USER GUIDE FOR "K" SERIES MIDI KEYBOARD STACKS

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INTRODUCTION

This document is intended as a generic user guide for our "K Series" MIDI keyboard stacks based on the M-Audio 'Keystation 61es' (later renamed 'Keystation 61'). These units are intended for use with virtual pipe organ software such as *Hauptwerk*, *Miditzer* or *jorgan*. They provide one, two, three (shown below) or four 61-note keyboards. They are connected to the computer using multiple USB connections. No external power supply is necessary. Standard stacks have eight pistons per keyboard (sixteen on the one-keyboard stack) but more or fewer can be provided if required. Earlier models had an additional piston with an LED at the LH end of each keyboard, which was used for setting the MIDI output channel for that keyboard. As this is not necessary for Hauptwerk, channel changing pistons are no longer fitted, unless they have been requested as an optional extra. The rear panel of the stack provides two jack sockets for attaching standard keyboard expression pedals, and one or two D-type sockets, to which up to eight additional switch inputs can be connected (eg toe pistons). An optional music stand can be attached to the top of the stack.

If you have questions about your stack which aren't answered here, please get in touch using the 'Contact Us' section of the website.

UNPACKING THE MIDI KEYBOARD STACK

If your stack has been delivered by courier, it will be packed in a cardboard carton, surrounded by sheets of polystyrene for protection. You will probably need the help of an assistant to lift it out of the carton, especially in the case of a 3-keyboard stack. After removing the polystyrene from each side, lift the stack by its end panels. Be sure not to lift it by the rear panel (which is only thin material) or the keyboards, or damage may occur.

When all of the packing material has been removed, you will find the USB leads tucked under the rear panel.

PROVIDING A SUPPORT FOR THE MIDI KEYBOARD STACK

One approach is to build the stack into an existing organ console, as a replacement for the original keyboards. Otherwise, some sort of stand or table will be necessary. The stacks are quite heavy, so strength and stability is obviously of paramount importance when choosing a support. The type of lightweight 'keyboard stand' sold by music stores will only be suitable for the one-keyboard stack. The other stacks in the range will require something more substantial.

If using an ordinary table, the aim should be to get sufficient leg-room (especially if a pedalboard is being used) without raising the stack any higher than is necessary. For this reason, a modern style office table which consists of tubular metal legs attached to a single, monolithic sheet of material will be more suitable than a timber table of traditional construction with rails below the worktop. Legs of adjustable length will be an advantage, particularly if the organ is to be played by more than one person. The Ikea 'Galant' range of tables provides for some height adjustment, and the legs are available separately.

Where a pedalboard is being used, the table must obviously be long enough to straddle it. A 32 note pedalboard will probably be around 1.4m (55") at its widest, so when you allow for the table legs being set in a certain distance from the end, the total length of table required will be around 1.6m (63").

The minimum width of the table depends on the number of keyboards as below

1 keyboard: 280mm (11")

2 keyboards: 395mm (15.5")

3 keyboards: 510mm (20")

4 keyboards: 610mm (24")

BOLTING DOWN THE STACK (OPTIONAL)

The stack is supplied with four rubber feet, but some users may prefer to remove these, in order to get the stack slightly lower (#2 pozidrive screwdriver required). If you would like to bolt the stack down to prevent movement, the sockets left when the feet are removed can be re-used for that purpose. It will probably be necessary to replace the M4 x 20mm bolts from the feet with longer bolts. For example, if the surface below is 25mm thick, M4 x 40mm bolts would be suitable. Alternatively M4 studs and nuts can be used.

Marking the positions for the holes is slightly tricky. One method is to replace the bolts in their sockets (minus rubber feet) with about 10mm protruding. Carefully place the stack in the required position, then mark the position of each bolt head with two pencil lines at ninety degrees. When the stack is then removed, the intersection of each pair of lines is the centre point for drilling the hole. To allow for minor inaccuracies, allow plenty of clearance (eg drill holes 6mm diameter) and fit a large, flat washer below the bolt head.

Don't bolt the stack tightly to a warped surface or it may be damaged. If the stack doesn't sit evenly on its support, insert thin washers as necessary to make up for the discrepancy.

SETTING UP THE FOUR-KEYBOARD STACK

The four-keyboard stack is made in two parts. The upper part is a standard two-keyboard stack, while the lower part is a special base unit which provides the two additional keyboards. The first stage is to provide suitable support for the base unit, and optionally bolt it down (as previously described). Then, the upper part of the stack is lowered vertically into position, until it sits on top of the lower part, located in the side-to-side direction by the metal tongues.   Some care is required, as some of the circuit boards of the lower part are exposed until the upper part is in position. It's much easier if an assistant is available. The upper part should be placed as far forward (ie towards the player) as it will go. The interface between the two parts is inclined, and gravity can be relied upon to prevent any unwanted movement.

Once the upper part is in position, there are two cables with D-type connectors emerging from the lower part which need to be plugged into the corresponding sockets on the upper part. This allows the piston encoder in the upper part to process the pistons of the lower part.

FITTING THE (OPTIONAL) MUSIC STAND

Your stack may be supplied with the music stand already fitted. If not, it's quite easy to fit one, and the only tool required is a #3 pozidrive screwdriver.

To begin, locate and remove two countersunk M6 bolts which pass down vertically through the top board of the stack, 300mm apart. Place the music stand in position, and pass the bolts through the two angled countersunk holes in the 'shelf' part, and back into their original sockets in the stack. Tighten the bolts carefully, just sufficiently to prevent any rocking movement of the music stand. Don't over-tighten them, or the music stand may be damaged.

The music stand should slope back away from the player. The angle is controlled by two short, round-headed bolts with lock-nuts which are fitted in front of the mounting bolts. These should already be set to a suitable length for your stack (the angle of the top board varies depending on the number of keyboards). If you want to adjust the angle, loosen the main mounting bolts and the lock nuts. Screw the adjustment bolts in or out as required, then re-tighten the lock-nuts and the main mounting bolts.

If you wish to fit your own music stand, you may find it convenient to use the two bolts referred to above. Alternately, it's safe to drive woodscrews into the top board of the stack (which is made of MDF and behaves similarly to wood) or fit insert nuts, but take great care that drills or screws do not project through the board and damage components underneath. The board thickness is 18mm.

CONNECTING THE MIDI KEYBOARD STACK TO THE COMPUTER

Connection is simply a matter of plugging all of the stack's USB cables into available USB ports on the computer. These USB links transmit MIDI data from the stack to the computer, and they also supply the stack with electrical power. No other power supply is required. The pistons have their own USB connection, so the total number of USB ports needed for the stack will be the number of keyboards plus one.

The stack's USB cables emerge at the rear LH corner (as seen from the playing position), so it is more convenient to have the computer located on that side too, if possible. If insufficient USB ports are available, it will be necessary to use a good quality powered USB hub, eg Belkin.

Once connected, the stack will automatically be ON when the computer is powered up, and OFF at other times. To confirm that the stack is ON, press one of the channel setting pistons (if fitted) once. The adjacent LED should light up. Press the piston again to return to normal playing mode.

SETTING THE MIDI OUTPUT CHANNEL

NB *Hauptwerk* users can ignore this section. The channel-setting pistons are only required when using *Miditzer* or *jorgan*. For *Hauptwerk*, all keyboards can be left to output on the default channel (channel 1).

If you need one or more keyboards to output on a different MIDI channel, proceed as follows:

1. Press the channel-setting piston once

2. Confirm that the adjacent green (or red on later models) LED is lit

3. Choose the MIDI channel by pressing one of the natural keys as below (starting at the LH end of the keyboard) :

> 1   D
>
> 2   E
>
> 3   F
>
> 4   G
>
> 5   A
>
> 6   B
>
> 7   C (octave 2)
>
> 8   D
>
> 9   E
>
> 10 F
>
> 11 G
>
> 12 A
>
> 13 B
>
> 14 C (octave 3)
>
> 15 D
>
> 16 E

4. After the key is pressed, the LED goes out, and the new channel is selected. It will remain in effect until the stack is next powered off.

USING THE MIDI KEYBOARD STACK WITH HAUPTWERK

The following sections describe how to use the stack with *Hauptwerk* v4. For other softwares, the procedure will be generally similar. Please consult your software instructions.

Before using the stack with *Hauptwerk*, it is necessary to make sure it has been recognised and is enabled for MIDI input. This should only need to be done once

1. Start the *Hauptwerk* software.

2. Click on the *General Settings* menu command

3. Click on *MIDI Ports*

4. Confirm that there is an entry called 'USB Keystation 61es' (earlier stacks) or 'Keystation 61' (later stacks) for each of the stack's keyboards. The identifiers 'A', ' B', etc, are inserted by the software. (Example below is for the 3-keyboard stack)

Hauptwerk MIDI IN port	Console MIDI IN	Seque
USB Oxygen 49	☑	☐
USB Keystation 61es	☑	☐
USB Keystation 61es A	☑	☐
USB Keystation 61es B	☑	☐
USB MIDI keyboard	☑	☐
Hauptwerk VST Link	☐	☑

5. Confirm that there is an entry called 'USB MIDI Keyboard' for the piston encoder. For stacks built after May, 2017, the piston encoder will be listed as 'J.O.W. 40'

Hauptwerk MIDI IN port	Console MIDI IN	Seque
USB Oxygen 49	☑	☐
USB Keystation 61es	☑	☐
USB Keystation 61es A	☑	☐
USB Keystation 61es B	☑	☐
USB MIDI keyboard	☑	☐
Hauptwerk VST Link	☐	☑

6. For each of the above entries, tick the 'Console MIDI IN' column (if not already ticked).

Hauptwerk MIDI IN port	Console MIDI IN	Seque
USB Oxygen 49	☑	☐
USB Keystation 61es	☑	☐
USB Keystation 61es A	☑	☐
USB Keystation 61es B	☑	☐
USB MIDI keyboard	☑	☐
Hauptwerk VST Link	☐	☑

7. Click *Done*

ASSIGNING THE VIRTUAL KEYBOARDS

The next step is to associate the physical keyboard(s) of the stack with the virtual keyboard(s) of an organ sample set. The 'auto detect' feature of Hauptwerk version 4 makes this easy, and saves the user from needing to be aware of the MIDI signals being sent. This procedure will need to be done once for each sample set you use.

1. Load the virtual organ

2. Ensure an image of the keyboard(s) is visible on screen (it may be necessary to select *Console* view)

3. Right-click on the image of the virtual keyboard which is to be assigned.

4. Left click on the first option (*Auto detect …*)

5. On the corresponding physical keyboard, press the lowest and highest keys once. (The parts about pressing hard and gently can be ignored, unless you wish to make use of '2nd touch')

6. Click on *Done*

Repeat, as necessary, for other keyboards. Your stack is now connected to your virtual organ and ready to play.

USING A PISTON AS A COMBINATION PISTON

The most common use for the pistons is to call up pre-defined combinations of stops, but this is by no means their only use. They can be used to do just about anything in Hauptwerk, including executing menu commands – everything from starting a recording to loading a new organ sample set. The simplest way to use them is to associate them with one of the pistons of the virtual organ. Typically, this will be with a virtual thumb piston on the corresponding manual, but there's no reason why you can't mix manuals, or even use a physical thumb piston to operate a virtual toe piston (or vice-versa) if you so wish. Generally speaking, though, it makes sense for the layout of the physical pistons to match the virtual pistons as far as possible.

     1. Load the virtual organ

     2. Select a view in which the virtual pistons are visible on screen

     3. Right click over the chosen virtual piston

     4. Left click on the first option (*Auto-detect …*)

     5. Press the physical piston once

     6. Left click on *Done*

USING A PISTON TO TRIGGER A MASTER GENERAL COMBINATION

As a further example of setting up a piston, this is how to make the piston operate Master General Combination number "3":

1. Left-click on the *View* menu command

2. Left-click on *Mini control panels (for this organ)*

3. Select *Master generals 1-10*

4. On the new mini control panel, right-click over *3*

5. Left-click on the first option (*Auto-detect …)*

6. Press the physical piston once

7. Left-click on *Done*

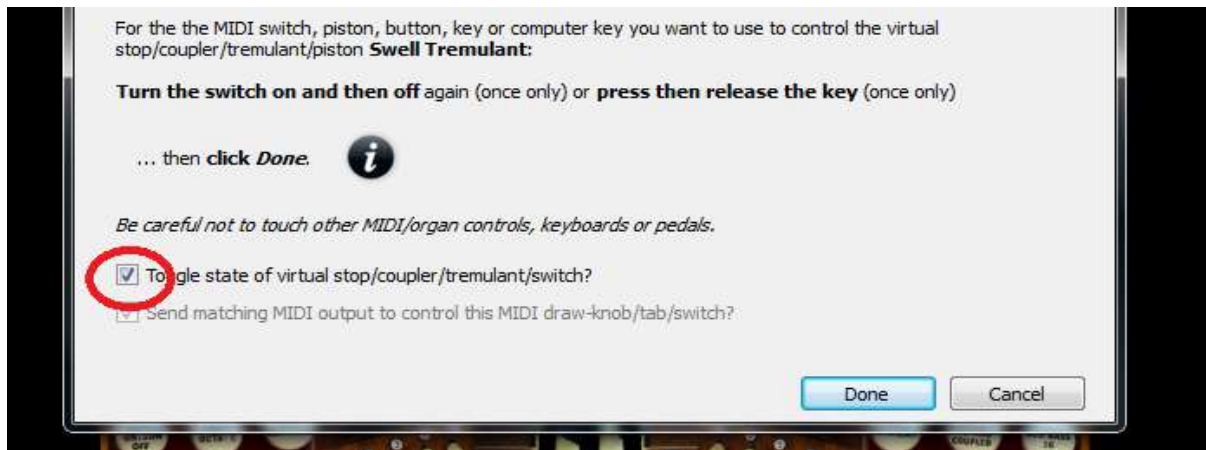## USING A PISTON TO ADVANCE THE COMBINATION STEPPER

When using the combination stepper, it is important that the piston does not suffer from contact bounce, otherwise certain steps in the sequence may be omitted altogether. Fortunately the pistons used on our keyboard stacks (unlike the pistons on our pedalboards) do not usually suffer from this condition. In the unlikely event that it does happen, Hauptwerk has a setting to prevent it. Please see the pedalboard user guide for details.

1. Left-click on the *View* menu command

2. Left-click on *Mini control panels (for this organ)*

3. Select *Combination stepper*

4. On the new control panel, right-click over the left-most right-pointing arrow.

5. Left-click on the first option (*Auto detect …*)

6. Press the piston once

7. Left-click on *Done*

8. The stepper mini control panel can now be hidden again, if not required.

USING A PISTON FOR INDIVIDUAL STOP CONTROL

Although pistons are mainly used for combinations, it is quite possible to use them to operate individual stops. The following example shows how to toggle the swell tremulant on or off using a piston.

      1. Right-click on the image of the tremulant draw-knob

      2. Left-click on the first option (*Auto-detect…*)

      3. Press the physical piston once

      4. Before clicking *Done*, check the box which says *Toggle state of virtual stop* ….

      5. Click *Done*

If the 'toggle' option had not been chosen, it would have been necessary to keep the piston depressed in order to keep the tremulant 'on'.

ATTACHING EXPRESSION PEDALS TO THE STACK

Each size of stack provides two sockets (rear panel, LHS as seen from playing position) to which expression pedals can be attached. You may find this facility useful if your pedalboard doesn't provide expression pedal(s) – or doesn't provide enough of them. The type of pedal which is suitable is known as a "keyboard" expression pedal (as opposed to an "in-line" expression pedal). It will have a ¼" jack plug divided into three segments, also known as a "stereo" plug. Examples of suitable pedals are the Yamaha FC-7, the Behringer FCV100, or the Bespeco VM18L.

It is safer to connect or remove expression pedals when the stack is powered off. Then, after starting Hauptwerk and loading an organ, the physical expression pedals can be assigned to virtual swell or crescendo pedals using the auto-detect facility. Right-click on the screen image of the pedal, then follow the on-screen instructions.

ATTACHING ADDITIONAL PISTONS TO THE STACK

Your stack will have one or two 9-way D-type sockets (rear panel, RHS as seen from playing position) which can optionally be used to attach additional pistons. Each socket provides for 8 pistons. This does not apply to the four-keyboard stack, because the two sockets of the upper part are already used to process the pistons of the lower part.

This facility can be a useful way of adding toe pistons to a pedalboard which doesn't have them. The pistons can be physically attached to the pedalboard, but processed by the keyboard stack. The pistons must function as normally open, momentary push switches, and must be wired to a 9-way D-type plug. One side of each switch is connected in common to pin 1. The other sides of the switches are connected to pins 2 to 9 respectively.

The additional pistons will need to be auto-detected in the normal way before they can be used.