

C600 Theatre Organ Project Part-4

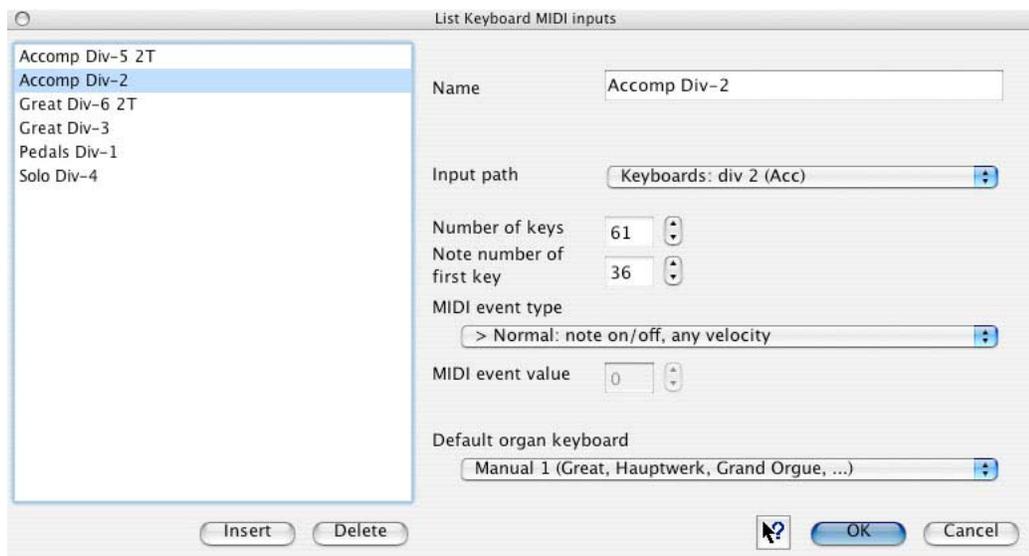
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Setting Up Keyboard MIDI Channels from the Console.

After configuring the audio and loading the sample set, the next thing was to configure the MIDI channels for the keyboards to match the console hardware so that Hauptwerk could read these sources. There are three sets of windows to configure that involve keyboards.

Firstly, in the “**General Settings, Keyboard MIDI Inputs**” window, the following console keyboard names had to be typed in (Pedal being first) to define the console keyboards. To make things easier to understand, each keyboard name includes its intended Hauptwerk division number (2T means Second Touch).

<i>Console Keyboard</i>	<i>MIDI Channel</i>
Pedals Div-1	1
Accomp Div-2	2
Great Div-3	3
Solo Div-4	4
Accomp 2T Div-5	5
Great 2T Div-6	6



Select the appropriate input path for each keyboard.

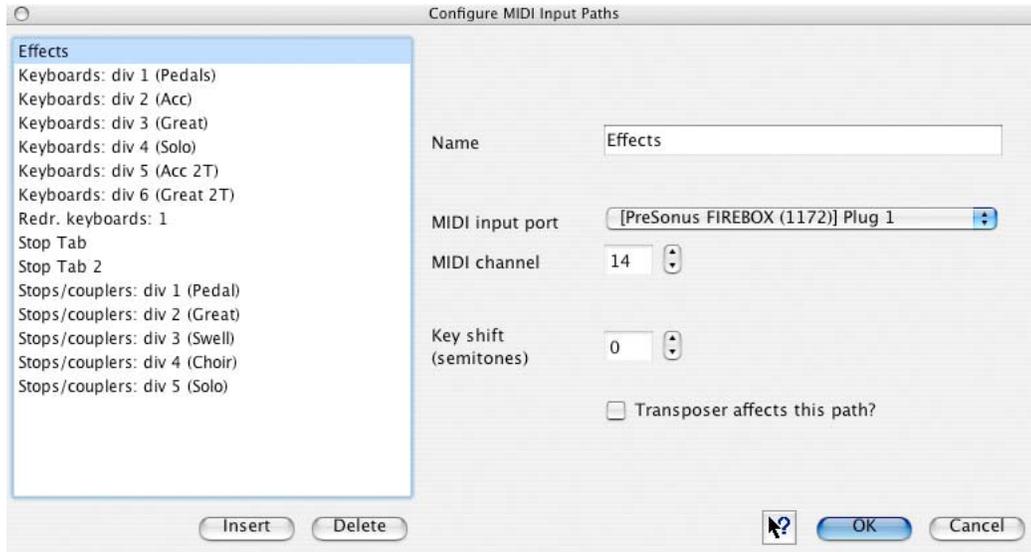
For each, select Quantity of keys as **61** (except pedals, **32**) and first note to be **36** (the standard MIDI note number for bottom-C).

Normal: **Note on/off, any Velocity**. Default Organ Keyboard is **<none>** but can be left as shown. Any other keyboards existing in this window can be deleted — after the above have been entered.

Setting Up MIDI Input Paths from the Console

In the second keyboard window, the MIDI Input Paths have to be entered for all keyboards, shoes and stops in the virtual organ to match the console software MIDI channels. These are all the channels in which the console sends information to control the virtual organ and the keyboards are listed in a different channel order from the previous table due to the division names being present. This involves typing in the wanted keyboard names and setting MIDI channels.

Select **“General Settings, Configure MIDI Input Paths”**, from the menu and type in keyboards, stops and effects, setting the MIDI Channels as below. This time the MIDI Channel order is that which is sent from the console (Great is first). In alphabetical order (as listed) these entries are:



<i>Console Items</i>	<i>MIDI Channel</i>
Keyboards: Div 3 (Great)	1
Keyboards: Div 1 (Pedals)	2
Keyboards: Div 2 (Acc)	3
Keyboards: Div 4 (Solo)	4
Keyboards: Div 5 (Acc 2T)	5
Keyboards: Div 6 (Great 2T)	6
Redirectable Keyboards 1	13
Effects	14
Stop Tab 2 (129-192)	15
Stop Tab (1-128)	16

Five others already existed but could not be deleted so were set to the remaining channels:

Stops/Couplers: Div 1 (Pedal)	8
Stops/Couplers: Div 2 (Great)	9
Stops/Couplers: Div 3 (Swell)	10
Stops/Couplers: Div 5 (Choir)	11
Stops/Couplers: Div 1 (Solo)	12

C600 Organ Project. Part-4 Configuring Hauptwerk's Controls

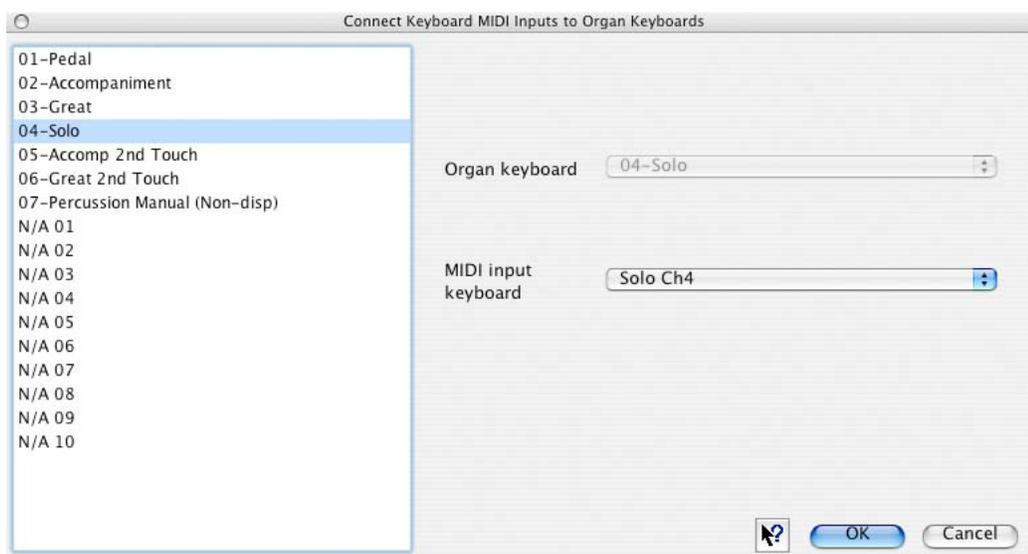
These console items all needed to have their parameters set for what they would be controlling. In the first ten cases, this is **Presonus Firebox (1172) Plug1** (i.e., the audio device). The rest should be set to **<None>**. Unselect the Transposer box. Key Shift = **0**.

Incidentally, a Redirectable keyboard is one that can be used to play the organ from an external source such as a MIDI sequencer. It is really only of use if you have, say, a three-manual organ recording playing a two-manual Hauptwerk organ. The missing recorded manual is arranged to play either real manual via the Redirectable keyboard. So in this organ, it could be deleted.

The stops and effects would be sorted out individually later. For now it is sufficient to create three high-numbered MIDI channels to handle them. Two are necessary for stops because there are more than 128, the maximum number of MIDI patches (one patch per stop) per channel.

Linking MIDI Inputs to Virtual Organ Keyboards

The third keyboard window is the one where the console and virtual organ keyboards are linked up. Select **“Organ Settings, Connect Keyboard MIDI Inputs to Organ Keyboards”**. The Hauptwerk keyboard order is the same as in the second table:



<i>Virtual Organ Keyboard</i>	<i>Console Keyboard:</i>
01-Pedal	Pedals Div-1
02-Accompaniment	Accomp Div-2
03-Great	Great Div-3
04-Solo	Solo Div-4
05-Accompaniment 2 nd Touch	Accomp 2T Div-5
06-Great 2 nd Touch	Great 2T Div-6
07-Percussion Manual (Non-disp)	<None>

The last eleven are not used but could not be deleted.

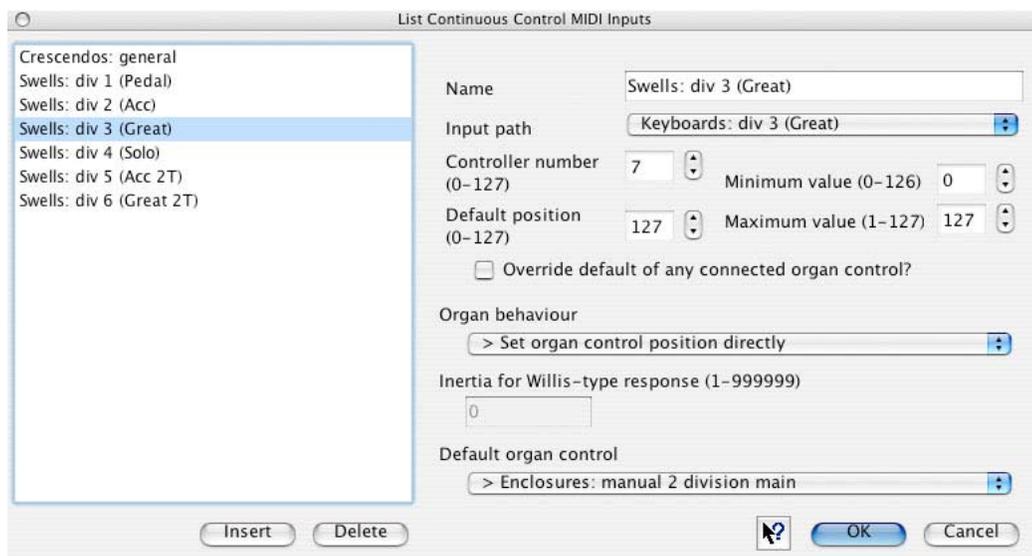
Setting Up Expression Shoes

Next, the Continuous Control Inputs had to be set (for the expression shoes). The Hauptwerk system is primarily for a church organ system and so the expression inputs seen in the window lists would seem to suit expression by division rather than by chamber as required in a theatre organ. Divisional expression is not practical on a theatre organ because it is possible to have the same rank, such as the 8ft. Tibia, playable from different divisions via similarly named stops. Obviously, you cannot control the volume of these stops individually when there is only one rank for all of them.

However, what actually happens is that the console software sends out MIDI volume messages (using Controller #7) for the two console expression shoes on all of its division channels. Some channels are for one shoe, the rest for the other one. The Crescendo shoe is not sent as it controls the console stops, not the Hauptwerk ones (although it could do so and its entry has been left in the list just in case it is wanted). It does not matter much which channels the two expression shoes use. What has to happen is that the shoe messages get routed to the Hauptwerk shoes to control them directly (so that the on-screen shoes move) and this automatically takes care of which ranks are expressed by each shoe as that has been decided in the virtual organ software.

There is one little wrinkle, though, which is that the MW-31 organ has three volume expression shoes. The Master one controls everything and we did not want that. The thing to do was to control just Main and Solo. The two channels with expression are Pedal (1) for Main and Accompaniment (2) for Solo.

In the “**General Settings, Continuous Control MIDI Inputs**”, window the following are set:



<i>Expression Shoe</i>	<i>MIDI Channel</i>	<i>Controller</i>	<i>Default</i>	<i>Minimum</i>	<i>Maximum</i>
Crescendo: General	14	7	127	0	127
Swells: Div 1 (Pedal)	1	7	127	0	127
Swells: Div 2 (Acc)	2	7	127	0	127
Swells: Div 3 (Great)	3	7	127	0	127
Swells: Div 4 (Acc 2T)	4	7	127	0	127
Swells: Div 5 (Great 2T)	5	7	127	0	127
Swells: General	6	7	127	0	127

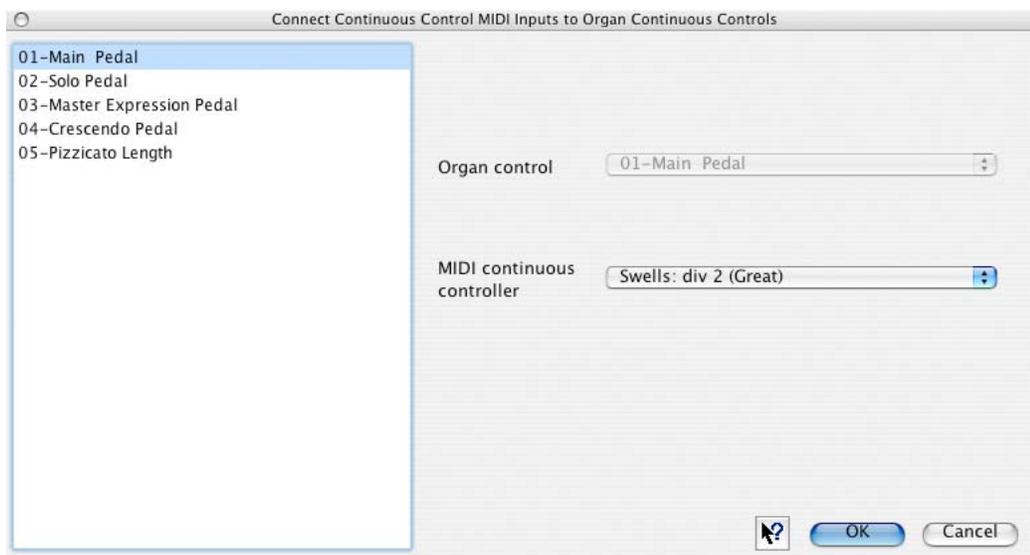
Uncheck the Override box, make sure that Organ behaviour is ‘Set Organ Control Position Directly’.

The ‘Default organ control’ should be left as shown (it is the first item in a long list after <none>).

There is another minor snag, which is that in the Classic control system, sending the expression MIDI command on a particular division requires at least one stop on that division to be on, otherwise no keyboard message will be sent by the console and thus, no expression command.

Linking the Expression Shoes to the Virtual Organ

These are listed in “General Settings, Continuous MIDI Inputs to Organ Continuous Controls” and the names do not need to be changed. All that is required is to match up the controllers:



<i>Organ Control</i>	<i>MIDI Continuous Controller</i>
01-Main Pedal	Swells: div 2 (Great)
02-Solo Pedal	Swells: div 4 (Solo)
03-Master Expression Pedal	<None>
04-Crescendo Pedal	<None>
05-Pizzicato Length	<None>

Presently, the Crescendo function is done by the Classic control system.

There are no Pizzicato couplers on the console, but if there were, the Classic control system would control the durations of each note.

Choosing Stops

The console stops have to be matched to appropriate Hauptwerk sample stops and this requires a lot of thought as to which are the best ones. It is a tedious business and, after a few drawn-out attempts to match things up, it was decided that the best approach would be to print out the console stop list (from the organ software listing), decide which virtual organ stops would go best with each one (by referring to the 3-31 stop list obtained from the website), write them on the list, tick them off on the website list (see Appendix for complete list) and then go back to the screen when done and enter in the details in one long session. This approach saved a lot of unnecessary time-wasting as it avoided inadvertent duplication and one probably wouldn't know without considerable thought which console tab should go with a particular Wurlitzer stop because the virtual stop list is less familiar than the console list as well as being presented in a different order.

For instance, the first two Hauptwerk Pedal stops are 32ft. ones but the console does not have any 32ft. stops, so they are not used (they are allowed for in the console list in case the tabs are ever fitted but would be of little use in a home environment). As the Hauptwerk list is presented in alpha-numerical order with the name of the division leading, these are not the first in the console list anyway — the Accompaniment stops are. The further you get into the process of linking up the stops, the longer it takes because of all the scrolling, as Solo and Tremulants are near the end of the list! Luckily, it only needs to be done during the initial setting up of the organ.

There is one thing to be thankful for, though, which is that the stop names on theatre organs are fairly standard from one organ to another so that the 3-31 Wurlitzer ones are a close match to the console ones and are in almost the same order within the divisions.

There are many more 3-31 Wurlitzer stops than console stops so it is not too difficult to find something suitable for every one of the console stops. As there are two different Tibias, and two different Vox Humanas, as well as multiple string ranks, the final console specification accesses more than its original 18 ranks — more like 29 of the 31 ranks.

One glaring omission in the 3-31 stop list is a 4ft. Pedal Flute. So on the console this tab is linked to a Pedal 8ft. Salicional as this has a high 4ft. content.

There are not enough Tremulant tabs on the console but it is no great hardship not to tremulate the Reed stops. Some of the console tabs will have to be renamed eventually when the specification has been finalised and there is room for more Tremulant tabs. Meanwhile, if you really want to tremulate the English Post Horn, for example, you can assign an existing console Tremulant tab to more than one 3-31 tremulant since all the tremulants are in one group. You cannot do this with divisional stop tabs.

Incidentally, one can still select and play stops using the mouse on any of the three screens. These stops may be in addition to those already linked up — the 32fts for example, for which there are no tabs on the console. There is only one limitation, which is that there must be at least one programmed stop selected on the division that the new stop belongs to. That is because the Classic system only sends key information for stops that are active. Similarly, the on-screen general and divisional pistons will also work.

Setting up the Stops

Almost the last thing to do, but by far the most tedious part of this setting-up procedure, is to define the console stops. The console stop list has to be typed into the Stop Input window (**General Settings, Configure Switch Inputs**), and each stop has then to be linked to an appropriate stop in the virtual organ list (there are nearly 300 of them plus piston functions). The console list includes effects pistons as these use 'borrowed' stop numbers (where there are no actual tabs). As the console has a possible 192 stops, including effects pistons, this all takes a long time. Each entry also has to have several parameters set but these are probably best set once the whole list has been entered as you can then concentrate on setting similar things in all of them in turn.

From past experience, it was found expedient to allocate each console stop a three-digit number at the start of the name and to include any leading zeroes in these numbers (i.e., 001 to 192). This is because the stop list is presented alpha-numerically and already has a lot of entries before the console stop names are added. Putting numbers first ensures that the console stops will head the list in a logical order and reduces the amount of scrolling necessary to get to the wanted places. Such a numbering system was used in the console software system anyway to define all the tabs. Although couplers and spare stops are not sent out, they are included in the list in case they may want be used in the future. Any tab numbers not used can be set to <None> so that they will have no effect on anything.

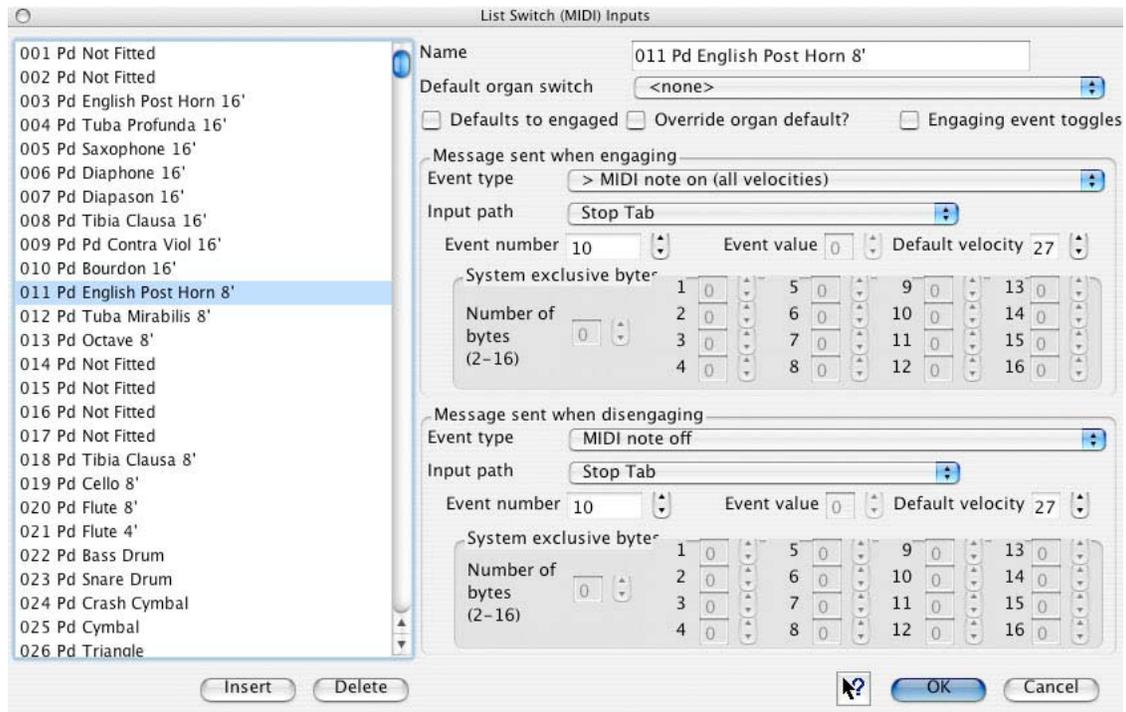
In some pull-down lists, there is no scroll bar, only continuation arrows at top and bottom of a very long list. Using the mouse in such a list is very frustrating as the rate of change is extremely slow. It is much quicker to use the mouse to click once near the bottom of the list and then hold down the Down Arrow key — but don't move the mouse during the scrolling or the selection will jump up to where the mouse was clicked! When the required name has been selected via the Up and Down keys, simply press Enter.

Once the list of stop names has been entered, various parameters have to be adjusted in drop-down boxes. Each stop has to be given a MIDI Event number from 0 to 127 — in two places. This number (commonly known as a Patch number) is actually the stop number minus 1. Since there are more than 128 stops, the 129th one begins again at 0 (up to 63) but this is taken care of as there are two different MIDI channels for stops (16 for stops 1-128 and 15 for 129-192, or 0 to 63).

Brief List of Switch (MIDI) Inputs

<i>Console Stops</i>	<i>Event Number</i>
001 Pd Not Fitted	0
002 Pd Not Fitted	1
003 Pd English Post Horn 16'	2
004 to 127:	3 to 126
128 G2 Trumpet 8'	127
129 G2 Glockenspiel 8'	0
130 G2 Solo-to-Great 2T 8'	1
131 to 190:	2 to 61
191 Trem Not Fitted	62
192 Trem Not Fitted	63
193 <None>	

C600 Organ Project. Part-4 Configuring Hauptwerk's Controls



Then each console stop or control has to have its control function entered. The message sent when engaging (i.e., turning on) must be set to '**MIDI Note On (All Velocities)**'. The message sent when disengaging must be set to '**MIDI Note Off**'. The Input Path is '**Stop Tab**' or '**Stop Tab 2**' unless it is an effect, when it will be '**Effect**'. Everything else can be left unchanged. The choosing of Stop Tab or Stop Tab 2 decides the MIDI channel to which the Event Number (Patch) belongs (16 or 15). These MIDI channels have already been set when configuring the keyboards.

Event numbers for Effects pistons are *not* the same as for stop tabs as they belong to Channel-14. The number range is actually 80 to 96, but the other parameters are the same (See the Appendix).

Although it may be less confusing to do the linking in stages like this, it might, in fact, because of the very slow scrolling, be less tiresome to set all the parameters for each stop at the same time as choosing the stop name. This then allows you to test the organ in stages as you configure a group of stops.

Another problem with this kind of list is that the function <None> is frequently required to be selected so that unwanted items cannot cause problems and this turns up as entry number 193 requiring monotonous scrolling for many, many items!

The virtual organ list also includes Effects pistons, Couplers, Blower sounds, and other functions, many of which are not needed. There are presently no console controls for such things anyway (Noises do not need controls as they are automatic if enabled).

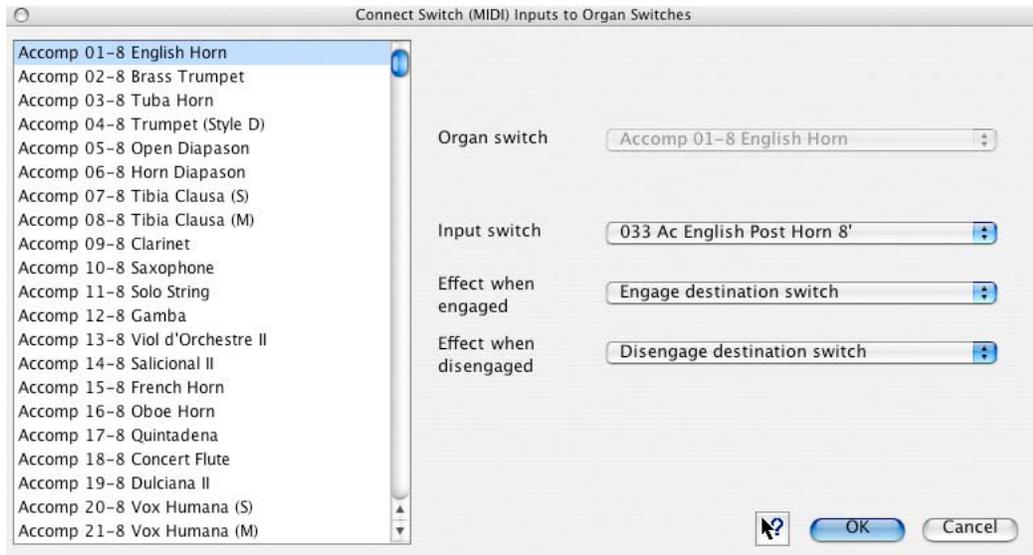
An irritation in linking the console stops with the Hauptwerk stops is that the basic list (with scroll bars) is for the 300 or so Hauptwerk stops and other functions (left column) while the 192 console stops (right column, next page) have to be located in a single-line drop-down box that does not scroll well when opened up.

Note that in this organ the Hauptwerk system is 'blind'. i.e., there is no feedback to the console to indicate that anything has happened. The moving of stop tabs is done by the console control system but it is possible to have Hauptwerk outputs via MIDI for all sorts of functions.

Linking up the Stops

Now the console Stop Outputs have to be linked to the Hauptwerk sample set stops. Note that you can only link one Hauptwerk stop to one console stop (unless it is a tremulant). You cannot have multiple divisional stops controlling a single Hauptwerk divisional stop. So do just a few at a time and then press 'OK'. Deal with any error messages before doing any more linking.

Select '**Organ Settings, Connect Switch MIDI inputs to Organ Switches**'. The left window shows the Hauptwerk stops and each one has to be linked to an appropriate console stop input switch in the list just entered:



Connect Switch (MIDI) Inputs to Organ Switches:

<i>Virtual Organ Stop List (Alpha-numeric, In Scrollable Window)</i>	<i>Console Stop List (In Pull-down Drop Box)</i>
Accomp 01-8 English Horn	033 Acc English Post Horn 8'
Accomp 02-8 Brass Trumpet	035 Acc Brass Trumpet 8'
etc. ...	etc. ...
Accomp 2T 51-8 English Post Horn	065 A2 Post Horn 8'
etc. ...	etc. ...
Great 01-16 English Post Horn	073 Gt English Post Horn
etc. ...	etc. ...
Great 2T 88-16' English Post Horn	125 G2 Post Horn 16'
etc. ...	etc. ...
Solo 01-16' English Post Horn	137 So English Post Horn 16'
etc. ...	etc. ...
Tremulants 01 Main I	179 Trem Main I

The full list will be found in the Appendix.

The following parameters have to be selected via drop-down boxes for each stop or effect piston linked: Effect when Engaged: **Engage Destination Switch**. When Disengaged: **Disengage Destination Switch**.

And that is it! Everything should now work. Turn on the console and audio amplifiers, check that the stop tabs operate tabs on the screen and away you go!

Further refinement will be required to voice all the ranks and notes according to taste.

Running Multiple MIDI devices

The console software can output 64 MIDI channels on four different ports (A-D with 16 each) but, in fact, only one port (D) is used to control Hauptwerk. A second port is used to output MIDI signals to a General MIDI device that can provide effects (since the Wurlitzer 3-31 has only four effects and one, the Bell Tree, is of limited use). In the C600 organ, a built-in GM-MIDI expander (type GM-9773) is used to provide various percussion sounds on Channel-10 (it must use Port-A).

There are up to 16 effects pistons on the organ (12 on key cheeks and four allowed for on future toe studs) and these are arranged to drive outputs on a patch-panel. As there are 46 possible percussion outputs on GM-MIDI Channel-10, any of these can be linked to any such piston. The use of diodes to OR several outputs together allows some special effects to be created, such as a Grand Crash where drums and cymbals operate together from a single piston. The GM-MIDI stereo audio output is simply mixed in with the organ sounds via the Firebox line-level inputs.

The effects are controlled by a 'keyboard' division in the C600 that is not subject to transposition so that the effects sounds, being determined by specific key numbers, will not be changed by transposition. This keyboard division is also sent out to the sequencer port so that effects will be recorded like any other division.

Regarding transposition. While the C600 system includes it, because the Hauptwerk system is used as a large expander, the note outputs are simply shifted up or down so that if you transpose down, in pitch, there will not be any notes available at the bottom end of each keyboard range (or at the top if you transpose up). If this is important, then it might be better to use the Hauptwerk transposer facility. In "**General Settings, Configure MIDI Input Paths**", tick the Key Shift boxes and use the mouse to select the transposer.

There is no reason why the other MIDI ports should not be used for other MIDI expander devices provided that console controls can be added for them.

This is a possibility if you also want to run the Virginia Wurlitzer sample set simultaneously as it has more effects than the 3-31 Wurlitzer (the raucous car horn, for example). It also has optional reiteration on its Xylophone, which the 3-31 does not. However, you must have a second computer system as you cannot run two organs at the same time in Hauptwerk. To run a second program, simply loop the console MIDI feed to the second computer system (Mac or PC). You would, of course, not link tabs intended for one organ on the other or you would get both sounds at once. This could easily have been done here as the previous Virginia Wurlitzer system still existed on a Windows PC with its own audio system.

You can also similarly run MidiTzer as well as Hauptwerk simply by using the same MIDI port and linking some stops to that as well as (or instead of) the 3-31 organ. However, you do need a separate computer system although you could probably mix in the audio at the Firebox.

The Classic control system is also capable of driving a real pipe organ, or any form of electronic tone generator as well as the Hauptwerk system, so you could make a truly spectacular organ if desired.

If you would like to know more about this project, contact Classic Organ Works at 905-475-1275 or 1-888-812-9717 and ask for me. Alternatively, and preferably, e-mail me at AWC@organworks.com or organawc@sympatico.ca