



## **Hauptwerk Release Notice Archived Version 2.21**

## Changes in version 2.21

Version 2.21 included mainly bug-fixes and work-arounds for problems found with versions 2.00 to 2.20. The following were included:

### **ENHANCEMENT HW-000422: Memory usage reduced during sample cache regeneration occasionally giving up to 48 MB more memory for samples.**

Hauptwerk keeps a specially-formatted cached copy of the samples for each organ so that organs are able to load extremely rapidly. When an organ is loaded for the first time, or if its rank routing parameters are changed subsequently, or after installing any Hauptwerk upgrade, Hauptwerk needs to regenerate the sample cache. During that process, some extra memory is required to ensure that the cache is written to the hard-drive with minimal disk fragmentation (especially on Windows NTFS). Hauptwerk automatically and dynamically reduces that extra memory if the computer is running low on memory during the cache regeneration process. However, it is sometimes possible that the operating system does not allow that memory to be reallocated, giving rise to an erratic 'out of memory' memory error when very regenerating the sample cache and very close to the limit of physical memory. It has been possible to reduce the size of the extra temporary dynamic memory used by 48 MB without causing an increase in subsequent organ loading times. In cases where the operating system previously failed to reallocate this dynamic memory, up to 48 MB more memory than previously is now available for loading an organ.

### **ENHANCEMENT HW-000392: Installer: .dmg (disk image) format used on Mac OS X instead of .zip (Mac OS X only).**

Previously Hauptwerk's installer was packaged inside a .zip archive file to provide error resilience (checksumming). However, we found the .dmg (disk image) format to provide somewhat easier verification to ensure that downloaded files or CDs are not corrupted, and so have now packaged Hauptwerk's installer in a .dmg file instead of a .zip file.

### **ENHANCEMENT HW-000397: Installer: extra resilience to partly-broken installations.**

If a user had moved or removed some of Hauptwerk's main folders and then run Hauptwerk's installer, or if the installer had previously been cancelled or crashed during an installation or deinstallation phase, or if two instances of the installer had previously been run at the same time, the version Hauptwerk 2.20 installer would detect the partial installation and enter 'clean installation' mode instead of attempting to upgrade or repair the installation, since it would no longer have the necessary information about where the files should be installed. This caused confusion for some users who had then selected different installation folders, preventing

settings and organs from the previous installation being found. The installer now only prompts for locations for any specific installation folders that are found to be missing, and gives a warning message if either of the two critical folder structures (user data, sample sets and components) is missing. Notes have also been added to the user guide that the installer should not be cancelled during an installation or deinstallation phase, and that two instances of the installer must never be allowed to run at the same time. The installer now also attempts to clean up any previous partial broken installations found.

### **ENHANCEMENT HW-000398: Jack OS X audio router software supported (Mac OS X only).**

Jack OS X is a freeware third-party utility that allows low-latency audio to be routed in real-time between OS X applications, such as Hauptwerk and an audio sequencer or between Hauptwerk and real-time reverb processor software. Hauptwerk has been changed to be compatible with it. However, Jack OS X is quite a technical piece of software, and we think some Hauptwerk users may find it too complex to configure, so it is probably not an ideal solution for those simply wishing to apply artificial reverb to dry sample sets.

### **ENHANCEMENT HW-000396: Documentation: installation folder clarification.**

When the 'Custom' option is selected in Hauptwerk's installer, you can select a folder for each of the types of data that Hauptwerk will create. It has been clarified as a background information note in the installation instructions in the user guide that the files and folders will actually automatically be created within a sub-folder of the selected folder.

### **ENHANCEMENT HW-000401: Documentation: installation note about time taken to open installer with Explorer (Windows only).**

A note has been added to the installation instructions to indicate that the installer or its icon may take a while to appear when using Windows Explorer. This is not relevant on Mac OS X.

### **BUG HW-000404: Possible periodic audio glitches when recording output (Windows only).**

Occasional glitches in the audio output could be heard in version 2.20 (only) when the output was being recorded. These usually took the form of a brief glitch lasting a few milliseconds every 20 - 90 seconds and were related to the buffering of the audio stream. They may or may not have appeared in the recorded audio, usually not. This only seems to have been a problem on Windows; it had not been found to affect Mac OS X.

**BUG HW-000405: Installer: Hauptwerk 2.20 installer could cause user settings to revert to their defaults under a certain circumstance.**

If you had not used Hauptwerk version 2 since the 31 October 2006 before upgrading to version 2.20, version 2.20's installer would overwrite your general settings with its defaults because the timestamp on the default settings files was 31 October and it would incorrectly overwrite the settings if its default files were more recent than those already installed. If you had already upgraded to 2.20 and had been affected by this problem and want to recover your previous settings, please contact us for instructions.

**BUG HW-000412: Copy-protected sample sets would not install or load on Apple Mac G4/G5 computers using Hauptwerk 2.20 (Mac OS X only).**

If you tried to install a copy-protected sample set on an Apple Mac with a G4 or G5 processor (only) using Hauptwerk version 2.20, error ERR:1223 would appear, preventing the installation from continuing. This problem did not affect Apple Macs with an Intel processor or Windows PCs.

**BUG HW-000428: 'What's this' question-mark help not working on Apple G4/G5 computers using Hauptwerk 2.20 (Mac OS X only).**

Each settings screen has a question mark button which is used to provide help for each setting on the screen. Clicking that button on Apple G4/G5 computers (only) caused Hauptwerk to crash.

**BUG HW-000391: Installer: un-installer could freeze if installation had previously been upgraded from pre-v2.20 version (Windows only).**

If you previously had a version of Hauptwerk 2 installed prior to 2.20 and then upgraded to 2.20 or later, the un-installer could freeze during the final stage when removing Windows registry entries.

**BUG HW-000402: Component installer could appear to have frozen when installing very large sample sets (Windows only).**

In Hauptwerk version 2.20 onwards, when you have selected a component package to install using the 'File | Install organ, sample set, temperament or impulse response' menu function,

Hauptwerk's component installer first copies the whole component package file to a temporary location on your hard-disk before attempting to extract it. During this initial copying process the message 'Please wait whilst the component package is prepared for extraction' is displayed, with a progress indicator beneath it. However, with extremely large component package files of several gigabytes, the progress indicator could incorrectly stay at 0 percent throughout the whole process. Since copying a file of several gigabytes may easily take five minutes or more, it appeared that Hauptwerk had frozen. This problem was related to the way that the size of such files is reported incorrectly by some Windows functions, and the problem did not affect Mac OS X.

**BUG HW-000403: VSTi: error message ERR:0813 could appear when clicking OK on audio outputs screen.**

In the VSTi configuration (only) of Hauptwerk, clicking OK on the 'General settings | Audio outputs' screen could give 'ERR:0813 You have specified a value for the attribute named buffer size (sample frames), which is not allowed'.

**BUG HW-000423: Component installer could be very slow in version 2.20 when installing large sample sets (Windows only).**

In Hauptwerk version 2.20 onwards when you have selected a component package to install using the 'File | Install organ, sample set, temperament or impulse response' menu function, Hauptwerk's component installer first copies the whole component package file to a temporary location on your hard-disk before attempting to extract it. In version 2.20 on Windows PCs this copying process could be very slow, depending on the speed of the CD/DVD drive. The problem did not affect Mac OS X. It has been possible to speed up the copying so that sample sets now install much faster.

**BUG HW-000406: Notes could stay on if a MIDI sequencer was stopped with notes sounding.**

Some MIDI sequencers (notably Cakewalk Sonar) do not send individual note-off messages for any pressed keys when playback is stopped, instead sending a single 'all notes off' message. Hauptwerk versions 2.20 and below did not implement the special MIDI 'all notes off' message, so the notes could remain sounding if a MIDI sequencer was stopped while notes were sounding.

**BUG HW-000409: Very occasionally virtual console display was not redrawn fully after an organ was loaded.**

After loading an organ, on rare occasions the virtual console display would be only partly drawn, leaving parts of the logo screen still visible.

**BUG HW-000395: Documentation/installer: installation note that dongle driver installer window can appear behind other windows (Windows only).**

The driver for the USB license dongle is automatically installed or upgraded by Hauptwerk's installer as a final installation step. On Windows PCs, if you use Alt+Tab to switch to another application during installation then you use Alt+Tab to switch back to Hauptwerk's installer, it may appear to have frozen whilst waiting for the driver to install. In fact that is not the case - the driver installer is a separate application, so you just need to switch to that to acknowledge its status message. If you do not switch applications during installation then the driver installer's window always appears on top, so it is obvious that you just need to click OK on it. This behavior probably cannot be changed because the driver installer is a separate application, but a note to this effect has been included in the installation instructions in the user guide.

**BUG HW-000407: CODM: value of 0 for Rank.WindSupply\_MaxFlowRandomisationPct parameter gives error.**

When using the Custom Organ Design Module (CODM) for non-pipe 'ranks' (e.g. harpsichords) one might reasonably want to disable the turbulence model by setting the WindSupply\_MaxFlowRandomizationPct parameter to 0 for the Rank table. However, doing so gave error ERR:4505 when loading the compiled organ definition file.

**BUG HW-000425: VSTi: recording format setting was not mandatory on audio outputs screen.**

In the VSTi version (only) on the 'General settings | Audio outputs' screen the recording format setting was not mandatory, but should have been. This caused no functional problems.

## Changes in version 2.20

Version 2.20 was a maintenance release, the primary focus of which was to produce a version of Hauptwerk for Apple Mac computers (both Intel and PowerPC G4/G5) running OS X 10.4 or later. However, various significant performance and usability enhancements were also included for all platforms, as well as many other minor enhancements and some bug

fixes.

### **ENHANCEMENT HW-000093: Hauptwerk ported to Apple Mac OS X (OS X 10.4.8, Intel Macs and G4/G5 Macs).**

Hauptwerk is now available for Apple Macs as well as for Windows PCs. Intel and PowerPC (G4 or later) Macs are fully supported and Mac OS X 10.4.8 or later is required. This first OS X release does not have a plug-in (Audio Unit or VSTi) version of Hauptwerk, but we hope to add that soon.

If you are planning to buy a new computer to run Hauptwerk, we now strongly recommend the Apple Mac Pros, since these offer the best performance we have yet seen with Hauptwerk, appropriate specifications are readily available pre-assembled from Apple with full hardware and software support and warranties, the Apple hardware and OS X together give absolutely robust, glitch-free, low-latency audio with superb MIDI timing, and we have found them generally much easier to install and configure than PCs. Our recommended specification for large organs is an Apple Mac Pro with 2 x 2.66 GHz processors and 4 GB of Apple memory. Please see the Hauptwerk website for audio and MIDI interface recommendations. An excellent 8-output firewire audio interface with one MIDI IN and one MIDI OUT port, with which we have conducted most of our testing on the Mac platform, is the Focusrite Saffire. With the Mac Pro it is easily possible to achieve a polyphony of over 4500 simultaneous pipes with all of Hauptwerk's realism feature's enabled.

Note that OS X is not yet fully 64-bit, so any one program is limited to a maximum of 4 GB of addressable memory. However, unlike 32-bit Windows (which has a limit of about 2 GB or 2.7 GB per program), the full 4 GB is available, so that is much less of an issue. Using a Mac Pro with 4 GB of memory, even the largest organs currently available for Hauptwerk (such as the Milan Digital Audio E.M. Skinner and OrganArt Media Aix) can be loaded in 16-bit, stereo with full release tails by simply enabling loss-less memory compression for all ranks in Hauptwerk (and also disabling multiple loops for the Hauptwerk.cz Litomysl). Since the Mac Pro has so much 'spare' processing power, the 10-15 percent reduction in polyphony resulting from using loss-less memory compression is no real problem.

We will, of course, continue supporting and developing for 32 and 64-bit Windows platforms with the same commitment that we have until now, but we have found the Intel Mac platform to be so good for Hauptwerk that we have decided to make this platform our primary recommendation for new computers. The new range of Apple MacBook Pro notebooks, using the Intel Core 2 Duo processors, should also be excellent for use with Hauptwerk, although they have only one dual-core processor (whereas the Mac Pros have two) and a maximum of 3 GB of memory can be installed.

A license for Hauptwerk version 2 is valid on any computer, Mac or PC, so there is no cross-

grade cost if you wish to transfer an existing Hauptwerk license from a PC to a Mac. The Mac and PC editions of Hauptwerk are available on separate CD media, since each requires a full CD. When ordering a CD from the Hauptwerk on-line shop you can simply select whether you would like a PC or Mac CD, or both.

We have tested all currently-known native Hauptwerk version 2 sample sets on the Mac platform and no problems were found. Hauptwerk version 1 sample sets can also be imported, and, once imported should work fully. However, unlike version 2, Hauptwerk version 1 did not have a native multi-platform sample set installer, so the third-party installers with which some version 1 sample sets were supplied may not work on non-Windows computers. For such version 1 sample sets you would either need to extract them temporarily to a Windows computer, and then transfer them to the Mac via CD, DVD or a network, or contact the supplier of the sample set to see if they can be supplied in a format that is readable on the Mac platform.

### **ENHANCEMENT HW-000175: Organ loading times massively reduced again, especially for large organs with tremulants.**

The high-speed sample cache has been extended to cover other types of data, especially tremulant data, which gives an enormous reduction in loading times for large organs with many ranks affected by a tremulant. For example, the loading time from cache for the Silver Octopus 36-stop Willis Hauptwerk v2 sample set has been reduced by a staggering 85 percent, and the Milan Digital Audio Virginia WurliTzer v2 by about 59 percent. There is some benefit for smaller instruments as well; the loading time for St. Anne's has been reduced by about 15 percent. A small amount of further improvement (typically 1-4 seconds of further reduction in loading time) is likely to be possible by caching the image data, which we will also be addressing in a future release soon.

### **ENHANCEMENT HW-000224: Combination files load much faster.**

The time taken to load a combination file for a large organ has been massively reduced. Combination files now load almost instantaneously for most organs.

### **ENHANCEMENT HW-000292: Maximum polyphony increased from 4096 to 8192 for the Concert Edition.**

Computers with two of the new Intel 'Core 2' Xeons (51xx series), such as the Apple Mac Pro series, can easily exceed the previous maximum Hauptwerk polyphony of 4096, hence we have increased the maximum polyphony to 8192 in the Concert Edition. The maximum polyphony remains at 1024 in the Studio Edition. For example, 32-bit Hauptwerk with all

realism features enabled can safely achieve a polyphony in the region of 4600 simultaneous pipes on a Mac Pro with 32-bit Mac OS X 10.4.8 ('Tiger'). We anticipate that much higher polyphony still will be possible with 64-bit Hauptwerk. (Note that full 64-bit support does not yet exist in OS X, and is expected in the next version of OS X, early in 2007).

**ENHANCEMENT HW-000304: All audio output configuration settings redesigned for ease of use.**

We have reviewed and redesigned all of the audio output configuration screens and settings with a view to making them as easy, quick and convenient to use as possible, whilst not losing any of their flexibility. We have moved as many settings as possible to the 'General settings | Audio outputs' screen, so that all standard stereo audio configuration (e.g. for the Studio Edition) can be performed from just that one screen, including device selection, device channel selection, output levels and buffer sizes. The 'General settings | General options | Audio output' screen tab has thus been eliminated, as has the 'General settings | Audio output channels' screen. On Windows platforms, both ASIO and DirectSound drivers are now always available for selection, eliminating the global driver type setting. For multi-channel audio (Concert Edition only), ASIO and DirectSound drivers can now be used simultaneously, with accurate synchronization being maintained between them. Concise 'tool tips', aimed at novice users, have been added to the 'General settings | Audio outputs' screen, and will be added to other screens in future releases. The buffer size setting now also affects ASIO drivers, allowing the 'General settings | Adjust ASIO settings for current audio device' menu function to be removed. All previous user configuration is automatically migrated with the exception of the ASIO buffer size, which is re-defaulted to 1024 sample frames. **IMPORTANT:** You may thus wish to review the buffer size after upgrading if you are using an ASIO driver.

**ENHANCEMENT HW-000004: Screen position of main window now remembered and restored automatically; no longer re-centers.**

Previously the main window was automatically re-centered on the screen whenever any system function was selected. Many system functions do not need to re-size the window (e.g. entering or leaving capture mode), and these no longer affect the window position. Instead of centering the window on the screen, Hauptwerk now stores your previous window position and automatically restores the window to that position when you load Hauptwerk or load/activate or unload/deactivate an organ. The window position is stored separately for each organ, allowing the window to be positioned optimally for multi-monitor and touch-screen configurations.

**ENHANCEMENT HW-000108: Additional multi-channel audio output allocation algorithms included, such as C/C# split with two mono channels (Concert Edition**

only).

The channel allocation algorithm, selected for an audio output group, determines the rules used to route each pipe in a rank to individual mono or stereo physical audio outputs. Three new channel allocation algorithms have been added: 1. Cyclic allocation within each octave, constant for each octave; 2. Cyclic allocation within each octave, with octaves and ranks cyclic (effectively minimizes the chance of any two pipes of a given pitch being routed to the same channel); 3. Cyclic across the whole rank compass. Algorithm 1 (cyclic within octave, constant across octaves) is equivalent to a simple C/C# separation when only two physical outputs are assigned to the group.

### **ENHANCEMENT HW-000263: Option for 16-bit output from built-in recording system for compatibility with older CD writing/audio editing software.**

A new option has been added to the audio outputs screen for Hauptwerk's built-in recording system to create audio recordings in 16-bit format, rather than the default 32-bit. This is useful for some CD writing software and some older audio editing software that cannot read 32-bit audio.

### **ENHANCEMENT HW-000296: MIDI/audio hardware now automatically queried fully whenever Hauptwerk starts, including channels.**

Previously the audio and MIDI hardware was only checked to verify whether devices had been added or removed when Hauptwerk started, and then queried fully only in that case. This could cause problems with some drivers which present variable numbers of audio channels or MIDI ports, such as the E-MU ASIO driver, in which the user can add or remove virtual audio channels via E-MU PatchMix DSP. In such cases it was necessary to force Hauptwerk to requery the devices by temporarily changing the audio driver type. Now Hauptwerk always queries all devices thoroughly whenever it starts, but logs and ignores any errors relating to devices that the user has not selected for use with Hauptwerk, making it robust to variable channel/port drivers and also suppressing warnings relating to irrelevant devices. **IMPORTANT NOTE:** If you routinely receive any ASIO driver messages relating to a device that is no longer present when you start Hauptwerk, or if the Hauptwerk window does not appear when you attempt to launch it, simply make sure that you uninstall any unused/broken audio drivers. Some drivers, such as the Creative ASIO driver, always display a warning message if the Creative product is not connected but its driver has not been uninstalled. Also if you receive warning messages from the ASIO Multimedia Driver or ASIO DirectX Full Duplex driver that the configuration has not been tested, please simply de-select the option on the warning screen to show future messages, or follow the driver's instructions to test the configuration. The warnings should not then appear in future.

**ENHANCEMENT HW-000307: Software MIDI synthesizer noises/percussion should no longer be triggered from virtual draw-knobs.**

On Windows platforms, it was possible that a software MIDI synthesizer virtual MIDI port could be selected as the default MIDI output port after installation, usually causing strange percussion effects to be heard when Hauptwerk's virtual draw-knobs moved. To avoid this, after installation Hauptwerk now attempts to select only real, physical MIDI ports for its default MIDI outputs, if any are available. See also ENHANCEMENT HW-000317.

**ENHANCEMENT HW-000317: Automatically attempts to guess best audio and MIDI devices to use when Hauptwerk first installed.**

On both PC and Mac platforms, Hauptwerk attempts to select appropriate audio device and MIDI ports, based on various criteria, automatically when it is run for the first time after installation. For example, software synthesizer virtual MIDI output devices are explicitly avoided (which previously could cause effects such as percussion to be heard when stops changed state) and virtual MIDI cable ports are avoided for the stand-alone configuration but preferred for the MIDI sequencer configuration. On Windows platforms, native ASIO drivers are preferred over DirectSound but emulated ASIO and DirectSound drivers are explicitly avoided. The aim is that Hauptwerk should work immediately 'out of the box' with no configuration at all required whenever possible. See also ENHANCEMENT HW-000307.

**ENHANCEMENT HW-000321: Accelerator keyboard short-cuts added for quick access to common menu functions.**

Additional standard keyboard short-cut 'accelerator' key combinations have been added to provide fast access to all common menu functions, such as re-loading the last-used organ, entering/leaving capture mode and the registration sequencer controls. On Windows systems the Ctrl key is used in combination with other keys to access them, whilst on Mac OS X the Alt key is used. The short-cuts are shown on the menus and work in addition to Hauptwerk's existing mechanism for assigning computer keys to control system functions and virtual organ controls.

**ENHANCEMENT HW-000322: Evaluation and licensed builds combined.**

Previously it was necessary to select either an evaluation or licensed build during installation, and to re-run the installer if a license was subsequently purchased after evaluating. Instead Hauptwerk now functions either in evaluation or licensed mode depending on whether a valid dongle is attached. This makes the installation processes simpler and less confusing, and

eliminates the need to re-run the installer if a license is purchased. It also makes patches smaller, and thus easier to download.

**ENHANCEMENT HW-000325: Automatically attempts to guess polyphony limit when Hauptwerk first installed and offers choice to optimize for realism or polyphony on older processors.**

The aim is that Hauptwerk should work well immediately 'out of the box' with no configuration at all required whenever possible. Various rules of thumb are used to guess an appropriate initial default polyphony limit conservatively based on the processor type and model and the number of processors and cores, on both PC and Mac platforms. (Note that HyperThreading should be disabled in the BIOS for best performance on computers with Intel processors with HyperThreading.) If the estimated polyphony with all of Hauptwerk's realism features enabled is low (less than 1000), Hauptwerk asks whether you would prefer to optimize for realism or polyphony by default. For best results, you should still always fine-tune the polyphony limit after installation, specifically for your hardware. However, the initial default value should be acceptable.

**ENHANCEMENT HW-000326: Polyphony testing organ extended, redesigned and made much quicker to use.**

The special 'polyphony testing' organ is used to determine the polyphony that your computer can achieve, so that Hauptwerk's polyphony management system can be configured to get the best possible performance from your computer without risk of audio glitches. There are now three versions of the 'organ' for computers with 512 MB, 1 GB and 2+ GB of memory, so that it is no longer necessary to disable ranks when loading, which previously was tedious. The 2+ GB version now has 125 ranks to allow for testing polyphonies up to 7625, now that the Concert Edition supports a theoretical polyphony up to 8196, and now that the latest Intel Core 2 Xeon systems can easily exceed 4096. The rank 'draw-knobs' have been replaced by a radio button-style selector for the number of pipes per key, which is more intuitive and faster to use. The screen layout has also been improved and concise instructions have been included on the screen so that the organ's purpose and method of use should be immediately obvious without needing to refer to the user guide.

**ENHANCEMENT HW-000334: Installer: patching now handled by native installer.**

Previously downloadable Hauptwerk patches were installed by a simple self-extracting archive, rather than Hauptwerk's main installer. However, this caused problems when an incorrect folder was selected by the user, or not all of the installation instruction steps were followed, sometimes causing corruption of the existing Hauptwerk installation. To avoid this

possibility, and to make the patching process simpler and more robust, a special version of Hauptwerk's main installer is now used to automate the process of applying a downloaded Hauptwerk patch. The necessary download details will be emailed to existing licensed and evaluation users as with previous updates.

#### **ENHANCEMENT HW-000364: Additional optimizations for new Intel Core 2 processors.**

Hauptwerk is now more highly optimized internally for the new Intel 'Core 2' processors, in addition to its existing optimizations for previous AMD and Intel processors.

#### **ENHANCEMENT HW-000365: VSTi: Steinberg Cubase 4 supported as VST host on PC platforms.**

Steinberg Cubase 4 is now tested and supported as a VST host for use with Hauptwerk. Cubase 4 does not currently support 64-bit plug-ins, so only the 32-bit Hauptwerk plug-in can be used. However, under Windows XP Professional x64 Edition, a maximum of 4 GB of memory is available to any given 32-bit application, rather than the 2 - 2.7 GB under 32-bit Windows.

#### **ENHANCEMENT HW-000366: VSTi: Cakewalk Sonar 6 supported as a VST host on PC platforms.**

Cakewalk Sonar 6 is now tested and supported as a VST host for use with Hauptwerk. Please note that we found that MIDI input to VST plug-ins would only work erratically in Sonar 6.0.0, so we strongly recommend updating to the latest Sonar 6 patch (6.0.1 at the time of writing), which seems to fix the problem. The 32-bit Hauptwerk VST plug-in is supported with both 32 and 64-bit Sonar 6, and the 64-bit Hauptwerk VST plug-in is supported with 64-bit Sonar 6.

#### **ENHANCEMENT HW-000372: New menu items to assign organs/combinations/temperaments quickly to the 'stand-by' slots.**

Each of the Organs, Combinations and Temperaments menus have eight 'stand-by' slots that allow objects of their respective types to be recalled quickly via the menu or from MIDI pistons. When Hauptwerk is in capture mode, those slots instead function to assign the current object to the respective slot. New sub-menus have now been added so that objects can be assigned to the stand-by slots directly via the relevant menu, avoiding the need to enter and leave capture mode to perform the assignment. The new items are intended as convenient menu short-cuts only, which are not accessible by MIDI, and augment the previous functionality.

**ENHANCEMENT HW-000380: Installer: Processor type now automatically detected.**

Previously during Hauptwerk installation it was necessary to select the type of processor that was installed in your computer so that the best-optimized Hauptwerk build could be installed. That caused confusion in some cases, so Hauptwerk's installer now detects the processor type and model and selects the best build automatically. Note that an option to install either 32 or 64-bit Hauptwerk is still presented on 64-bit Windows XP, since not all audio interfaces have 64-bit drivers that are fully compatible with native 64-bit software at the moment.

**ENHANCEMENT HW-000388: Small increase in polyphony on multi-core or multi-processor computers.**

Some additional tuning of the multi-processor engine has enabled Hauptwerk to give typically about 3 percent higher polyphony than previously possible on any given multi-core or multi-processor computer.

**ENHANCEMENT HW-000034: Settings now automatically restored from backup if they become corrupted.**

If the computer lost power or crashed at exactly the moment that Hauptwerk was saving its settings, it was possible that Hauptwerk's settings files could be only partly written, thus corrupting its configuration. Although the situation is unlikely, it had occurred on several occasions, usually when a computer had been turned off without shutting it down safely. Hauptwerk now detects partly-written or corrupted settings files and automatically restores them to the most recent valid backup, also writing a warning message to the log file for diagnostic purposes.

**ENHANCEMENT HW-000077: Configuration (stand-alone, MIDI sequencer, etc.) now shown on 'About Hauptwerk' screen and log file.**

This is useful if you forget which short-cut you used to open Hauptwerk, and also for diagnostic purposes.

**ENHANCEMENT HW-000280: Component installer progress display improved.**

Previously sample set installation progress could be difficult to monitor accurately since the extraction and installation action message lines could be wider than the visible area of the

progress display window. The lines are now automatically wrapped so that the full progress text is always visible. The progress window also does not now appear to freeze if you switch to another application and back.

**ENHANCEMENT HW-000285: Work-around to allow Hauptwerk to work with ASIO drivers that report latency incorrectly.**

The Behringer FCA202 interface is one such device, which should now work with Hauptwerk.

**ENHANCEMENT HW-000305: New Steinberg ASIO version supported with extended 64-bit driver support.**

Hauptwerk's internal ASIO support has been moved up to the new 2.2 version, which gives maximum compatibility with future third-party 64-bit drivers. The new version of ASIO has much more native support for 64-bit Windows drivers with 64-bit applications such as 64-bit Hauptwerk, which we hope we will lead to many more third-party 64-bit ASIO drivers in the near future.

**ENHANCEMENT HW-000323: Installer: Dongle driver now installed automatically by Hauptwerk installer.**

Previously it was necessary to run a separate installer to install the USB dongle driver, in addition to Hauptwerk's main installer. To simplify the installation process the dongle driver is now instead installed or upgraded automatically by Hauptwerk's installer.

**ENHANCEMENT HW-000332: Hauptwerk now launches more quickly.**

The time taken to initialize Hauptwerk when launched from a short-cut should now be noticeably less.

**ENHANCEMENT HW-000335: Pentium III and Pentium 4 builds merged on PC platform.**

Performance remains as good on either type of processor as with the previously separate builds, but combining them allows patches to be smaller, making for easier upgrade downloads. It has also eliminated an option from the installer that was confusing to some users.

**ENHANCEMENT HW-000342: Canceling organ load no longer shows message.**

Previously an unnecessary message indicating that loading of the organ had been cancelled was shown if the user clicked 'cancel' whilst the organ was loading. That message has been removed.

**ENHANCEMENT HW-000343: [St. Anne's, Moseley organ sample set] Crescendo pedal now defaults to fully off and swell box to fully open whenever loaded.**

Previously the states of the two expression pedals was remembered each time the St. Anne's organ was loaded. However, this caused confusion for some users who had inadvertently left the crescendo pedal on or the swell box closed, and we felt that it would be more useful to have the pedals defaulting to their most commonly-used positions.

**ENHANCEMENT HW-000344: Invalid audio and MIDI devices no longer shown in device selection lists.**

Each time that Hauptwerk starts, it queries all audio and MIDI devices to attempt to determine their suitability for use with Hauptwerk. Those that cannot be used are no longer available for selection in the device lists, eliminating the possibility of them being selected accidentally, and simplifying the options presented to the user.

**ENHANCEMENT HW-000345: Installer: MIDI Yoke priority optimized automatically for Hauptwerk if MIDI Yoke present.**

The third-party MIDI Yoke 'virtual MIDI cable' software for Windows is commonly used with Hauptwerk to connect Hauptwerk to a software MIDI sequencer running on the same computer. By default, MIDI Yoke runs at low priorities within the operating system, which can cause MIDI streams to freeze at times of high processor loading (see also the FAQ page on the Hauptwerk website). It is possible to boost MIDI Yoke's priority to that of a conventional hardware MIDI driver, which enables it to work well with processor-intensive applications such as Hauptwerk. Hauptwerk's installer now automatically makes that change to MIDI Yoke's settings if it finds that MIDI Yoke is installed at the time of Hauptwerk installation. Note that you will still need to adjust these MIDI Yoke settings manually if you install MIDI Yoke after installing Hauptwerk, or if you use Hauptwerk from a different Windows user account, since the settings are user-specific. Please see the FAQ page for more information if required.

**ENHANCEMENT HW-000348: Start-up messages simplified when audio/MIDI hardware changed.**

Previously it was possible that up to three messages could be given sequentially if audio or MIDI hardware had changed for which Hauptwerk was configured. These messages have been condensed to a single message giving the option to exit and keep existing configuration or automatically to re-default any necessary settings for the changed hardware.

**ENHANCEMENT HW-000350: Component installer more resilient to problems reading CDs and DVDs.**

The component installer now automatically copies each component package file (such as a sample set) to the hard disk and verifies it prior to attempting installation. This makes it much more robust in cases where the CD/DVD drive is having problems reading the disk, and ensures that such situations are handled as cleanly as possible. Please note, however, that more free disk space is now required temporarily during installation of sample sets.

**ENHANCEMENT HW-000358: 'Tool tips' added to some key settings screens and additional extra-visible 'what's this' buttons added.**

When the mouse pointer hovers over some of the main audio settings, a 'tool tip' is now shown giving a very brief tip about what the setting is for. This is in addition to the existing 'what's this' help, which provides full help on every setting. We will be adding tool tips to the remaining screens and settings in the near future. An additional 'what's this' help button has also been included on all settings screens, so that it is easier to find.

**ENHANCEMENT HW-000368: Dongle updates can now be performed via the Hauptwerk menu.**

Previously a separate utility program named 'Update Hauptwerk License Key' was used via the Windows Start menu to update Hauptwerk's USB license key dongle for additional license options or sample sets purchased. The functionality of that utility has now been incorporated within Hauptwerk itself so that it is more convenient to find and use. The new functions can be found on the 'File' menu and are identical to the equivalent functions in the previous utility program.

**ENHANCEMENT HW-000370: New functions on Help menu to launch Custom Organ Design Module user's guide and other documents.**

All of the Hauptwerk documents that were previously accessible from the Windows Start menu are now instead accessed via the Help menu within Hauptwerk, with the intention of

making them easier and quicker to find and launch. This includes the Custom Organ Design Module user's guide, the release notice and the license agreement.

**ENHANCEMENT HW-000375: Default audio output level reduced to -10 dB when an organ first loaded.**

Some audio interfaces require lower signal levels than others, and audio distortion (clipping) could be caused by some sample sets with the previous default output level with those interfaces. Hence the default output level when an organ is loaded for the first time has been reduced to -10 dB. This may be quieter than necessary for many audio interfaces, but it was felt that it was better always to have audio without distortion by default, since it is simple to turn the level up if required using the 'Organ settings | General options' screen.

**ENHANCEMENT HW-000245: Deinstallation of mandatory Hauptwerk components disallowed in component installer.**

Previously it was possible to use Hauptwerk's component installer to un-install some core Hauptwerk components, which required the Hauptwerk installation to be repaired from the CD. The component installer no longer allows mandatory components to be un-installed.

**ENHANCEMENT HW-000273: Component installer can now display a license during sample set installation.**

A sample set producer can now include a file named Licence.rtf at the top level within a component package. If present, the file must be in valid rich text format, and its contents will be displayed to the user immediately prior to installation of the component package. The user must accept the license to continue with installation of the package.

**ENHANCEMENT HW-000277: User option to disable error logging removed.**

Previously it was possible to disable Hauptwerk's error/activity log file. However, this caused confusion for some users who had inadvertently disabled all error handling, making diagnosing problems very difficult. It is still possible to disable screen error messages (for 'headless' operation as a digital organ engine) but the log file is now always enabled for diagnostic purposes.

**ENHANCEMENT HW-000283: VSTi: VSTHost freeware VST host software supported.**

The freeware VSTHost software did not work with previous versions of Hauptwerk because the host incorrectly reports its latency as zero. Hauptwerk has been changed to work around the problem by using a specific default latency internally.

**ENHANCEMENT HW-000319: [Sample set developers only] New ContinuousControlDoubleLinkage max and min functions.**

These are useful for modeling certain types of 'All swells' expression pedal couplers and similar mechanisms

**ENHANCEMENT HW-000336: [Sample set developers only] Number of stop codes per division increased from 64 to 99.**

This is mainly relevant for forthcoming large theatre organ sample sets.

**ENHANCEMENT HW-000341: Organ loading progress indicator no longer waits at 0 percent.**

Previously the organ loading progress indicator would remain at 0 percent whilst loading tremulant data. Now it moves smoothly throughout the whole loading process.

**ENHANCEMENT HW-000367: Preliminary changes to support forthcoming Windows Vista.**

Some preliminary changes have been incorporated in preparation for the forthcoming Windows Vista. However, we have not yet completed testing on the current Vista beta version, and Hauptwerk may not yet be fully compatible. Full support for Vista is planned in time for its public release in spring 2007.

**ENHANCEMENT HW-000371: Recommended MySQL Server version moved from 4.1 to 5.0.**

Previously the tested and supported version of MySQL Server was 4.1. We have tested version 5.0.26, and now recommend and support that version for use with Hauptwerk. Note that the MySQL Server can be used as a tool for developing sample sets and is not required for use with Hauptwerk. Use of MySQL Server with Hauptwerk requires a valid commercial license for the MySQL Server software.

**BUG HW-000233: MIDI input had a tendency to stick with extreme processor loads on multi-processor systems.**

Previously on multi-core/multi-processor computers with certain MIDI or audio drivers there was a tendency for the MIDI stream to become delayed the first time that many pipes sounded after activation, causing notes to stick in the 'on' state for a few seconds. Usually it would only happen only once (occasionally twice), shortly after activation, and only with very large chords with more than a few hundred pipes sounding at once, and would work normally thereafter. Some fine-tuning of Hauptwerk's multi-processor engine and NUMA optimizations have eliminated this problem, and MIDI input should now be fully responsive under even extreme processor loads.

**BUG HW-000242: Installer: Now able to repair partial/broken installations/deinstallations properly.**

Previously if an installation or deinstallation failed part way through, which could happen if an error occurred reading the Hauptwerk CD, it was possible that the installer would be misled into believing that Hauptwerk was already installed, whilst being unable to repair the installation due to the installation paths being detected as 'NULL'. The installer has been changed to handle this situation safely. Now if some of the paths cannot be detected the installer behaves as for a clean installation, thus allowing the whole installation to be overwritten or repaired.

**BUG HW-000253: Installer: main installer executable resilient to CD/download data errors.**

Previously, if the Hauptwerk CD media was physically damaged or a data read/write error occurred, Hauptwerk's installer could continue but produce unexpected results, sometimes corrupting the Hauptwerk installation. To make it more robust against such media/download errors, the main installer executable is now contained within a self-extracting archive file that includes automatic error-checking. Hence an error will now be shown if the media/file is corrupted, preventing the installer itself from executing and potentially causing damage to an installation.

**BUG HW-000272: Component installer occasionally crashed when installing certain sample sets.**

With a few particular sample sets, some users reported problems with the component installing crashing during extraction prior to sample set installation on certain computers. The

third-party archive extraction tool, used by Hauptwerk to perform the extraction, has been updated to a more recent version and this problem now appears to be fixed.

**BUG HW-000330: Stand-by combination file menu items 2-8 were not working properly.**

Combination files can be assigned to the menu using eight 'stand-by' menu items so that they can be recalled quickly via the menu or from MIDI pistons or computer keys. Previously, assigning a combination file to any of the eight stand-by slots always incorrectly assigned it to slot number one.

**BUG HW-000337: Rare settings corruption problem fixed.**

An extremely rare circumstance was identified in which it was possible that one of Hauptwerk's settings files could be corrupted when unloading an organ or closing Hauptwerk. The problem has now been fixed.

**BUG HW-000291: Changes in tremulant rates in organ definition files were being ignored unless voicing was reset.**

Voicing data are stored for tremulants, including the tremulant rates. However, the user voicing screen to adjust tremulant parameters has not yet been included in Hauptwerk. Since a tremulant rate voicing parameter overrides the organ definition value, this was preventing changes to the rate being picked up from the organ definition file, for example if the user changed the rate value in a Custom Organ Design Module (CODM) organ definition, unless the voicing was reset explicitly. The tremulant voicing parameters are now ignored until the relevant user tremulant voicing screen has been implemented.

**BUG HW-000316: MIDI system-exclusive dumps larger than 256 bytes could cause notes to stick or other corruption of MIDI input stream.**

In practice this was unlikely, but the problem has now been rectified.

**BUG HW-000083: Unnecessary console screen redraws when system functions triggered from MIDI or a computer key.**

Previously the virtual console was redrawn each time that a 'system function' (menu function) was triggered, regardless of the function and regardless of whether it was triggered from the menu or from a MIDI piston or computer key. In many cases this was unnecessary, such as

when entering or leaving capture mode or using the registration sequencer, and caused an unsightly flicker. The screen is now only redrawn when it is absolutely necessary, determined on a function-by-function basis.

**BUG HW-000327: Output LCD status display could cause unnecessary MIDI reset messages with some MIDI drivers (Concert Edition only).**

The Concert Edition of Hauptwerk has functionality to drive an LCD panel to display Hauptwerk's status without needing a computer monitor. An incorrect byte in the MIDI system exclusive message used to control it could previously trigger some MIDI drivers and devices to perform a MIDI reset.

**BUG HW-000328: Output MIDI status indicator lamp system was not compatible with all MIDI decoders (Concert Edition only).**

Hauptwerk has functionality to control lamps/LEDs as indicators for its statuses (organ loaded, recording, combination capture mode, etc.), to allow operation without a computer monitor. Previously these status messages were configured by default to send MIDI note-on/off messages with a velocity of zero. However, many MIDI decoders interpret a note-on message with velocity zero as a note-off message. A velocity of 127 is now sent by default for these messages.

**BUG HW-000284: [Documentation] Incorrect footnote in prerequisites about Image-Line FL Studio VST Host features.**

The host does, in fact, allow multiple audio outputs from a VST plug-in.

**BUG HW-000329: Custom Organ Design Module ignoring full organ name.**

In the Custom Organ Design Module (CODM) both a 'full' and 'short' name can be specified for an organ definition. Previously the full name was being ignored.

**BUG HW-000349: Component installer was forgetting last-used folder following a deinstallation.**

Previously the last-used component package folder was not being used as a default if a deinstallation had been performed immediately before installing a new package.

**BUG HW-000390: [Sample set developers only] Conditional inertia/Willis continuous control linkage timing error.**

There was a problem whereby conditional inertia/Willis-type continuous control linkages in an organ definition were being evaluated using an incorrect time interval the first time that they were iterated when the condition changed state, causing unexpected behavior with theatre organ pizzicato couplers and similar mechanisms for forthcoming sample sets. This problem is not known to affect any existing sample sets.

**Changes in version 2.11**

Version 2.11 included mainly bug-fixes and work-arounds for problems found with versions 2.00 to 2.10, plus a couple of very minor enhancements. The following were included:

**ENHANCEMENT HW-000207: Evaluation version can now be used with Intel Pentium II and pre-Athlon XP AMD Athlon processors.**

Previously Intel Pentium III or AMD Athlon XP or more recent processors were required for the evaluation version, whereas now it can also be used on Pentium II and early Athlon processors. Note that the evaluation version now gives about 13 to 15 percent less polyphony than can be expected with the licensed version using a Pentium III, Athlon XP or other more recent 32-bit processor. We felt that this reduction in performance for the evaluation build (only) was a worthwhile trade-off since many users may wish to evaluate Hauptwerk on older computers before making a decision about whether to buy Hauptwerk or upgrade to more recent computer hardware.

**ENHANCEMENT HW-000203: [Sample set developers only] Limits on the number of objects within the organ definition files have mostly been removed.**

Except in a few necessary cases, the numbers of most types of objects within the organ definition files are now limited to 999999, being the highest ID number supported for each object. This allows for extremely large organs and sample sets, without increasing memory requirements for other sample sets.

**BUG HW-000198: No audio device channels were available for selection with ASIO drivers that support 44100 Hz sample rate only.**

When Hauptwerk queries the audio devices (which occurs if the selected driver type or audio hardware change), no channels will be listed on the 'General settings | Audio output channels' screen if it is unable to query the driver (usually because it is in use by another application) or if the driver does not support any of Hauptwerk's audio formats. The reasons are written to the main Hauptwerk log file. If an ASIO driver supported ONLY the 44.1 kHz sample rate, Hauptwerk incorrectly concluded that no supported sample rates were available, even though 44.1 kHz is in fact a valid sample rate for Hauptwerk. This bug affected very few ASIO drivers since almost all also support sample rates other than 44.1 kHz. Such drivers are now handled correctly.

**BUG HW-000210: On the pipe voicing screen, if the 'QUICK' faders had been used, Hauptwerk could sometimes crash.**

The problem only occurred after adjusting the 'QUICK' faders for octaves without a full complement of pipes.

**BUG HW-000221: Periodic audio glitches were audible on some PCs with version of v2.10.**

A few computers (probably determined by the motherboard design) were found to experience periodic very brief audio glitches, usually about once every 1 to 3 minutes.

**BUG HW-000238: Some pipes with release sample(s) in separate files to the attack/sustain sample(s) did not play correctly in version 2.10.**

In particular, some of the ranks on the Sonus Paradisi Doksy Rieger sample set were affected by this problem and produced odd sounds.

**BUG HW-000205: Hauptwerk v1 Silver Octopus 25/36-stop Willis sample sets did not import into v2.10 properly.**

A few entries were found in the Hauptwerk version 1 Silver Octopus 25/36-stop Willis organ definition files which caused problems when importing into Hauptwerk version 2.10. The import process has been changed to allow for these circumstances for version 2.11 onwards. If you previously tried and failed to import one of these sample sets, please re-import the sample set using Hauptwerk version 2.11 or above before attempting to load it via the 'Organ' menu. Note that, because the keyboards were assigned in an unconventional order, once the sample sets have loaded, you may need to use 'Organ settings | Connect keyboard MIDI inputs to organ keyboards' to adjust the keyboard assignments. Hauptwerk now detects and

corrects cases where the pedalboard was assigned a MIDI input other than the conventional pedalboard input (which previously caused the wrong key images to be displayed for the pedalboard and a manual) and allows for console image items that are partly or fully outside the visible screen area.

**BUG HW-000209: Prospectum Carl Schaefer and St. Michael Hauptwerk v1 organ sample set did not import into v2.10 properly.**

A few entries were found in the Hauptwerk version 1 Prospectum Carl Schaefer and Prospectum St. Michael organ definition files which caused problems when importing into Hauptwerk version 2.10. The import process has been changed to allow for these circumstances for version 2.11 onwards. If you previously tried and failed to import one of these sample sets, please re-import the sample set using Hauptwerk version 2.11 or above before attempting to load it via the 'Organ' menu. Specifically, Hauptwerk now ignores cases where multiple keyboards were assigned to the same Hauptwerk version 1 MIDI input, and detects and corrects cases where the pedalboard was assigned a MIDI input other than the conventional pedalboard input (which previously caused the wrong key images to be displayed for the pedalboard and a manual).

**BUG HW-000230: Hauptwerk v1 aH Moerdijk Marcussen sample set would not load when imported into v2.10.**

The 34/04-D#1.wav sample in the Hauptwerk version 1 edition of the aH Marcussen sample set had a corrupted loop point, which prevented the sample set from loading once imported into Hauptwerk version 2.10. The error number given was 'ERR:4926 The sample file 34/04-D#1.wav is invalid ...'. For Hauptwerk version 2.11 onwards, Hauptwerk tolerates an invalid loop point in the same way that version 1 did; the loop will not sound correctly if the key is held down for a long time, but the sample set can still be loaded and used apart from that. A warning is now written to the log file for such samples.

**BUG HW-000227: Tab order was incorrect on the 'Organ settings | General options' screen.**

Most notably on the 'Audio Engine' tab.

## **Changes in version 2.10**

Version 2.10 was a maintenance release which included several major new features, many

major performance and usability enhancements, a lower-cost edition, the ability to import version 1 sample sets and various bug fixes. Please note that the lower-cost edition was named the Studio Edition in versions 2.01 to 2.21, but has been renamed to the Basic Edition in version 3 and later (a change of name only; no loss of functionality). The previous Concert Edition has also been renamed to the Advanced Edition in version 3 onwards.

**ENHANCEMENT HW-000027: New per-rank option to disable multiple sample loops, saving memory.**

Hauptwerk supports samples containing multiple loops, which it plays in a complex sequence to reduce repetition. A new option is available on the 'Organ | Load organ, adjusting rank audio output routing' screen which causes Hauptwerk only to load the loop that ends first in the sample, often saving a considerable amount of memory but at the expense of some realism. For best results it is recommended that this setting only be used if a sample set will not fit into available memory, and then preferentially on only the least frequently-used or least prominent ranks. Note the multiple sample loop playback can also be disabled globally using the 'General settings | General options' screen.

**ENHANCEMENT HW-000028: New per-rank option to truncate releases to save memory and for 'dry' simulation.**

A new option is available on the 'Organ | Load organ, adjusting rank audio output routing' screen, which causes Hauptwerk to truncate release samples artificially, using specially-shaped frequency-dependent decays, to simulate 'dry' samples (with no reverb). With very 'wet' sample sets, simulating dry samples in this way can save a considerable amount of memory. It can also allow such sample sets to be played in reverberant spaces and helps to reduce noticeable differences in acoustics when using sample sets containing samples drawn from several different sources. However, the results are never completely the same as using true dry-recorded samples, since a room acoustic also affects the attack and sustaining portions of the sound, which simple truncation of releases cannot model. True dry samples are thus highly preferable to using this option, and it is recommended that it only be used as a last resort. The licenses for some sample sets do not allow modification of samples in this way, and this option is disabled for such sample sets.

**ENHANCEMENT HW-000030: New per-rank option for loss-less memory compression.**

A new option is available on the 'Organ | Load organ, adjusting rank audio output routing' screen, whereby you can select whether each rank should be compressed using a fast loss-less memory compression algorithm. Compressing the memory has no effect at all on audio quality and typically reduces the memory required for a rank by between 30 and 45 percent,

depending on the contents of the samples. However, since processor overheads are increased slightly when compressed samples are played, the polyphony that can be achieved will be reduced a little; typically by about 10 to 15 percent. Hauptwerk's polyphony management algorithms automatically allow for this, so the polyphony limit should be set in the usual way (without compression). This new option is especially useful for very large sample sets that require more memory than can be installed in a given computer/motherboard or can be accessed with 32-bit Windows (which is limited to about 2.75 GB). In such circumstances, it is recommended that you enable it preferentially for ranks that place the least demands on polyphony, such as Pedal ranks, and then on lesser-used ranks. The option is also particularly useful for loading large 24-bit sample sets in standard desktop computers.

### **ENHANCEMENT HW-000060: Hauptwerk version 1 sample sets can now be used in version 2.**

A new function has been added to the 'File' menu to enable any Hauptwerk version 1 sample set to be imported into Hauptwerk version 2. Once imported, the sample set will behave fully as a normal version 2 sample set, and can be loaded via the 'Organ' menu as with any other sample set. Note that Hauptwerk version 1 was a much less powerful and less realistic system than version 2, and its organ definition files contained only a tiny fraction of the information held in version 2 files. Because the information for many version 2 features (such as the shapes of tremulant waveforms for each pipe and the wind supply model parameters) was simply not available in version 1 sample sets, Hauptwerk can only use simple defaults when importing. Imported sample sets will look and function much as they did in version 1. They will sound much better because of the core improvements in audio quality and sample play-back inherent in version 2 and its new models, but they won't be nearly as functional or realistic as a native version 2 sample set. It is thus still highly preferable to obtain an official Hauptwerk 2 version upgrade of a sample set from its supplier to simply importing its Hauptwerk 1 version in this way. Since Hauptwerk version 2 now performs better in every way than version 1 (it can use less memory, can give a higher polyphony, has much higher audio quality, is much more realistic and is many times more powerful), is available in a low-cost edition, and can use version 1 sample sets, version 1 itself is now considered obsolete and will no longer be available.

### **ENHANCEMENT HW-000062: All main setting screens now accessible regardless of whether an organ is loaded or active.**

It is no longer necessary to un-load or deactivate the current sample set to access the relevant settings screens. When necessary, deactivation and re-activation are automatic and now almost instantaneous.

**ENHANCEMENT HW-000080: Sample set loading times massively reduced.**

If a sample set has been loaded two or more times consecutively using the 'Organ | Load organ' or stand-by/recent options, its samples are read from a special fast sample cache rather than the original files. Various optimization techniques have been used to speed up the loading of a sample set from that cache, typically increasing loading speed by a factor of about four times over previous Hauptwerk 2 versions, and by a factor of about six times over loading from the 'raw' (non-cached) samples.

**ENHANCEMENT HW-000095: Per-pipe real-time voicing adjustments screen.**

A new screen is available under the 'Organ settings' menu which allows graphical adjustment of many aspects of the sound of each pipe in real-time. (If a pipe is composed of several layered samples, then adjustments can be made for each layer separately.) The rank, layer and parameter are selected at the top of the screen, and sliders are then used to adjust the level of the selected parameter for each pipe in the rank (and layer), with additional 'short-cut' sliders to allow rapid shaping of the response across the rank as a whole. The resulting voicing settings are saved separately for each sample set. These voicing facilities are only available in the full Concert Edition of Hauptwerk. The licenses for some sample sets do not allow voicing to be adjusted, and the screen cannot be used with such sample sets.

**ENHANCEMENT HW-000101: New lower-cost, reduced Hauptwerk edition available.**

A new lower-cost edition of Hauptwerk is now available, named the Studio Edition, intended for home and practice use and also as a very affordable upgrade for users of Hauptwerk version 1 or newcomers to Hauptwerk. The full edition of Hauptwerk is now referred to as the Concert Edition. The new low-cost edition has its polyphony restricted to 1024 simultaneous voices (pipes), no multi-channel audio output facilities, no MIDI output, no user per-pipe real-time voicing facilities and no wind supply model, but in all other regards is identical to the Concert Edition.

**ENHANCEMENT HW-000131: New option to disable audio engine interpolation, giving very high polyphony on older computer hardware (typically a much higher polyphony than even Hauptwerk version 1).**

In order to allow the pitch of each pipe to vary constantly in real-time, Hauptwerk's audio engine uses a mathematical process known as 'interpolation'. A new option has been added to the 'General settings | General options' and 'Organ settings | General options' screens to allow this interpolation to be turned off, globally or for any given sample set. By selecting this option, Hauptwerk will only play samples at exactly the pitch at which they were recorded.

This gives an enormous increase in the polyphony that can be achieved on given computer hardware, and is especially useful for older or lower-specification computers. This option typically allows a much higher polyphony to be achieved than even Hauptwerk version 1 could manage. For example, on a Pentium 4, 2.8 GHz processor using audio buffer sizes of about 20-23 milliseconds, Hauptwerk version 1 can manage a polyphony of about 1600 simultaneous pipes. With all features enabled, Hauptwerk version 2 can manage about 720 simultaneous pipes, but with interpolation, the per-pipe filters and multiple sample loops disabled, Hauptwerk version 2 can manage about 2160 simultaneous pipes on the same computer. However, the sound will be less realistic as a result of disabling interpolation (but still much better than Hauptwerk version 1). In particular, tremulants, the wind supply model and Hauptwerk's various models which impart life and movement to the sound will be less effective with interpolation disabled. It is recommended that you only select this option if the polyphony you can achieve with your computer hardware is not adequate. Note that some sample sets are not compatible with this option, and an error will be given if you attempt to load such a sample set. Hauptwerk's temperaments and adjustable tuning will also no longer work.

### **ENHANCEMENT HW-000150: License key replaced by USB dongle for Hauptwerk and sample sets.**

In order to provide secure licensing and copy protection for Hauptwerk sample sets, which is a requirement for some existing and new sample set producers, Hauptwerk's licensing mechanism has been changed to use a USB dongle. A dongle-based licensing mechanism also makes it easier for third-parties who install or sell Hauptwerk as part of organ systems. A dongle and version 2.10 CD will be sent to all existing licensed version 2 users at no charge. Without the dongle attached, Hauptwerk will function as an evaluation copy. You will need a spare USB port to attach the dongle.

### **ENHANCEMENT HW-000151: Audio engine options now adjustable separately for each sample set.**

Some users have a range of sample sets of different sizes, with smaller sets easily running on their computer hardware without needing to disable any audio engine features, whilst other, larger, sample sets may push the computer to its limits and need some processor-intensive audio engine features disabled. To accommodate this, the key audio engine options performance tuning options can now be adjusted for each sample set individually, as well as globally. These settings are: 'disable swell box filters', 'disable harmonic-shaping filters', 'disable interpolation', 'disable MIDI velocity sensitivity' (not strictly a performance option), 'disable main wind supply model' (for non-U.S. customers) and the polyphony limit. Using these options it is now possible to get the maximum possible realism from each sample set within the limits of the computer hardware available.

**ENHANCEMENT HW-000156: Activation now almost instantaneous, reducing loading times.**

Once a sample set has been loaded, it is 'activated' at which point Hauptwerk starts all of the necessary audio and MIDI devices and performs various other internal indexing to give maximum real-time performance. Previously this could take 10 to 20 seconds, depending on the size of the sample set and the speed of the computer. It has now been highly optimized and typically takes less than a second. Thus the overall sample set loading and activating time is reduced accordingly.

**ENHANCEMENT HW-000160: Overall memory footprint reduced by about 400 MB.**

A great deal of effort has been put into tuning Hauptwerk's background memory usage, without compromising its real-time performance. As a result, in use Hauptwerk typically now needs about 400 MB less with a sample set loaded overall than it did in previous Hauptwerk 2 versions. When Hauptwerk is running with no sample set loaded it now uses approximately 38 MB of memory (nearly 70 percent less even than Hauptwerk version 1). Although slight further tuning may be possible, it is unlikely that it could be reduced much further without an impact on performance. As a result of this reduction in memory requirements, substantially larger sample sets can now be loaded within a given amount of memory. For example, the St. Anne's, Moseley sample set can now easily be used in full (without memory compression) on computers with only 1 GB of memory. It is also now possible to use Hauptwerk effectively with smaller sample sets on computers with only 512 MB of memory, and the prerequisite minimum amount of computer memory required to use Hauptwerk has been reduced accordingly.

**ENHANCEMENT HW-000162: Almost all options and settings can now be adjusted without re-loading a sample set.**

Previously the 'General options', 'Audio output groups', 'Audio outputs' and 'Audio output channels' screens on the 'General settings' menu all required any sample set to be un-loaded before they could be accessed. All of the those screens can now be accessed regardless of whether a sample set is loaded or active, and almost all of their settings no longer require any currently-loaded sample set to be re-loaded. In particular, all except one of the settings on the 'General options' screen now take effect almost instantaneously, and the audio drivers, audio device channels and audio buffer size (latency) can all be changed with almost immediate effect, as can almost all of the performance tuning parameters, such as enabling/disabling audio engine features (e.g filters and interpolation) and adjusting the polyphony limit. The very few exceptions are clearly shown on the relevant screens.

**ENHANCEMENT HW-000054: [VSTi only] Cakewalk Sonar 5 now supported as VST host.**

Hauptwerk (32-bit) has now been made compatible with Cakewalk Sonar 5 as a VST host, and is fully tested and supported on that platform.

**ENHANCEMENT HW-000057: Organ-specific settings saved when OK clicked on audio routing screen.**

Previously, if some ranks were disabled using the 'Organ | Load organ, adjusting rank audio output routing' screen, and it then transpired that an insufficient number had been disabled to allow the (subset of the) sample set to load into the memory available, after the insufficient memory error had been displayed the selection of disabled ranks would not be saved, thus it was necessary to disable them again next time. With many ranks disabled, this could be time-consuming. Now the disabled rank selection is always saved at the point that OK is clicked on the screen, saving considerable time in such situations when memory is in short supply.

**ENHANCEMENT HW-000067: MIDI expression pedal range can now be adjusted/mapped.**

Some electronic organ consoles have MIDI expression pedals that do not produce the full 0-127 range of MIDI continuous control values. Previously when such pedals were used to control a virtual swell or crescendo pedal in Hauptwerk, either only part of the range of the virtual pedal would be accessible, or a third-party real-time MIDI message translation tool such as MIDI-OX would be required. However, MIDI-OX could have a significant detrimental impact on Hauptwerk's performance. Now on the 'General settings | Continuous control MIDI inputs' screen you can specify the minimum and maximum values that your pedal can transmit and Hauptwerk will map its range automatically, so that third-party tools are no longer necessary.

**ENHANCEMENT HW-000111: [VSTi only] New native 64-bit VSTi build.**

Now that the Steinberg VST specification supports native 64-bit VST plug-ins, a new 64-bit Hauptwerk VST plug-in is included with the 64-bit Hauptwerk installation option. Because the majority of VST hosts do not yet support native 64-bit plug-ins, both the 32-bit and 64-bit versions of the plug-in are installed with the 64-bit Hauptwerk installation option, so that the appropriate one can be used depending on the VST host under 64-bit Windows. Support for the 64-bit Hauptwerk plug-in should be considered beta for now, since it has not yet been

possible to test it properly with any commercial VST hosts supporting native 64-bit plug-ins.

**ENHANCEMENT HW-000125: [VSTi only] General compatibility with VST hosts significantly improved and support extended.**

Various compatibility issues have been addressed, and the Hauptwerk VSTi edition plug-in should now be compatible with the vast majority of VST hosts. Although we cannot test on all hosts, as much as possible we will endeavor to support Hauptwerk on any current host provided that we can obtain a testing copy from the manufacturer and that any compatibility issues prove to be due to Hauptwerk and not the host itself. Note that SpinAudio Virtual Mixing Console is known not to work fully with Hauptwerk, which is under investigation.

**ENHANCEMENT HW-000154: Memory required and loading time reduced for polyphony testing organ.**

The polyphony testing organ is used to determine the appropriate setting for the polyphony limit, which controls Hauptwerk's polyphony management system and is described in the 'performance tuning' section of the user guide. Since realism is irrelevant for this organ, it has been changed to use Hauptwerk's release sample truncation feature and not to use multiple sample loops, thus saving memory for its release samples and reducing its loading time. Overall the free memory required to load the whole sample set is now only about 972 MB, including Hauptwerk itself, a large reduction. In all other respects it works exactly as before.

**ENHANCEMENT HW-000173: NTFS file fragmentation reduced for faster loading.**

We have found the Windows NTFS file system to be particularly prone to fragmentation (breaking files up into many small chunks), which was increasing loading times for Hauptwerk and sample sets significantly. By changing the file handling in Hauptwerk it has been possible to reduce significantly the likelihood and extent of file system fragmentation with NTFS, which has given a big additional reduction in loading times on Windows systems. In order for these changes to be fully effective, we strongly recommend defragmenting your hard-disk, as described in the 'upgrading' section of the latest version of the Hauptwerk user guide, either prior or shortly after upgrading to version 2.10.

**ENHANCEMENT HW-000092: [VSTi only] Geniesoft Overture 4 now supported as VST host.**

Hauptwerk (32-bit) has now been made compatible with Geniesoft Overture 4 as a VST host, and is fully tested and supported on that platform. Note that Overture does not currently

support multiple audio outputs, so Hauptwerk can only be used with its output mixed to a single stereo output pair.

**ENHANCEMENT HW-000110: [VSTi only] New VST 2.4 specification now supported.**

Internally, the Hauptwerk VSTi edition has been updated to use the new Steinberg VST 2.4 specification, which allows for compatibility with additional host features and native 64-bit VST operation.

**ENHANCEMENT HW-000121: [VSTi only] Emagic/Apple Logic 5.5 now supported as VST host on PC platforms.**

Hauptwerk (32-bit) has now been made compatible with Emagic/Apple Logic 5.5.1 as a VST host, and is fully tested and supported on that platform. Note that Logic does not allow a plug-in to re-size its window, so the console may appear truncated, and Logic does not currently support multiple audio outputs with Hauptwerk, so Hauptwerk can only be used with its output mixed to a single stereo output pair.

**ENHANCEMENT HW-000122: [VSTi only] Brainspawm Forte 1.5 now supported as VST host.**

Hauptwerk (32-bit) has now been made compatible with Brainspawm Forte 1.5 as a VST host, and is fully tested and supported on that platform. Note that Forte does not allow a plug-in to re-size its window, so the console may sometimes appear truncated. After loading/unloading or activating/deactivating a sample set, close and re-open the plug-in's 'editor' window to force the host to display it at its new size, thus working around the problem. Note also that Forte does not currently support multiple audio outputs, so Hauptwerk can only be used with its output mixed to a single stereo output pair.

**ENHANCEMENT HW-000123: [VSTi only] Image-Line FL Studio 6 now supported as VST host.**

Hauptwerk (32-bit) has now been made compatible with Image-Line FL Studio 6 as a VST host, and is fully tested and supported on that platform. Note that FL Studio does not currently support multiple audio outputs with Hauptwerk, so Hauptwerk can only be used with its output mixed to a single stereo output pair.

**ENHANCEMENT HW-000124: [VSTi only] Magix Samplitude 8 now supported as VST**

**host.**

Hauptwerk (32-bit) has now been made compatible with Magix Samplitude 8 as a VST host, and is fully tested and supported on that platform. Note that Samplitude does not allow a plug-in to re-size its window, so the console may sometimes appear truncated. After loading/unloading or activating/deactivating a sample set, close and re-open the plug-in's 'editor' window to force the host to display it at its new size, thus working around the problem.

**ENHANCEMENT HW-000043: Component installer file browser now remembers last file location.**

The file browser that appears when using 'File | Install organ, sample set, temperament or impulse response' now opens in the folder that you last used it for convenience.

**ENHANCEMENT HW-000104: Processor type of build visible via Windows properties of Hauptwerk executable or VSTi DLL.**

The processor type chosen during Hauptwerk's installation is now visible via the Windows properties of the Hauptwerk executable or VSTi DLL for diagnostic purposes.

**ENHANCEMENT HW-000127: Show installed license options in the About box and log file.**

The installed license type and options are now shown on the 'Help | About Hauptwerk' screen and in the log file for diagnostic purposes

**ENHANCEMENT HW-000142: Memory requirements reduced slightly when loading sample sets.**

The memory required temporarily whilst Hauptwerk loads a sample set from disk has been reduced slightly.

**BUG HW-000147: Hauptwerk could occasionally crash on a few particular PCs if tremulants with particular parameters were left running for long periods of time.**

Only a very small number of computers exhibited this problem, and only then with particular sample sets, notably the Milan Digital Audio Virginia Virtual Wurlitzer. It was traced to a bug in Hauptwerk's tremulant synchronization mechanism which was sensitive to the particular

tremulant settings and timing of the computer, and has now been fixed.

**BUG HW-000091: [VSTi only] Selecting a sample set via the VST instrument program number/name in the VSTi edition of Hauptwerk could cause the sample set to be re-loaded unnecessarily when the host project was saved.**

In the VSTi edition of Hauptwerk, a sample set can be specified by assigning it as a stand-by organ and then selecting the corresponding entry as the program property of the VST instrument in the VST host software. However, some hosts trigger a program selection when saving a project or at other times, which could cause Hauptwerk to re-load the specified sample set unnecessarily. Hauptwerk has been changed to ignore such selection messages if the corresponding program (stand-by sample set) is already selected. Please note that sequencer projects saved for use with versions of Hauptwerk prior to 2.10 may need to have their VST instrument program number (stand-by sample set) updated, since it has been necessary to re-number the programs to work around this problem.

**BUG HW-000109: [VSTi only] The VST plug-in 'program' numbers did not all correspond properly to the stand-by organ numbers.**

In the VSTi edition of Hauptwerk, a sample set can be recalled by assigning it as a stand-by organ and then selecting the corresponding entry as the program property of the VST instrument in the VST host software. However, only the first of the eight VST 'program' entries were triggering stand-by organ entries, and then not the ones expected. This has now been corrected, and all eight stand-by organs can be recalled from VST 'programs'. Additionally, a VST program entry has been added which causes no organ to load. Please note that sequencer projects saved for use with versions of Hauptwerk prior to 2.10 may need to have their VST instrument program number (stand-by sample set) updated, since it has been necessary to re-number the programs to correct this problem.

**BUG HW-000116: [St. Anne's, Moseley organ sample set] The couplers were not being recalled by the crescendo action.**

On the crescendo programmer page, the couplers were stored and recalled properly in combination files but did not actually affect the couplers when the pedal was operated.

**BUG HW-000081: Component installer incorrectly allowed a patch to be installed if a prerequisite version was not present.**

When applying a patch to a sample set data package, the component installer did not prevent

the patch being applied if an earlier prerequisite version of the package was not already installed and valid.

**BUG HW-000082: If a Windows display style (theme) other than 'Windows Classic' was used, the division headings on the Custom Organ Design Module console pages were not always visible.**

Organs created with the Custom Organ Design Module show a black bar along the top of each console screen page with labels for the divisions. If the Windows display style (theme) was 'Windows XP' or another style other than 'Windows Classic' with wide window title bars, then the division headings were not always be visible.

**BUG HW-000086: If an aux-send audio output was deleted whilst a primary output was routed to it, a crash was possible.**

On the 'General settings |Audio outputs' screen if an audio output was configured as an aux-send output, another (primary) output had that aux-send output specified as an aux-send destination, then the aux-send output was deleted and OK clicked on the screen without first having navigated to the referring primary output, Hauptwerk would crash.

**BUG HW-000087: Very occasionally a recorded audio output file was not be finalized properly when recording was stopped.**

This circumstance was very unlikely unless many audio streams were recorded simultaneously, e.g. when using many audio output channels (multi-channel audio output) and recording them all separately, rather than mixing them down and recording just the mixed output.

**BUG HW-000112: Console screen area could vary slightly according to Windows style/theme.**

If the Windows display style (theme) is 'Windows XP' or another style other than 'Windows Classic' with wide window title bars, then the top few pixels of a sample set's console window could be hidden by the page tab bar.

**BUG HW-000115: [Documentation] In the 'virtual console' section of the user guide the St. Anne's setter piston was incorrectly referred to as labeled 'S'.**

The St. Anne's setter piston was incorrectly referenced in the user guide.

**BUG HW-000118: [VSTi only] An LCD panel object and MIDI output path were included in the default configuration even though the LCD system is disabled for the VSTi edition.**

The VSTi edition of Hauptwerk does not allow the LCD panel system to be used since the VST specification does not support the required type of MIDI messages. However, an LCD panel entry and associated MIDI output path were included in the default configuration, and could not be deleted because the LCD panel screen is not available in the VSTi edition, thus preventing deletion of the spurious output path.

**BUG HW-000120: [Documentation] Trivial typing error in 'registration sequencer' section of user guide.**

The example showing the frame number calculation by bank was incorrect.

**BUG HW-000129: Unlikely circumstance identified in which sample cache could be regenerated unnecessarily.**

If a sample set has been loaded two or more times consecutively using the 'Organ | Load organ' or stand-by/recent options, its samples are read from a special fast sample cache rather than the original files. A very unlikely circumstance was found in which the cache could be regenerated unnecessarily, causing a longer than necessary loading time on rare occasions. Diagnostic messages have also been added to the log file to show the reason that the cache is regenerated each time to help diagnose such problems in the future.

**BUG HW-000138: Custom Organ Design Module works with short tremulant samples.**

Previously the Custom Organ Design Module (CODM) required each tremulant waveform sample to have at least 100 milliseconds of data before the start of a loop to allow for its crossfade. Since this has caused problems with certain sample sets (notably the Milan Digital Audio Virginia Virtual WurliTzer), the length of the crossfade has been reduced to 10 milliseconds to improve compatibility. In particular, the CODM is now compatible with the Virginia WurliTzer sample set.

**BUG HW-000152: When console screen display is disabled the screen size was still checked.**

When using Hauptwerk 'headless' (with no mouse, monitor or computer keyboard connected), the computer's display driver often sets the desktop screen size to a standard basic size (e.g. 1024 x 768 pixels). Hauptwerk's display can be disabled for such 'headless' use, but was still checking whether the resolution was sufficient when loading a sample set. This could prevent a sample set with a large screen display from loading if no monitor was connected.

**BUG HW-000185: Re-installing a patch with the component installer would un-install the component first.**

If a sample set data component was installed, then patched, then the same patch applied a second time, the component would incorrectly be un-installed prior to re-applying the patch, which could leave it only partly installed.

**BUG HW-000186: Component installer would fail to clean up temporary files after installation if hidden files were included in a sample set.**

Although a sample set should not contain hidden files, Hauptwerk has been changed to be resilient to their existence. Previously, if a sample set contained hidden files, the component installer would install the components properly but then give error 'ERR:1220 Could not empty Hauptwerk's temporary folder ...' after their installation.

## **Changes in version 2.02**

Version 2.02 included only bug-fixes and work-arounds for problems found with version 2.00, plus some minor enhancements. The following were included:

**BUG HW-000047: If there was insufficient memory to load one of Hauptwerk's internal images, an incorrect error message was shown.**

If Hauptwerk could not load one of its internal images (e.g. MainBackgroundPage.png) due to insufficient memory or resources, then the error was reported as ERR:4404 or ERR:4405, whereas the message should have been more explicit. Very minor.

**BUG HW-000052: Certain samples (especially percussion) could consume excessive CPU resources, leading to audio break-up at low polyphony with certain stops.**

This behavior is processor-dependent and partly unavoidable on processors earlier than the Pentium 4 (C1 stepping), i.e. Pentium III, AMD Athlon XP and other pre-Pentium 4 processors, since it is caused by the floating point handling of the processor. However, on Pentium 4 (C1 stepping and above), AMD Athlon 64 and AMD Opteron processors, optimizations are available to avoid the problem. Alternative more limited optimization techniques are possible for the Pentium III and Athlon XP. Although Hauptwerk 2 has always used the optimizations in the Pentium 4 and AMD 64-optimised builds (determined by the processor installation option), due to a compiler issue we have found that one of the optimizations was not being used in a key part of the audio engine. Although arguably not a bug in Hauptwerk itself, we have been able to produce a version that works around the problem for Pentium 4 and AMD 64 processors and, to a more limited extent, for Pentium III and Athlon XP processors. Note that no fix is possible for earlier processors. In particular, this problem caused the audio to break up on the percussion ranks of the Milan Digital Audio Virginia WurliTzer sample set.

**BUG HW-000064: Very occasionally could hang during deactivation or when closing Hauptwerk.**

We found a further circumstance which could (very rarely) cause Hauptwerk to hang during deactivation of the audio system, such as when closing the program with a sample set loaded. Because the settings are saved on exit, this could prevent changes to the settings being saved.

**BUG HW-000065: If an audio device driver type (e.g. ASIO or DirectSound) was selected for which no drivers were installed on the computer, and then Hauptwerk was closed at that point, an error message was given preventing a different driver type being selected.**

When the audio driver type is changed (either ASIO or DirectSound for stand-alone Windows configurations), Hauptwerk correctly raises an error if no drivers of that type are installed on the computer. However, if Hauptwerk was closed at that point then the message would be given whenever it was re-run, preventing the device driver type being changed back. To prevent that situation it now offers the option to restore the driver type back to its default for the platform (DirectSound on Windows) and then opens in maintenance mode.

**ENHANCEMENT HW-000066: Additional optimized Hauptwerk executable for Pentium III and Athlon XP processors included.**

Although not all of the optimizations available in the Pentium 4 Hauptwerk executable are possible with the Pentium III and Athlon XP processors, some additional processor features

can be used to give significant performance benefits over the 'generic' Hauptwerk executable (as much as doubling the polyphony that can be achieved on them). An additional processor option has thus been added to Hauptwerk's installer to install a new executable specifically optimized for the Pentium III and Athlon XP. This change has have no effect on other types of processor.

**BUG HW-000068: If a MIDI device driver was broken and could be queried, it could prevent Hauptwerk from opening.**

If one of the MIDI device drivers for a MIDI device that is or was installed on the computer was broken, and Hauptwerk was unable to query its name from the operating system, Hauptwerk raised an error on initialization, preventing the program from being opened. Since it was possible that the device was not needed anyway for use with Hauptwerk, such a device is now simply labeled as invalid, rather than a blocking error being raised.

**BUG HW-000069: The fields on the Routing tab of the 'General settings | Audio outputs' screen were not always enabled and disabled correctly and the aux send look-ups sometimes misbehaved.**

If the output type was changed on the Routing tab of the 'General settings | Audio outputs' screen, some of the fields on that tab correctly became enabled or disabled. However, if the selection in the left-hand browse list was changed, the status of those fields was not updated. Also the aux send fields sometimes allowed incorrect (primary) audio outputs to be selected, with their look-ups not always being updated properly if audio outputs were inserted or deleted without clicking OK.

**ENHANCEMENT HW-000078: Processor type of build logged and shown on Help | About Hauptwerk screen.**

The processor type chosen during Hauptwerk's installation is now recorded in the log file for diagnostic purpose, and also displayed on the Help | About Hauptwerk screen.

**ENHANCEMENT HW-000079: Processor type installation option can be changed without completely de-installing.**

Since it is currently sometimes the case that 64-bit driver issues make it necessary to use the 32-bit build of Hauptwerk with certain audio and MIDI hardware, the processor selection (build type) can now be changed by simply re-running the installer, without having to de-install Hauptwerk completely first, thus preventing any settings being lost.

## Changes in version 2.01

Version 2.01 included only bug-fixes and work-arounds for problems found with version 2.00. The following were included:

### **BUG HW-000006: [Sample set developers only] Windows Notepad could corrupt Hauptwerk XML files, which crashed Hauptwerk.**

If Windows Notepad is used to edit XML files, it can write two-byte 'byte order marker (BOM) codes' to the start of the files, which strictly renders them invalid as XML files. Although not themselves a bug in Hauptwerk, such invalid codes could cause Hauptwerk to crash, so Hauptwerk has been changed simply to ignore such codes.

### **BUG HW-000010: Component installer packages needed to be copied to hard-drive for installation.**

In version 2.00 the component installer would abort incorrectly with error code 1161 (no read privileges) if installing a component package (e.g. sample set) from non-writeable media, such as CD or DVD. The work-around was to copy the files to a hard-drive prior to installing them.

### **BUG HW-000011: [Documentation] Incorrect link in user guide.**

In version 1.00 of the user guide, on the 'MIDI Implementation' page, the 'MIDI organ consoles section' link on the 5th line pointed to the wrong page.

### **BUG HW-000013: [Sample set developers only] first column in diagnostic log files had no comma.**

Diagnostic logging is possible for various internal virtual organ objects to aid sample set developers. The first column in these log files should be terminated with a comma, but was not.

### **BUG HW-000015: Original organ tuning option only worked when sample set loaded with 'Organ | Load organ, adjusting rank audio output routing'.**

If a sample set has been loaded two or more times consecutively using the 'Organ | Load organ' or stand-by/recent options, its samples are read from a special fast sample cache rather than the original files. In such cases the 'Temperament | Original organ tuning' option could cause no audio output or a crash. The work-around was always to load a sample set with 'Organ | Load organ, adjusting rank audio output routing' if the original organ tuning option was to be used.

**BUG HW-000016: Could not insert/update with 'General settings | Audio output groups' screen.**

Clicking OK on the 'General settings | Audio output groups' screen gave error 0813.

**BUG HW-000018: If an organ was left active for a long period of time, the audio may crash (usually only with DirectSound drivers).**

In such circumstances the audio output could become silent or make a buzzing noise, and Hauptwerk would not close or deactivate properly. The problem was extremely unlikely to occur with ASIO drivers.

**BUG HW-000019: Shutting the computer down without first closing Hauptwerk could prevent settings changes being saved.**

If the computer was shut down from the Windows Start menu or by pressing the computer's power-off button, Hauptwerk may not have closed cleanly, and any changes to its settings may not have been saved. This problem did not affect the 'File | Shut computer down' or 'File | Re-start computer' menu items in Hauptwerk, which shut Hauptwerk down correctly before shutting the computer down. The work-arounds were to ensure that you used one of these options, or quit Hauptwerk before shutting the computer down.

**BUG HW-000020: [Sample set developers only] Samples larger than about 8 MB in 32-bit resolution could crash Hauptwerk.**

If a sample was loaded in 32-bit resolution, and its size exceeded 8 MB after conversion to that resolution, then Hauptwerk could crash. 8 MB equates to a stereo 32-bit sample at 48 kHz of about 21 seconds in length, hence samples should not exceed that length. This is an intentional limit, and is only listed as a bug because Hauptwerk crashed in such circumstances, rather than reporting the error properly.

**ENHANCEMENT HW-000032: Allow St. Anne's organ sample set to be used with Creative Audigy ASIO driver.**

The sample rate of the Creative Audigy ASIO driver is fixed at 48 kHz. Since the St. Anne's, Moseley organ sample set is recorded at 44.1 kHz, the main St. Anne's organ definition file cannot be used with the Audigy ASIO driver because it requires 44.1 kHz output. As a work-around, we have created a special version of the St. Anne's organ definition file which produces audio output at 48 kHz for compatibility with drivers whose sample rates are locked at 48 kHz, such as the Creative Audigy ASIO driver. Please note that audio quality is not increased as a result, since the samples used remain at 44.1 kHz, thus this special organ definition file should only be used with audio interfaces with sample rates locked at 48 kHz.

**BUG HW-000033: [Sample set developers only] tuning scheme deviation in definition file should always allow zero.**

When creating a sample set, the organ definition file should allow zero to be specified for the `Pipe_SoundEngine01.Pitch_Tempered_BaseTuningDeviation` if the `Pitch_Tempered_BaseTuningSchemeCode` is an increment type.

**BUG HW-000035: [Documentation] Incorrect reference to organ ID range in CODM User Guide.**

In version 1.00 of the Custom Organ Design Module User's Guide, page 13, fourth paragraph the range should read 800000 to 899999.

**BUG HW-000039: Occasionally hung during deactivation or when closing Hauptwerk.**

We found a circumstance which could cause Hauptwerk to hang occasionally during deactivation of the audio system, such as when closing the program with a sample set loaded. Because the settings are saved on exit, this could prevent changes to the settings being saved.

**BUG HW-000040: Computer keyboard key codes greater than 255 could not be used for switch (MIDI) inputs.**

The 'General settings | Switch (MIDI) inputs' screen allowed maximum values of 255 to be entered for the engaging and disengaging event numbers for 'Computer keyboard key pressed/released' event types. Special keys (function keys, etc.) have higher key codes and

so the limit needed to be raised accordingly.

**BUG HW-00041: [Documentation] Computer keyboard key codes for switch (MIDI) inputs were not listed in the user guide.**

Key codes needed to be listed in the user guide for 'Computer keyboard key pressed/released' event types for the 'General settings | Switch (MIDI) inputs' screen.

**Changes in version 2.00**

Changes between Hauptwerk version 1 and version 2 are not listed in this release notice, since they are so extensive. Hauptwerk version 2 was considered to be a completely new product which superseded version 1. Please consult the list of features on the Hauptwerk website for information about new features in version 2.