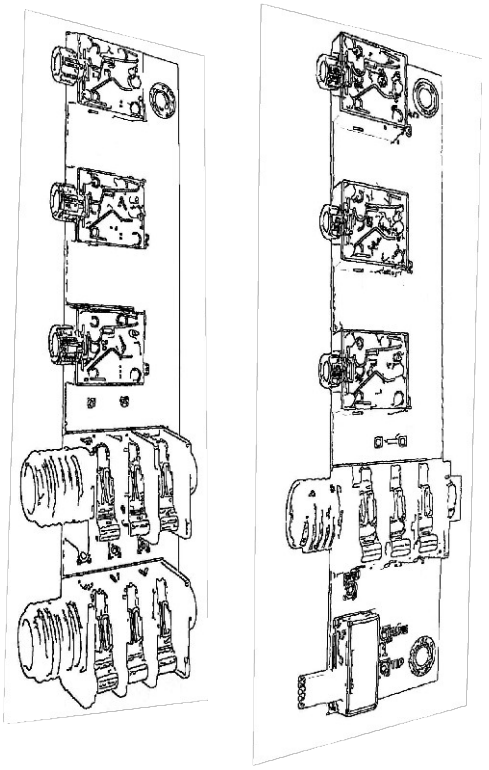
Patch Bay

Model 9746
Assembly and Using Manual



This second-generation 9700-series processing element for modular sound synthesizers is designed to provide great sound and excellent value.

A two-section module, the 9746 features two sets of patch points for combining or splitting signals within a system.

Passive (non-powered) combinations or splits can be made via multiple 1/8" phone jacks (tip-ring-sleeve (TRS) phone, aka 3.5mm stereo) and 1/4" stereo phone jacks. The patch bay can be used to adapt patches from one size connector to the other.

One section links three 1/8" and two 1/4" TRS phone jacks, the other section links three 1/8" and one 1/4" TRS phone jacks with a switch-selectable link to the other section or to a common stereo bus in a system with multiple 9746 modules.

This high-performance module is designed to be compatible with most modular synthesizer systems with little or no modification. Most active components are already mounted, making assembly a snap.

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ASSEMBLING THE 9746 PATCH BAY

Before beginning assembly, go through the manual. Look at the drawings. Feel the parts. You're naturally eager to plunge right in, but take a few deep breaths first. Check the parts supplied against the packing list on the last page of this manual.

In some cases, notes packed with the parts will be used to call your attention to special situations. ***If parts are missing, please notify PAiA at missing@paia.com or by phone at (405) 340-6300, fax (405) 340-6378. A NOTES page is included at the end of this manual.***

Notice that each step in the manual is marked with a checkoff box like this:

DESIGNATION	DESC.	MARKING
( ) R27	100ohm	brn-blk-brn-gld

Checking off each step as you do it may seem silly and ritualistic, but it greatly decreases the chance of omitting a step and also provides some gratification and reward as each step is completed.

Numbered figures are printed in the Illustrations Supplement in the center of this manual. These pages may be removed for easy reference during assembly.

THE CIRCUIT BOARD

The 9746 Patch Bay is built on two double-sided circuit boards. No special preparation or cleaning is necessary before assembly. Note the “top” side of the board has the connector and control placement designators. Install parts to the top of each board and solder them on the bottom.

TOOLS

You'll need a minimum of tools to assemble the kit – a small pair of diagonal wire cutters, pliers, screwdriver, soldering iron, and solder.

Modern electronic components are small (in case you hadn't noticed) and values marked on the part are often difficult to see. Another handy tool for your bench will be a good magnifying glass. Also use the magnifier to examine each solder joint as it is made to make sure that is doesn't have any of the problems in the SOLDERING section which follows.

SOLDERING

Select a soldering iron with a small tip and a power rating of not more than 35 watts. Soldering guns are completely unacceptable for assembling solid-state equipment because the large magnetic field they generate can damage components.

Use only a high quality electronic solder. Your kit is compatible with lead-free and/or tin-lead flux-core solders made especially for electronic assembly. Plumbing solder will destroy your kit with its acid core. Jewelry solder (silver solder) will destroy your kit with its high working heat. Neither is for electronics work.

A proper solder joint has just enough solder to cover the soldering pad and about 1/16-inch of the lead passing through it.

There are two improper connections to be aware of: Using too little solder will sometimes result in a connection which appears to be soldered when actually there is a thin layer of flux insulating the component lead from the solder bead. This situation can be cured by reheating the joint and applying more solder.

Too much solder may produce a conducting bridge of excess solder between adjacent pads causing a short-circuit. Continued feeding of solder into a hot joint can result in accumulation on the underside of the board and may cause bridges or impede the action of mechanical components. If you see this, position the board above the iron tip and the excess will flow to the tip.

Use care when mounting all components. Never force a component into place.

ASSEMBLY OVERVIEW

The 9746 Patch Bay module uses two printed-circuit-boards, a 9746-1 with connectors only and a 9746-2 with connectors and a switch. Assembly of module will proceed with soldering of components to one board, then the next, joining these boards with wire lengths, and fitting them to the panel.

CONTROLS AND CONNECTORS

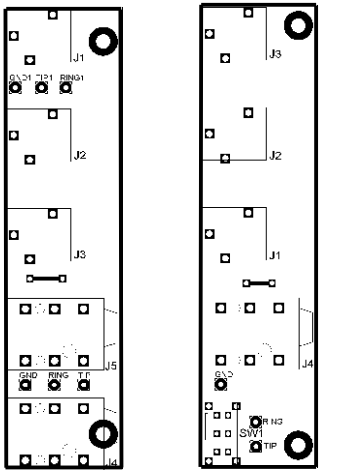
Controls and connectors will be installed on the top side of the board with the placement designators as shown in the illustration to the right.

Miniature phone connectors referenced as “stereo phone jacks” in the manual parts list are specified below with the contact/terminal names, Tip, Ring and Sleeve (TRS) and are labeled on the board and schematic as such (GND=S).

The potentiometers have tabs extending from their body for stability. They have a snap-fit to the board. Align the tabs and pins with their holes and press them into place. There is no need to bend the tabs or terminals.

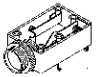
To ensure the best alignment with these parts with the front panel, begin by soldering only one of the multiple terminals associated with each of the following parts as it is installed. Then, if a part is tilted or crooked, it is only a matter of reheating the joint as the part is aligned.

Match the tab of the polarized power connector with the corresponding board marking.



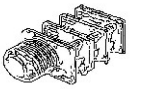
9746-1 9746-2

Tops of circuit boards



TRS Connector

Slide Switch



1/4” TRS Connector

DESIG.	DESC.	MARKING
9746-1		
( ) J1	TRS connector	
( ) J2	TRS connector	
( ) J3	TRS connector	
( ) J4	1/4” TRS connector	
( ) J5	1/4” TRS connector	
9746-2		
( ) J1	TRS connector	
( ) J2	TRS connector	
( ) J3	TRS connector	
( ) J4	1/4” TRS connector	
( ) SW1	Slide switch	

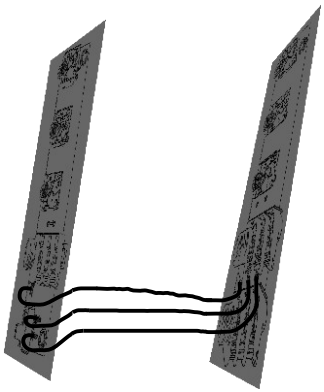
BOARD-TO-BOARD WIRING

Prepare the three 3" (7.5cm) lengths of wire by stripping about 1/4" (5mm) of the insulation from each end. Form the strands to a single bundle by pulling them through a pinched thumb and forefinger with a gentle twist. "Tin" each end by heating with the tip of the iron and flowing just enough solder to join the strands.

Make the first connections to the three T, R, and, S (GND) points at the lower edge of the 9746-2 board, with the wires entering from the top side of this board. As each joint is soldered, clip any excess at the top of the joint. Form the three wires to extend in the opposite direction of the switch and connectors.

Insert the free ends of these wires to the corresponding T, R, and, S (GND) points on the lower edge of the 9746-1 board. Solder and clip any excess at these three connections to complete the links between the two boards.

Attach the 9746-1 board to the panel and follow with the 9746-2 board as shown in the illustration Fig. 1. Smooth and form the wires in a group, looping any excess in the gap between the two boards.



Wire T (Tip) to T, R (Ring) to R, and S (Sleeve) to S (labeled GND) from 9746-2 to 9746-1 using 3" lengths of insulated, stranded hook-up wire.

TESTING

A quick and simple way to test the 9746 is with a miniTRS to miniTRS cable into a MP3 player and headphones terminated with a 1/4" TRS plug. With the mini-plug in any of the mini-sockets, each channel of audio from the MP3 should be heard through the phones into any of the 1/4" sockets. The Switch acts to link the two boards or not, so verify this operation. Alternatively, use a set of plugs into the sockets and a continuity tester to check the circuits, tip to tip, ring to ring, and sleeve to sleeve.

APPLICATIONS

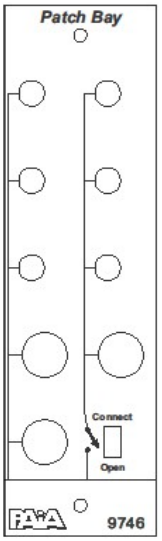
Use the 9746 to split, combine, adapt, or switch, audio or control voltage patches.

Split a single gate or pulse trigger to multiple envelope generators. Split a single pitch cv to multiple VCOs. A through-patch can be made with one branch taking one route and the other available for use as an original copy.

Two VCO's waves can be combined for input to a VCF saving mixer channels for more different sources. Consider the connection between multiple sources is direct and could be a conflict, so if you aren't sure whether two signal sources can be joined, use a mixer for the combination.

Patches between systems or modules using miniature or regular TRS (or TS), TipRingSleeve (or TipSleeve) connectors can be made using the 9746. Miniature and regular sockets are joined together on the two sides or sections of this module so instead of using a patch cord to adapt from one connector to the other, the two different types may be used to make the adaptation between connector sizes. Be aware that use of TS cords with TRS cords in a multiple patch will result in the Ring circuit of the TRS cord being shorted to the Sleeve circuit by the TS plug in the TRS socket. In TS to TS patches this is not a concern. Even some TRS to TS patches are no problem (ie connecting the TRS output of a MIDI2CV8 with it's open-collector transistor, ring-circuit, grounding via a patch with a TS plug).

The right section of the module can be combined or separated from the other section by operating the slide switch. Patches can be connected or disconnected without rearranging cords.



Builder's Notes

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DESIGN ANALYSIS

The 9746-1 is comprised of five parallel-connected TipRingSleeve phone socket connectors, three of which are miniature size. Wiring points are made available for each of the three connector links.

The 9746-2 is comprised of four parallel-connected TipRingSleeve phone socket connectors, three of which are miniature size, and a DPDT (double-pole, double-throw). Wiring points are made available for each of the three connector links, via the switch. The switch works to open or close the link between the connector terminals and the wiring points.

A 9746 Fractional Rack mount format module combines the 9746-1 and 9746-2 boards with wire links enabling the two sections to be connected or disconnected by operation of a slide-switch.

9746 Parts List

Please check the parts against this list. As you locate a part type and verify the quantity (and mounting hardware -- if required) check it off in the space provided.

If anything is missing please notify PAiA at missing@paia.com **or by phone at (405) 340-6300, fax (405) 340-6378.**

	Quan	Description	Ref Des	Marking
( )	1	9746-1 Printed Circuit Board, Patch Bay		
( )	1	9746-2 Printed Circuit Board, Patch Bay		
( )	1	9746 Front Panel, Patch Bay		
( )	6	Phone Jack, Stereo, 3.5mm	J1, J2, J3	
( )	3	1/4” Stereo Phone Jack, Switched	J4, J5	
( )	3	Nut, Plastic, Black (Nut for NRJ6HF)		
( )	1	Switch, Slide, DPDT, RA, PCB Mount	SW1	
( )	2	Screw, Self tap, #4 x 3/8, Pan Head Phillips, Black Oxide		
( )	3	Wire, #22 Stranded, Insulated, 3 inches		

There are no power requirements for this module.