Switches

Drivers and Interface Modules

Figure 1. HP 11713A (upper left), HP 70611A (upper right), HP 87130A (lower).

Figure 2. HP 87130A with various attenuators and switches.

HP 11713A Attenuator/Switch Driver

The HP 11713A attenuator/switch driver provides simple HP-IB control of up to ten 24 Vdc solenoid activated switch or attenuator sections. The HP 11713A supplies 24 Vdc common and ten pairs of current sinking contacts to control up to 10 relays. The internal 24 Vdc power supply of the HP 11713A can deliver control signals totaling 0.625 amps continuously or 1.25 amps for one second. Each HP 11713A comes equipped with two plug-in drive cables for driving attenuators. Other cables are also available. The convenient front panel controls allow manual control of individual attenuator sections and/or switches.

HP 70611A Attenuator/Switch Driver for MMS

The HP 70611A is a 1 / 8 MMS module capable of driving up to 248 electromechanical switches or attenuator switch sections. The HP 70611A is MSIB, SCPI and HP-IB compatible. In addition to being programmable, the HP 70611A features an extremely user-friendly manual interface via any MMS display unit. The highlight of the manual interface is the operator's ability to customize groups of switch control lines and their settings, then identify these switch settings with user-defined alphanumeric labels. In this manner, end users of the HP 70611A can define custom menus with their own identification labels for simplified manual control.

The HP 70611A can store up to 256 user-defined, labeled paths. Path definitions can be stored in non-volatile EPROM. Groups of paths can be stored in "directories" for easier access to similar path commands. The HP 70611A controls switches or attenuator sections in banks of 31 (eight banks total) through individual HP 84940A I/O driver cards which are, in turn, directly wired to the switches and/or attenuators.

HP 70612/613 Series MMS Interface Modules

In addition to custom interface modules, HP offers off-the-shelf interface solutions in MMS. The HP 70612 (1 x 6 switch tree) series and the HP 70613 (2 x 5 switch tree) series are microwave matrixes available in 2 / 8 MMS modules with integrated controllers. They are equipped with front panel indicators to facilitate manual use and the integrated controller has all the capabilities of the HP 70611A attenuator/switch driver. A variety of options are available for the HP 70612/13 series including performance to 26.5 GHz, terminated or unterminated switches, integrated attenuators and a choice of port locations. For a more detailed description of these products, refer to publication number 5091-4897E, *Modular Measurement System Technical Data Sheet.*

HP 87130A Attenuator/Switch Driver

The HP 87130A is a 3.5-inch high (2 rack units), full rack width attenuator/switch driver capable of driving up to 248 electromechanical switches or attenuator sections. The HP 87130A is controlled over HP-IB via standard commands for programmable instruments (SCPI). The HP 87130A has been designed for use in both ATE switching systems and computer controlled bench-top applications. Control and programming are accomplished via application programs in IBASIC, RMB, C or Pascal. An ITG driver is also available for use separately or in conjunction with HP's Visual Engineering Environment (VEE).

The HP 87130A is electronically identical to the HP 70611A and shares its performance characteristics with the exception of the method of manual control. The HP 87130A has no front panel controls. Manual control of the HP 87130A is realized through its ITG driver and a computer controller. The HP 87130A can drive 31 switches or attenuator sections directly

Switches

Drivers and Interface Modules

and up to an additional 217 switches via seven additional HP 84940A driver cards. A distribution board, HP 84941A (see opposite), is available to facilitate the interconnection of the HP 87130A to switches or attenuators.

HP E1368A, E1369A and E1370A VXI Attenuator and Switch Drivers

HP's VXI family of instrumentation includes modules for microwave switching and attenuation control up to 18.0 GHz. HP E1368A contains three factory-installed SPDT switches such as the HP 8762B which feature all-port termination, dc to 18.0 GHz. HP E1369A is identical to the HP E1368A except that the switches are not included. This allows user-substitution of HP 8763/64 series transfer switches. HP E1370A allows the user to customize the internal configuration for HP 8766 series multiport switches or HP 8494/95/96/97 series step attenuators.

For more information, request a copy of the HP VXI Catalog, Pub. no. 5964-3970E, 5964-6898E (CD format).

HP 84940A Switch Driver and HP 84941A Distribution Card

The HP 84940A is an expansion driver card for the HP 70611/12/13 family of MMS attenuator/switch drivers and the HP 87130A attenuator/switch driver. The HP 84940A has been designed for incorporation into large interfaces located remotely from their controller. A single HP 84940A can control up to 31 switches and can be located up to 150 feet (45 m) from an HP 70611/12/13 or HP 87130A. The physical interconnection to the switches or attenuators is realized via 31 four-pin output connectors which permit quick connection and disconnection of the switches or attenuators. The HP 84941A is a signal distribution card designed to simplify the interconnection of the drive cable from an HP 70611A, Option 001, or HP 87130A to the 31 components directly driven by these controllers. The HP 84941A also provides 31 four-pin connectors for convenient interconnection to switches or attenuators. Included with the HP 84941A is a pack of 31 cables, to connect as many as 31 switches or attenuator sections to the HP 84941A.

Custom Switch Matrixes (dc to 40 GHz)

HP designs and manufactures custom microwave switch matrixes for applications in ATE systems and bench test stands. Switch matrixes provide multiple path routing of stimulus and measurement signals under computer control. HP's custom design team is also able to include many of the other signal conditioning components, such as: step attenuators, detectors, power sensors, noise sources, mixers, power splitters and others that may be required to build a high performance solution. HP broadband amplifiers, described in this catalog, can be used to augment path losses and increase test signals for input to other measuring instruments. In addition, it is often possible to include extra logic and switching functions which add calibration paths for running confidence tests on the system.

With years of experience in custom matrix design, HP test solutions reduce test time, provide measurement confidence and enhance reliability. Each HP matrix is fully documented with a general description, RF and dc component schematics, parts identifier drawings, parts list, drive logic and verification data.

The simplest custom matrix is a collection of switches, with their RF connectors routed to the front or rear panel of the equipment rack. The customer can then use external cabling to configure their own system. Next in complexity is the "common highway" matrix configuration, whereby any one of the inputs may be routed to any one of the outputs, but only one path at a time. A full-access matrix is the most flexible switching solution, allowing simultaneous routing of signals from any input port to any unused output port.

Depending on the desired configuration of the matrix, HP designers will use SPDT switches, transfer switches, and/or SP4T and SP6T switches to achieve the required function. Each switch has its own design tradeoffs. The SPDT switches are more versatile in allowing complex, full-access configurations, while use of multiport switches are more economical, and provide higher performance in terms of insertion loss, isolation and phase shift.