hook-up for the HP programmable attenuators.

Controlling HP Programmable Attenuators

Pushbuttons one through four (attenuator X) and pushbuttons five through eight (attenuator Y) can be used to control any of the HP 8494/5/6/7, or 33320/1/2/3 series, or any similar programmable step attenuator.

Each pushbutton controls a pair of transistor switches that connect the appropriate attenuator relay coil to ground. By activating the appropriate relay coil, either the attenuation card or the thru-line of each attenuator section is selected.

Connection between the 11713A and an attenuator is made by a 12-conductor drive cable with connectors at each end that simply plug into the 11713A and the attenuator.

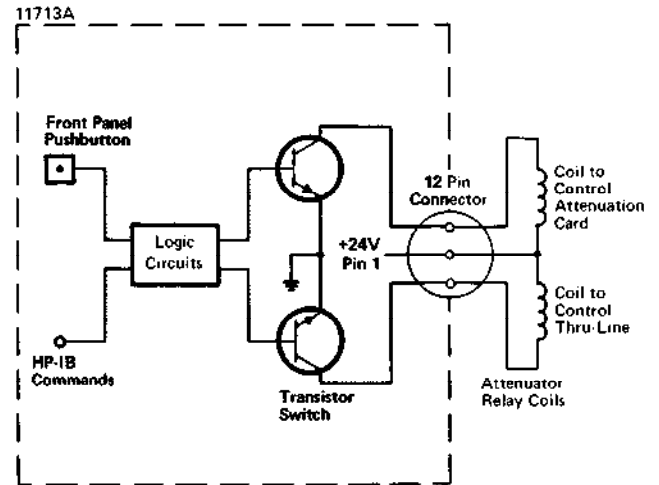


Figure 1. Simplified diagram of 11713A's attenuator driving circuit.

Relay Driving Applications

Since the ten front panel pushbuttons each control a switch, they can also be used to control up to 10 external 24 volt relays. The use of diodes across the relay coils is recommended to reduce voltage transients. Figure 2 shows a diagram of one pair of wires which would be used to control one 24 volt relay.

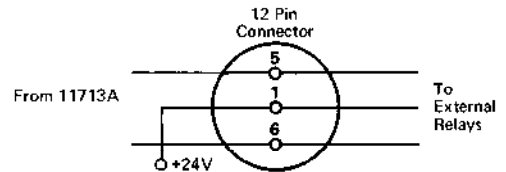


Figure 2. 11713A wiring diagram to control external relays.

Controlling HP Electro-Mechanical Switches

Pushbuttons nine and zero on the front panel can be used to control both HP 8761B and 33311B/C microwave switches. Rear panel banana plug connectors provide a 24 volt common and two pairs of switchable contacts. See Figure 3 for the switching diagram of these contacts.

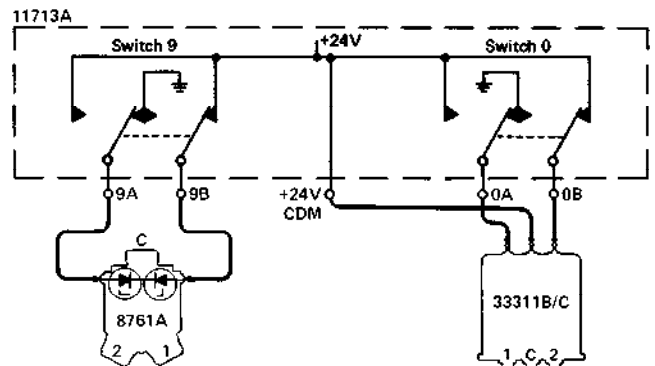


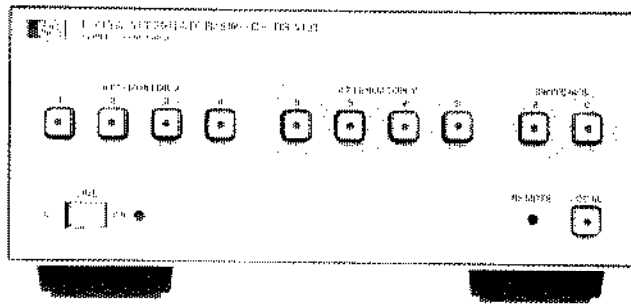
Figure 3. 11713A switching circuit for Banana Plug contacts. (Contact shown in initial power up position with ports 1 and C connected.)

* HP's implementation of the IEEE standard 488.

Front & Rear Panel Controls

Attenuator X and Y Pushbuttons: Lights indicate which attenuation card is selected.

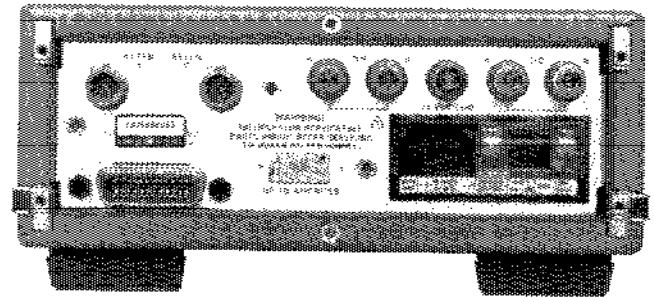
Switch 9 and 0 Pushbuttons: Pushbuttons 9 and 0 control the switching for the rear panel banana plug connectors. Light "ON" indicates that 24 volts is switched to the 'B' contact and the 'A' contact is grounded; light off indicates 24 volts is switched to the 'A' contact and the 'B' contact is grounded.



Turn On State: When the 11713A is first turned on, all pushbuttons are "ON" (i.e., all attenuator sections engaged).

Address Switch Assembly: Switches A1 through A5 set the HP-IB listen address on the bus, preset at the factory to 28 (11100). Switches A6 and A7 are not used.

Programming Connector: 24 pin connector (standard HP-IB connector). Mates with HP-IB cables 10631A/B/C.



Programming Considerations

The 11713A can be controlled using the Hewlett-Packard Interface Bus (HP-IB). An alpha-numeric string will turn the external attenuator cards on or off. An "A" preceding the string will turn the attenuator cards ON, and a "B" preceding the string will turn the attenuator cards OFF. On and off conditions can be mixed in a single string. For example, "A123B4" will switch the 1, 2, and 3 attenuation sections on and the attenuation section 4 off for attenuator X. Thus, using an attenuator like the HP 8494G, 7 dB of attenuation would be on. The attenuator Y (buttons 5 through 8) cards are switched in or out in the same way.

The ease of programming allows the user to incorporate a simple subroutine into a general program.

The program shown below is an example of how easy it is to program the 11713A. The program controls a four-section, 0 to 11 dB attenuator. Section 1 is 1 dB; section 2 is 2 dB; and section 3 and 4 are each 4 dB. The program is written for a 9826A desktop computer with option 004 or option 704 (HPL language operation).

For more details on programming HP attenuators refer to the 11713A Operating and Service Manual.

```
0: "          SAMPLE PROGRAM FOR 11713A          ":
1:
2: dim X$(11,6)
3:
4: "ATTENUATION VALUES BEING ASSIGNED":
5: "A1B234">X$(1); "A2B134">X$(2); "A12B34">X$(3); "A4B123">X$(4)
6: "A14B23">X$(5); "A24B13">X$(6); "A124B3">X$(7); "A34B12">X$(8)
7: "A134B2">X$(9); "A234B1">X$(10); "A1234">X$(11)
8:
9: "RUN":
10: ent "ENTER ATTENUATION (1 to 11dB; 0 to stop)",X
11: if X=0!end
12: if X>11!dsp "ENTERED ATTN EXCEEDS RANGE";beep!wait 2000!sto -2
13: wrt 728,X$(prnd(X,0));dsp X;" dB OF ATTN TURNED ON";wait 2000
14: "SET BACK TO ZERO ATTN":wrt 728,"B1234"!sto -4
*20239
```

Specifications describe the instrument's warranted performance. Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance parameters.

Specifications

Operating Temperature: 0° to +55°C.

Response Time: Contact Pairs 1 through 8: 10 μ s max.

Contact Pairs 9 and 0: 20 ms max.

Driver Power Supply Capability

Voltage: +24 V \pm 2 V; all outputs are short circuit protected.

Maximum Power Supply Current

Peak: 1.3 A for 1 second.

Continuous: 0.65 A.

Not recommended for capacitive loads.

Contact Pairs 1 through 9 and 0: Maximum current of 0.65 A continuous through one or all contacts.

Supplemental Characteristics

Power: 100, 120 V; +5%, -10%; 48 to 440 Hz.

220, 240 V; +5%, -10%; 48 to 66 Hz.

80 VA max.

Driver Life: Greater than 2,000,000 switchings at maximum current.

Maximum Load Inductance: 500 mH.

Net Weight: 4.1 kg (9 lb).

Shipping Weight: 5.4 kg (12 lb).

Dimensions

Height: 102 mm (4 inches including feet).

Rack Height: 89 mm (3½ inches; half width module).

Width: 213 mm (8.38 inches).

Depth: 295 mm (11.6 inches).

Accessories Furnished

Two twelve wire drive cables each five feet long (Part No. 8120-2703). Twelve pin connectors on each end mate with 11713A rear panel, and 8494/5/6/7 and 33320/1/2/3 series programmable attenuators. Other cables can be assembled by the user with Viking Industries connector plug number TKP12-102 P-TS-100 AU.

Accessories Available

HP-IB Cables: 10833A, one metre; 10833B, two metres; 10833C, four metres; 10833D, 0.5 metres.

11716A/B RF Interconnection Kit for two 8494/5/6 attenuators; includes rigid RF cable with connectors, bracket, and screws needed to connect two step attenuators in series. The 11716A cable has Type N connectors and the 11716B has APC-7 connectors.

11717A Attenuator/Switch Rack Mount Support Kit: Aluminum panel and screws used to mount attenuators and switches inside an instrument rack.

Dimensions

Length: 439 mm (17.3 in).

Width: 177 mm (7 in).

Thickness: 2 mm (0.07 in).

Rack Mounting: for systems applications, the 11713A can be rack mounted by itself or combined with another ½ module width instrument. For rack mounting combinations, consult with your local HP sales representative.

Ordering Information

11713A Attenuator and Switch Driver

11716A RF Interconnection Kit, Type N

11716B RF Interconnection Kit, APC-7

11717A Attenuator/Switch Rack Mount Support Kit

Rack Mounting

11713A mounted by itself, order 5061-0072

11713A mounted with another ½ module width instrument, order 5061-0074 and lock-together kit 5061-0094

Data Subject to Change

For more information, call your local HP Sales Office or nearest Regional Office: Eastern (201) 265-8000; Midwestern (312) 255-9800; Southern (404) 955-1500; Western (213) 970-7500; Canadian (416) 678-9430. Ask the operator for instrument sales. Or write Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 94304. In Europe: Hewlett-Packard S.A., 7, rue du Bois-du-Lan, P.O. Box, CH 1217 Meyrin 2, Geneva, Switzerland. In Japan: Yokogawa-Hewlett-Packard Ltd., 29-21, Takaide-Higashi 3-chome, Suginami-ku, Tokyo 168.