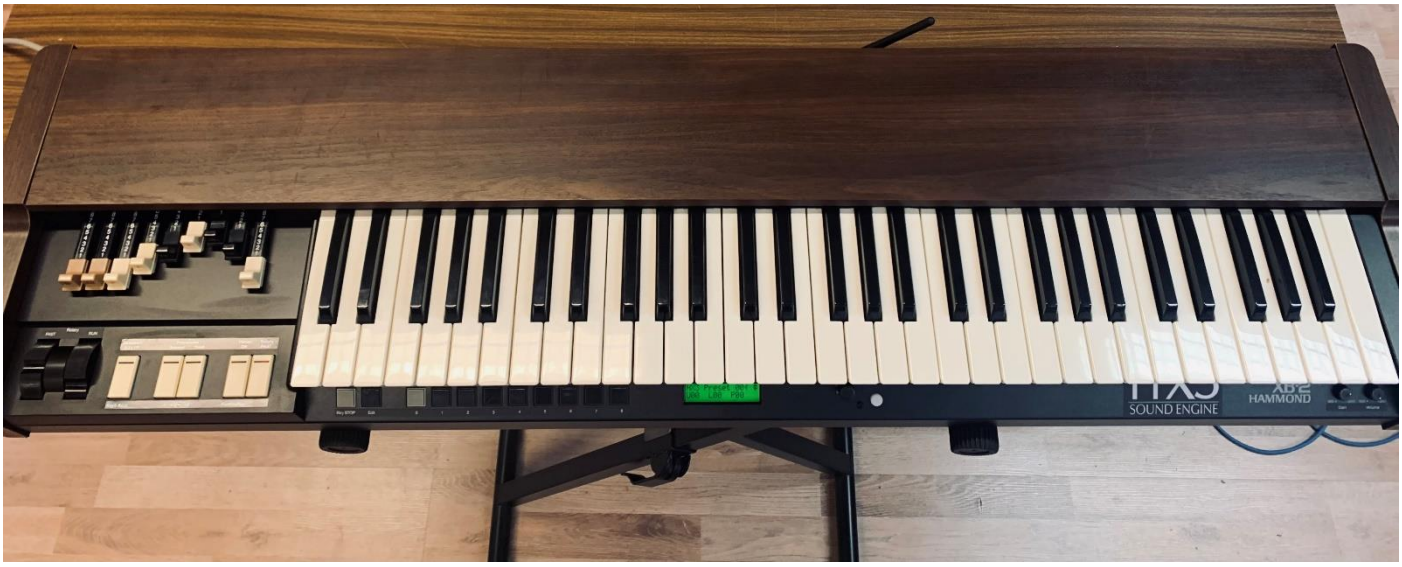
HX3
SOUND ENGINE

User Manual

Hammond XB2 with HX3.6

(As of firmware version 6.010, May 2023)



keyboardpartner.com

Please read this manual carefully before using the HX3/XB2.

Designed for indoor use only. Do not use in moist places. Do not spill liquids or solvents into unit.

No user-serviceable parts inside. Refer to qualified technician or service representative if problems occur.

Only clean with damp soft cloth. Using detergents or solvents may deteriorate finish and lettering.

Keep packaging in case of service shipment.

EU conformity declaration

CE

The producer/distributor

KEYBOARDPARTNER UG

Entwicklung elektronischer Musikinstrumente
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hereby declares, that the product

HX3 XB2 Retrofit Kit

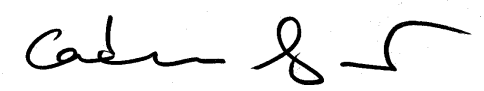
has been designed, produced and examined in compliance with the DIN VDE 0580 standard and in accordance with the EU Low Voltage Directive.

Following directives, standards and guidelines have been used:

EMV-Richtlinie 2014/30/EU
Niederspannungsrichtlinie 2014/35 EU

RoHS-Richtlinie 2011/65/EU

Langenhagen, May 2023



Carsten Meyer / Geschäftsführer

Inhalt

HX3.6 Retrofit Kit for Hammond XB2

With the HX3.6 Retrofit Kit, the Hammond XB2 finally sounds like the real thing. If MUSE or DRB chip have died, HX3 revives your XB2 with a new soul.

HX3 is a tonewheel emulator with all the features of a classic electromagnetic organ. The HX3 sound engine offers unlimited polyphony and 100 presets, 3 x 15 drawbar presets and CaM rotor simulation with rotary speaker, scanner vibrato and amp 122. General MIDI sounds like piano and strings are also available.

Optionally (with Extended License) the HX3 RealOrgan sound generator is capable of recreating all electromagnetic organs, including the famous H100, plus combo organs and concert organs of the 70s and 80s like Böhm Orchestra and Wersi Helios.

This manual covers the rebuilt Hammond XB2 with basic retrofit kit consisting of HX3.6 mainboard and two interface boards, which allow to continue using all existing controls of the Hammond XB2, as well as the optional additions HX3.5 extension board, menu control unit and WiFi interface.

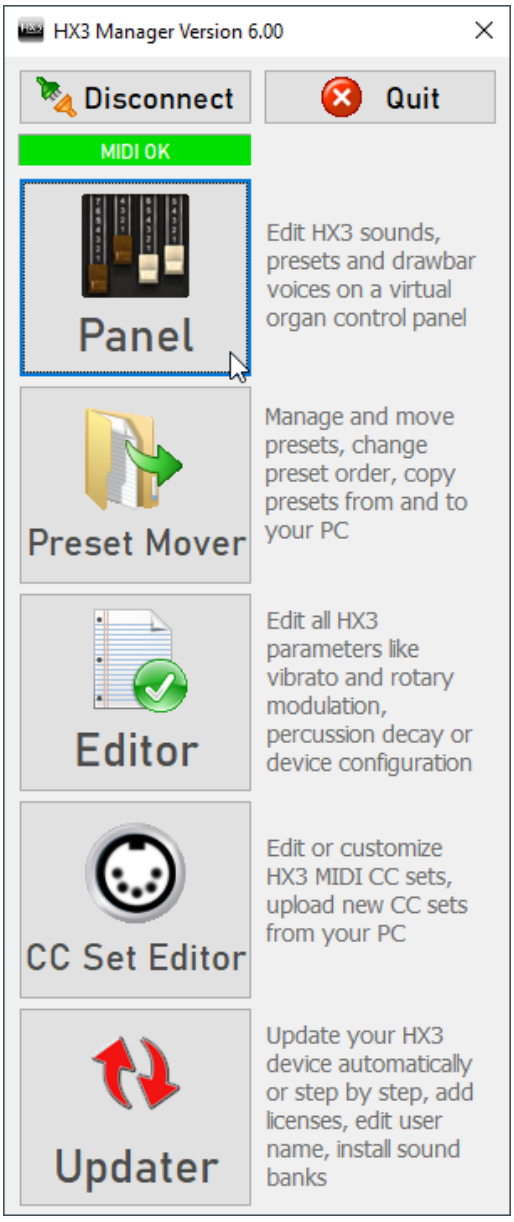
Features

- Authentic reproduction of the tone generator. Key contacts, percussion, rotary effect, scanner vibrato and TubeAmp realized using physical modeling in pure hardware.
- Extremely low internal latency of 50 microseconds Key-to-Audio.
- Natural key click due to 9 (B3 mode) or 12 (H100 mode) virtual contacts closing separately
- Authentic ‘CaM Rotor’ simulation with 122 amp
- General MIDI (GM) Synth, 54x polyphonic
- Transposable in semitone steps, tunable in range of A = 433 through 447 Hz
- Effects DSP providing 3 reverb programs, level adjustable
- MIDI IN for separate keyboard or bass pedal, 2x MIDI OUT with selectable CC sets
- Swell (expression) pedal and footswitch jacks
- Connector for 11-pin Leslie® Speakers
- Wirelessly operable via TouchOSC (iOS, Android) if the optional WiFi interface is installed
- Made in Germany

HX3 Apps and Tools

If the optional control unit is installed, you can control the HX3/XB2 completely via the menu panel (see section Menu Panel). However, there are other, more convenient options: Use the Panel in the HX3 Manager for operation via PC or notebook. Use TouchOSC for operation via tablet or smartphone.

HX3.6 Manager



The HX3.6 Manager supports the use of your HX3 device with a variety of functions:

The **Panel** contains switches and drawbars for your HX3 device. In the panel window you can adjust sounds and effects, create, name and save presets. When the panel is open, you can recall presets live using the function keys on your PC keyboard.

The **Preset Mover** makes it easy to manage presets. It lets you try out, move, and rename presets. You can transfer presets from a file to the HX3 device or save them to a file.

The **Editor** lets you set up the HX3 for all conceivable hardware configurations, gives you access to all available parameters, and lets you fine-tune sounds and effects.

With the **CC Set Editor** you can edit the MIDI CC Sets of the HX3, create CC Sets or load them from a file from your PC. This allows you to get the most out of your keyboard controller, even if none of the included CC Sets fit right away.

The **Updater** updates the operating software of your HX3 device completely in an automatic process or individual selected parts. Use the Updater also to activate an Extended License or to change the username.

TouchOSC for HX3

Control your HX3 device via tablet or smartphone with the TouchOSC mk1 app from Hexler, which you can get for a few euros in the Apple App Store or Google Play. For wireless connection of iOS or Android mobile devices we offer a WLAN interface. iOS devices can also communicate with TouchOSC via MIDI over USB.

Connectors and pots at the rear side

Left to right:

LESLIE Standard 11-pin Leslie® speaker connector for newer Hammond Suzuki loudspeaker cabinets. Not suitable for 9-pin Leslie® speakers with passive adaptor due to different polarity of switching voltages. We recommend using a Leslie® preamp for 6-pin and 9-pin Leslie® speakers. Of course, this output only works if the optional HX3.5 Extension Board is installed.

USB USB B-type connector for MIDI over USB, for updates and configuration by HX3 Manager application.

Headphone ¼" stereo jack. Headphone amplifier output.

Audio L ¼" mono jack. Audio output left channel (line level).

Audio R ¼" mono jack. Audio output right channel (line level).

Swell ¼" stereo jack. Expression pedal input is compatible with Yamaha FC-7 and similar expression pedals (direct connection preferred for speed/accuracy, but may also be remote controlled by MIDI control change, controller 11). Plug connection: Sleeve = ground / potentiometer start, ring = potentiometer tap, tip = potentiometer end.

Footswitch ¼" stereo jack. Single or double foot switch controls simulated rotary speed as well as external rotary cabinet speed: SLOW/FAST on plug tip, RUN/STOP on plug ring. Please use latching foot switches; momentary (button type) switches are not supported. If single foot switch is used, Rotary is always on RUN (no plug ring, input grounded by plug sleeve). The switch affects both the internal simulation and an externally connected Leslie®.

Potentiometers **Bass, Treble** Equalizer settings Equalizer (can be assigned other functions with the HX3.6 Manager/Editor).

FOOT SWITCH socket is not used.

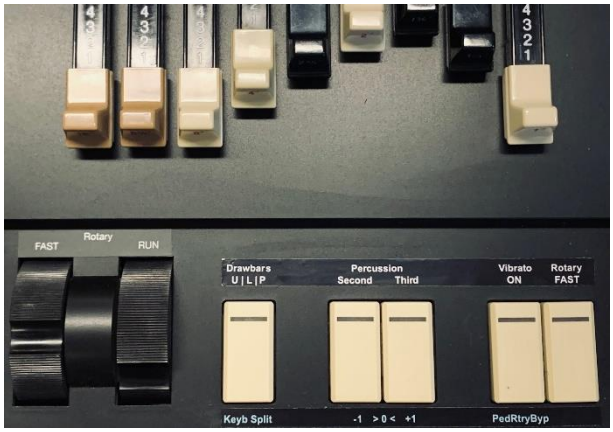
WiFi antenna (optional).

MIDI OUT1, MIDI OUT2 MIDI outputs for connecting external devices or DAW. The HX3/XB2 generates MIDI signals with a velocity component, which can also be used to control piano expanders, for example.

MIDI IN Input for MIDI signals from any MIDI-capable keyboard or pedal.

The CC Sets for MIDI input and outputs are selectable and can be edited with the CC Set Editor.

Button functions



Almost all buttons are double assigned. After switching on, the organ is in standard mode. The buttons are assigned to the functions marked in white letters.

Press the **Edit** button on the front panel to access the other functions, which are printed in cyan.

The display shows the accessed HX3 functions - useful especially for the unlit buttons.

The HX3 sound engine is designed for a fully equipped organ with upper manual, lower manual and bass pedal. You can connect another manual or pedal via MIDI (see chapter MIDI control). You can split the XB2 manual and play either the lower manual or bass with the left hand.

Split functions: In Edit mode, press the **Keyb Split** button to split the keyboard into two zones. There are the following options:

- Lower to Upper: Press a **single key** on upper manual while switching SPLIT on to map lower to upper manual up to this key.
- Pedal to Upper: Press **two keys** simultaneously on upper manual while switching SPLIT on to map pedal to upper manual up to highest of both keys pressed (useful for playing pedal bass lines on single manual keyboards without bass pedal).
- Lower to Upper +1: Press **three keys** simultaneously on upper manual while switching SPLIT on to map lower to upper manual up to highest of all keys pressed. Lower notes range is transposed one octave up (useful for left-hand 8’ accompaniment chords on single manual keyboards).
- Lower to Upper +2: Press **four keys** simultaneously on upper manual while switching SPLIT on to map lower to upper manual up to highest of all keys pressed. Lower notes range is transposed two octaves up (useful for left-hand 16’ accompaniment chords on single manual keyboards).

With the **Drawbars U | L | P** button you assign the drawbars cyclically to the manuals or the pedal. Press the button once, the LED lights steadily, drawbars now affect the lower manual. Press again, the LED flashes, drawbars now act on the pedal. Press next time, LED turns off, drawbars act on upper manual again. When switching to pedal, the first two drawbars are assigned to 16' and 8' harmonics, with the third you can set the pedal decay ("sustain"). The other drawbars have no function.

Drawbar settings only become effective when the drawbars are actuated.

Percussion Second or **Third** switch the percussion effect of the upper manual on or off at the 4' or 2 2/3' foot position respectively. When percussion is on, the 1' drawbar is turned off, as with the real thing (optional, can be changed in the editor). The percussion does not sound every time a key is pressed, but only if all keys have been released beforehand. The level can be set in the Percussion Setup submenu or in the Editor.

The **Soft** and **Fast** percussion settings are located on the rightmost buttons on the front panel in Edit mode. Drawbar volume is damped in the normal position to emphasize the percussion. Soft decreases the damping and thus the strength of the percussion effect. Fast shortens the decay time of the effect from about one second to 0.2 seconds.

Vibrato ON switches vibrato on/off. Synchronously with the drawbar assignment, vibrato is switched to the lower manual when the LED in the Drawbars U | L | P button is lit.

In Edit mode, use the **Vibrato** button group on the front panel to select the vibrato intensity from 1 to 3 and toggle the **Chorus** effect on/off.

Rotary FAST switches the rotary speed between SLOW and FAST. The built-in LED flashes with the frequency of the rotor rotation. The **Rtry STOP** function is on the first button on the left of the front panel. Even with the motors stopped, the amp and speaker modeling is maintained; so this is not a bypass function. Press the button in Edit mode for **Rotary Bypass**.

Pitch-Wheel and **Mod-Wheel** can optionally be used for rotary control as well. With the Mod-Wheel you switch the simulated motors on and off, with the Pitch-Wheel you switch between SLOW and FAST.

Transpose: In Edit mode, press the **-1** button or the **+1** button to decrease or increase the pitch in semitone steps, respectively. Press both buttons at the same time **> 0 <** to cancel transposition.

If you press **PedRtryByp** in Edit mode, the pedal sound will bypass the rotary simulation.

Equalizer Bypass in Edit mode switches off the equalizer. In the default setting, the EQ emulates a typical Leslie frequency response. If the organ is used with a Leslie, a linear frequency response is preferable. When operating with a tube Leslie, Tube Amp Bypass and Rotary Bypass may also be advisable.

The **Reverb** button group selects one of the reverb programs 1, 2, or 3 (1+2) in Edit mode.

The buttons marked with the white numbers **0** to **8** are used to quickly access presets. Preset 0 is the live preset, which takes over the current drawbar settings.

The assignment of the buttons in edit mode can be changed in the editor of the HX3 manager by means of the Switch Remap parameters as desired.

Potentiometers

The knob formerly labeled REVERB has been assigned **Gain** (overdrive). The **Volume** knob adjusts the volume of the audio outputs and the headphone output.

The two pots on the back next to the footswitch jack retain their functions as level controls for **bass** and **treble**. They thus override the EQ settings in the HX3 menu, which can be made with the optional control unit.

The assignment of the pots can be changed as desired in the editor of the HX3.6 Manager using the Analog Remap parameters. For example, you can assign the Reverb Level and Percussion Level functions to them.

Volume/Expression Control

Output level of all output channels is controlled by **Volume** rotary knob or MIDI CC #7 “Volume”, whichever occurs last.

Organ's **expression pedal** position is controlled by a pedal or MIDI CC #11 “Expression”, whichever occurs last. The loudness curve is similar to the swell pedal of a classic tonewheel organ, so expression volume will not reach zero. We recommend connecting an expression pedal Yamaha FC-7 or similar (1/4" jack, 10k to 47k total resistance). Swell control is faster and more accurate when connected directly than via MIDI.

MIDI CC #11 and #7 may be altered via menu to any valid MIDI CC Number.

Menu Panel

The menu actions described in this chapter can only be performed with the optional control unit. But even without the control unit, the display is fully functional and provides information about the states of the non-illuminated buttons.

With the HX3/XB2 in factory setting, some of the menu items listed below are omitted since physical controls exist. These menu items can be added to the menu by means of the editor with the parameters of the Menu Enables group.

On power on, the **Preset/Drawbar menu** is present. Pressing the rotary knob twice briefly will let you return to the home position from any other menu position.

Turn the rotary knob to scroll through the menu. A hatched arrow indicates the menu position. **Press the rotary knob once to edit a parameter value**. A white arrow indicates the selected entry that may be altered. Turn the rotary knob to change that value. Press the rotary know once again to continue scrolling through the menu.

In the preset/drawbar menu the rotary knob selects the **Presets 0 … 99**. Presets consist of drawbar settings and optionally tab switch settings (percussion, vibrato etc., including rotary Run/Fast/Slow), volume and 122 tube amp gain as well as all other effects. Use the Panel in the HX3 Manager, Presets page, to select which parameters are to be recalled with the presets.

Scroll downwards (= turn the rotary knob clockwise) to the drawbar presets (**Voices**) for **U**pper manual, **L**ower manual, and **P**edal. The top display line shows the drawbar positions as numbers from 0 – 8.

Saving settings

Parameter values tagged by the letter **C** are part of a single preset. Values tagged by **D** apply to all presets and are stored as **defaults**. The assignment can be changed in the editor of the HX3 Manager with parameter #1498 or on the Presets page of the Manager's Panel.

Values tagged by **U**, **L**, or **P** are part of the current voice for upper, lower, or pedal. These are saved as Voice (Drawbar settings only) if you save them while one of these markers is displayed.

O marks settings of the selected organ model, **R** marks settings of the selected rotary model.

An asterisk appears at the bottom right of the display when a value has been changed. To save the setting, keep the rotary knob pressed until a confirmation message appears on the display, for example:

- "Saved to Defaults OK" for default values.
- "Save Preset to #XX" for presets ("XX" stands for the number of the currently active preset). Change the number as desired and press the knob again.

"Save UpperDbV to #XX", "Save LowerDbV to #XX" or "Save PedalDbV to #XX" for drawbar settings ("XX" stands for the number of the currently active Voice). Change the number as desired and press the knob again.

Menu Overview

From the HX3 menu you can access all control functions, such as rotary speed, percussion, chorus/vibrato. You can select organ models and rotary models. You can adjust many sound-defining parameters. You can create and recall Common Presets and Voice Presets (drawbar settings only). You can perform updates of the operating software, optionally even without the HX3.6 Manager.

Important to know:

The HX3 menu is arranged in **function groups** and has two levels: The **main menu**, shown in green, contains the operating functions that are frequently used. In the **submenu** of the respective function group, shown in blue, you will find parameters that are used less frequently, usually the pre-settings.

Press the lower button to switch from a **main menu** to a **submenu**. An "S" symbol then appears at the bottom right of the display. Press the upper button to return to the **main menu**.

Turn the rotary knob to navigate through the menu. Press the rotary knob briefly to change a setting. Briefly press the rotary knob again to navigate further.

The menus are arranged in a ring. The last menu item in the list is therefore followed by the first again when you scroll down further, and the same applies vice versa.

As of firmware version 5.637, the menu is shorter and therefore clearer than in previous versions. Rarely used parameters have been removed from the menu, but are still adjustable with TouchOSC, with the Panel or with the Editor of the HX3 Manager. Please use this method for the manifold settings in ***EG*** mode.

The editor can be used to remove other unwanted menu items from the menu or added to the menu.

Start menu

HX3 Preset: Selection of Common Presets 00 ... 99.

Common Presets include Drawbar settings and optionally Tab Switch settings (Percussion, Vibrato etc.), Rotary Run/Fast/Slow, TubeAmpGain, and other effect settings. In the Editor or Panel of the HX3 Manager you can define which parameters are saved in presets. Preset 0 determines the settings when the device is switched on.

- **Edit Name:** The name of the preset can be edited in this submenu. Press the rotary knob once. Turn the knob to select the desired letter and press the knob again to save the change.
- Turn the knob to edit the next letter. Turn the rotary knob past the last digit or turn the rotary knob from the first letter to the left to navigate to the other submenu items.
- **LED Dimmer:** Brightness of the LEDs on connected control panels and on the menu panel of the HX3 MIDI Expander.
- **Save Defaults:** Saves all settings as default values that apply at power-up.
- **SD File Exec:** Selection of a script file on the SD card when the SD card adapter is connected.
- **BootId Update**: Press the rotary knob for two seconds to launch the bootloader for operating software updates. HX3.6 performs a system reset and puts itself into a special communication mode for "Device Firmware Upgrades" (DFU mode). This interrupts the connection with the HX3.6 Manager.
  - **DFU upload ...** Fast and secure transfer of firmware via DFU (see chapter Updates). DFU packages can be transferred to the device using the **DreamDFU** app or **DreamDFU_kbp for macOS**. Under Windows, this is also possible with the updater of the HX3.6 Manager.
  - **FPGA recover from FAILSAFE** Restore the FPGA configuration from the backup copy stored in the device.
  - **FW recover from FAILSAFE** Restore the microcontroller firmware from the backup copy stored in the device.
  - **Exit update, start HX3.6** Exit the DFU mode with a reset, *Connect* of the HX3.6 manager via MIDI over USB is then possible again.
- **WiFi Init Def:** Reset WLAN interface to factory default.
- **Preset Init:** Sets the live preset 0 to a basic B3 organ sound.

Upper Voice

U00 ... U15: Selection of the drawbar presets (voices). The upper line shows the drawbar settings as numbers from 0 ... 8.

- **UpperDB 16 ... UpperDB 1:** Settings of the standard drawbars for the upper manual.

In addition to the organ sounds, **General MIDI (GM) instruments** are available that can sound as layers simultaneously. To activate a GM instrument, set its level as desired. To deactivate the organ, set all drawbars to 0

- **UpperGM Prg 1:** Selection of GM instrument by program number
- **UpperGM Lvl 1:** Level setting of GM voice
- **UpperGM Hrm 1:** Harmonic transposition of GM voice

Lower Voice

L00 ... L15: Selection of the drawbar presets (voices). The upper line shows the drawbar settings as numbers from 0 ... 8.

- **LowerDB 16 ... LowerDB 1:** Drawbar settings for the lower manual.
- **LowerGM Prg 1:** Selection of the GM instrument by program number.
- **LowerGM Lvl 1:** Level setting of the GM Voice
- **LowerGM Hrm 1:** Harmonic transposition of the GM voice

Pedal Voice

P00 … P15: Selection of the drawbar presets (voices). The upper line shows the drawbar settings as numbers from 0 ... 8.

- **PedalDB 16, PedalDB 8:** Drawbar settings for the pedal.
- **PedalDB 16H, PedalDB 8H:** Drawbar settings for the pedal, smoother sound.
- **Pedal Release:** Changes decay time of pedal sound (often called string bass "sustain" on other organs).
- **PedalGM Prg 1:** Selection of the GM instrument by program number.
- **PedalGM Lvl 1:** Level setting of the GM Voice
- **PedalGM Hrm 1:** Harmonic transposition of the GM voice

Audio Setup

Master Volume: Sets the volume for all outputs. Higher values result in a better signal to noise ratio.

TubeAmp Gain: Sets the level of the simulated tube amplifier. The amplifier enters saturation and distorts at high values and higher swell pedal values. So the distortion level is controlled with the swell pedal as well. If *Gain Vol Compensation* is set in parameter 1501 of the editor, Gain works almost volume-neutral.

TubeAmpBypass: When ON, the rotary tube amplifier is bypassed.

The Audio Setup menu items have a common submenu:

- **Equ Bypass:** When ON, the equalizer is bypassed.
- **Bass Equal:** Bass level adjustment
- **Bass Equ Frq**: Bass filter frequency, invalid if Parameter B/T is set to OFF.
- **Bass Equ Q:** Bass filter Q (bandwidth), invalid if Parameter B/T is set to OFF
- **Mid Equal:** Mids level adjustment
- **Mid Equ Frq:** Mids filter frequency
- **Mid Equ Q:** Mids filter Q (bandwidth)
- **Treble Equal:** Treble level adjustment
- **Treb Equ Frq**: Treble filter frequency, invalid if Parameter B/T is set to OFF.
- **Treb Equ Q:** Treble filter Q (bandwidth), invalid if Parameter B/T is set to OFF.
- **Parametr B/T:** Parametric equalizer also for bass/treble. If Parameter B/T is set to OFF, the equalizers for bass and treble act as shelving filters.
- **Upper Lvl Adj:** Allows separate upper manual default level setting.
- **Lower Lvl Adj:** Allows separate lower manual default level setting.
- **Pedal Lvl Adj:** Allows separate pedal default level setting.
- **Perc Lvl Adj:** Allows percussion level setting.
- **PedalRotBypas:** Routes the pedal signal to bypass the CaM Rotor, optionally only to the separate pedal output, if *No Pedal on Main* is set in parameter #1501, Bit 3 of the editor.
- **AO28 Tone Pot:** Tone potentiometer setting on preamp.
- **AO28 Gain Cap:** Overall gain of AO28 preamp.
- **AO28 MinSwell:** Minimum volume of swell pedal in heel position.
- **AO28 Tube Age:** Age of the preamp tubes. The older (the higher the value), the more clearly the triode distortion becomes audible.

Reverb Levels

Reverb Prgm: Reverb program selection (OFF, 1, 2, 3).

- **Reverb 1 Lvl:** Reverb portion in position REV 1.
- **Reverb 2 Lvl:** Reverb portion in position REV 2.
- **Reverb 3 Lvl:** Reverb portion in position REV 3.

Rotary Setup

Rotary Motor: RUN/STOP switch of the rotary simulation.

Rotary Fast: SLOW/FAST switch of the rotary simulation.

Rotary Bypass: Switching off the rotary simulation.

Rotary Model: HX3 contains predefined rotary models that are editable. With the Standard license you can choose from 6 models, with the Extended License from 16.

  - **122 Std SmR** (Model 122 Standard, small room)
  - **122 Std LgR** (Model 122 Standard, large room)
  - **122 Old SmR** (Model 122 alt, small room)
  - **122 Old LgR** (Model 122 alt, large room)
  - **147 New SmR** (Model 147, small room)
  - **147 New LgR** (Model 147, large room)

The Rotary Setup menu items have a common submenu:

- **HornSlowSpeed:** Rotation speed of the horn in SLOW position.
- **RotrSlowSpeed:** Rotation speed of the rotor in SLOW position.
- **HornFastSpeed:** Rotation speed of the horn in FAST position.
- **RotrFastSpeed:** Rotation speed of the rotor in FAST position.
- **HornRampUp:** Horn ramp up time.
- **RotorRampUp:** Rotor ramp up time.
- **HornRampDown:** Horn runout time
- **RotorRampDown:** Rotor runout time.
- **Rotary Throb:** Microphone placement.
- **Rotary Spread:** Stereo width.
- **Rotary Balnce:** Level balance between rotor and horn.
- **Tube Select A:** Age of power stage tube A, adjustable from 0 (very old) to 7 (new).
- **Tube Select B:** Age of power stage tube B, adjustable from 0 (very old) to 7 (new). If A and B are set differently, the proportion of the 2nd harmonic increases.

Percussion Setup

Percussion: Percussion selection stepwise in all possible combinations of NORM/SOFT, FAST/SLOW, 2nd/3rd (not for H100) and OFF.

- **PercNormLvl:** Level in position NORMAL.
- **PerSoftLvl:** Level in position SOFT.
- **PercLongTm:** Decay time in position LONG.
- **PercShortTm:** Decay time in position SHORT.

Vibrato Setup

UPR: Scanner vibrato upper manual OFF/ON.

LWR: Scanner vibrato lower manual OFF/ON.

Vibr: Vibrato knob with the six positions V1 ... C3.

The Vibrato Setup menu items have a common submenu:

- **Scanner Gear:** Vibrato frequency.
- **Ch ScannerLvl:** Scanner portion in chorus positions C1 ... C3.
- **Ch Bypass Lvl:** Dry portion in chorus positions C1 ... C3.
- **V1/C1 FM Mod:** Modulation depth at positions V1, C1.
- **V2/C2 FM Mod:** Modulation depth at positions V2, C2.
- **V3/C3 FM Mod:** Modulation depth at positions V3, C3.

Organ Setup

Organ Model: HX3 contains predefined organ models that are editable. With the Standard license 4 models are available, with the Extended License 16.

  - **B3 Standard** (B3 with nine drawbars per manual).
  - **B3 Old** (1955 B3, Flutter and Leakage increased).
  - **B3 Recapped** (B3 with new capacitors).
  - **M100/M3**

TG Tuning: Allows organ generator tuning in range from A = 433 through 447 Hz.

The organ setup menu items have a common submenu:

- **Gating Mode:**
  - **B3/9 Drb:** The HX3 default setting (B3 mode) implies mechanical key contacts, 2 2/3' or 4' percussion, and 9 drawbars per manual. The remaining menu items require an Extended License.
  - ***H100/12 Drb*** switches to the H100 organ model including 3 additional mixtures. This activates the respective drawbars. B3 percussion is de-activated in this mode, instead the *H-Perc 16' … H-Perc Mixt3* in submenu Voice Upper settings are effective if **Perc ON** is selected. By means of this mask you may assign percussion individually to each available harmonic. Percussion always sounds without vibrato and phasing rotor. This mode may be combined with all generator models.
  - ***EnvelopeGen*** *(EG)* substitutes "mechanical" keying, which generates a key click, by "soft" electronic keying. This is the way to model the entirely electronic organs of the 80s. In this mode three additional mixtures are available; the respective drawbars are active. An ADSR envelope is applied to the harmonics selected by means of the *EnvEna 16' … EnvEna Mixt3* settings on the Panel or with TouchOSC.
  - ***EG +PercDrb*** works like *EnvelopeGen (EG)*, but instead of the ADSR envelope a percussion envelope is active on the harmonics selected by the *EnvEna 16' … EnvEna Mixt3* settings in submenu Voice Upper. The percussion effect amount can be adjusted with the Envelope Generator Drawbars (*EGenvDB 16' …Mixt3)* on the Panel or with TouchOSC.
  - ***EG +TimeDrb*** as well works like *EnvelopeGen (EG)*, but in this mode the Envelope Generator Drawbars (*EGenvDB 16' …Mixt3)* affect the decay and release times of the ADSR envelope on harmonics selected by the *EnvEna 16' … EnvEna Mixt3* settings in submenu Voice Upper. Thus you can create interesting transient and decay effects similar to a Fourier synthesizer by using time settings depending on the respective harmonics.
- **TG WaveSet:** Determines the content of harmonics in the generated sound. Automatically set for the selected generator, but can be overridden in this menu:
  - B3 25%...38% k2 – B3, clean to rich harmonics (new to old organ)
  - Sine 2% k2 – clean LSI/transistor sine generator
  - Sawt Fltrd – Sawtooth-like tone
  - Sine LC Gen – sine wave generator with moderate k2 content
  - Sine TOSGen – square wave generator with sine wave filtering, sounds slighty hollow
- **TG Flutter:** Adjusts tone generator "sloppyness" (spring clutch tension, bearing precision, and resulting slow phase shifts and pitch changes).
- **TG Leakage:** Sets tone generator leakage (crosstalk noise of adjacent notes, "growl").
- **ContSpringFlx:** Adjusts key contact spring flex, thereby affecting click frequency.
- **ContSpringDmp:** Adjusts key contact spring damping, thereby affecting click length.

- **ContEarlyActn:** Fatar keyboards only: Sound triggering on upper key contact. If OFF, the organ sound is triggered with the lower key contact. MIDI NOTE ON on the other hand is always sent with velocity and thus after closing the lower contact.

- **NoDB1@Perc:** With the original, the 1' foot position is switched off during percussion when PERC is ON. This behavior can be switched off here.

Keyboard/MIDI

MIDI Transpose: Allows transposition of sound generation by up to +24/-24 half note steps. Note: Like the original, tonewheel generator includes 5 octaves. Notes outside this range do not sound.

- **MIDI CHANNEL:** Sets the MIDI basic receive channel from 1 to 10 (upper manual, lower manual +1 , pedal + 2).

- **MIDI OPTION:** Sets the MIDI Routing to
  - Local Tx – own MIDI Events are sent to MIDI OUT
  - Inp 1 Thru – MIDI IN1 is routed as THRU to MIDI OUT
  - Inp 2 Thru – do not use
  - USB InThru – USB MIDI IN is routed as THRU to MIDI OUT

- **MIDI CC Set:** Sets the HX3 accepted MIDI CC set to
  - NI B4 d3c: Native Instrument B 4, Döpfer d3c controller (default), NI B4D
  - Hammond XK
  - Hammond SK (Note: Hammond changed MIDI CC set between XK and SK series, so try out which fits)
  - Versatile MIDI CC Set
  - Nord C1/C2 MIDI CC Set
  - Voce Drawb – Voce MIDI drawbars
  - KeyB/Duo
  - Hamichord (or „Mojo“, same hardware)
  - HX3.5/KBP MIDI CC Set
  - MIDI Custom CC Set
  - MIDI Custom CC Set B

- **MIDI Swell CC:** CC number for swell pedal (default 11, expression pedal).

- **MIDI VolumeCC:** CC number for Master Volume (default 7, volume pedal).

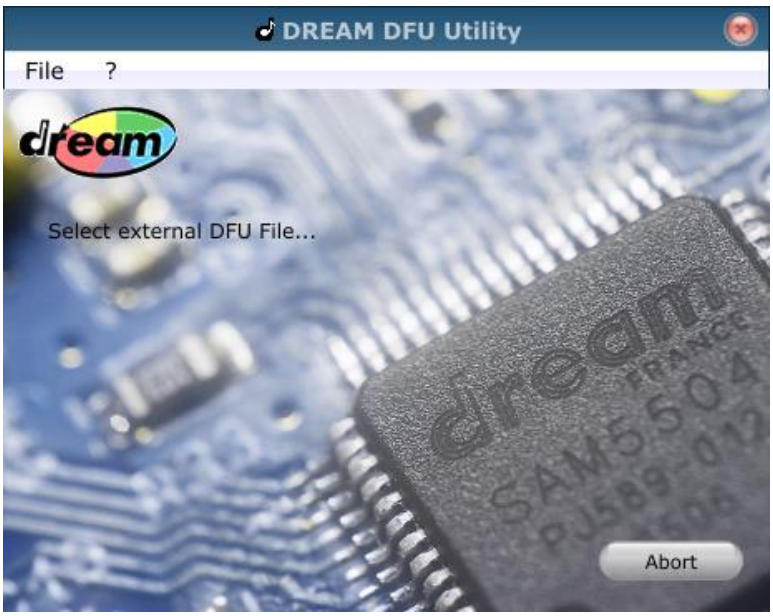
- **MIDI PresetCC:** CC number for presets (default #32 bank select LSB)

- **TransposeOffs:** Transposition of directly connected Fatar keybed can be shifted for special purposes. Affects MIDI OUT only.
- **Local On/Off: I**nterrupts the connection from a directly connected keyboard to the tone generator. Notes are only sent via MIDI.
- **Split Keyb:** When ON, the keyboard is split into two zones at the set split point.
- **Split Point:** Sets split point (when split is ON) as key number (24 is second „C“ on manual).
- **Split Mode:** Default split setting on power-up, engaged when split set to ON.
  - 'PedalToLower', map pedal to lower manual up to split point.
  - 'LowerToUpper', map lower to upper manual up to split point.
  - 'PedalToUpper', map pedal to upper manual up to split point.
  - 'Lower+1 ToU', map lower to upper manual up to split point, transpose lower +1 octave.
  - 'Lower+2 ToU' map lower to upper manual up to split point, transpose lower +2 octave.
  - ‘LwrAddPedal’, links the pedal to the lower manual up to the split point.

Split point and split mode may also be changed by one of the following procedures:

- Pedal to Lower: Press a **single key** on lower manual key while switching SPLIT on to obtain a custom split point.
- Lower Add Pedal: Press a **two keys** on lower manual key while switching SPLIT to link the pedal to lower manual up to the split point.
- Lower to Upper: Press a **single key** on upper manual while switching SPLIT on to map lower to upper manual up to this key.
- Pedal to Upper: Press **two keys** simultaneously on upper manual while switching SPLIT on to map pedal to upper manual up to highest of both keys pressed (useful for playing pedal bass lines on single manual keyboards without bass pedal).
- Lower +1 to Upper: Press **three keys** simultaneously on upper manual while switching SPLIT on to map lower to upper manual up to highest of all keys pressed. Lower notes range is transposed one octave up (useful for left-hand 8’ accompaniment chords on single manual keyboards).
- Lower +2 to Upper: Press **four keys** simultaneously on upper manual while switching SPLIT on to map lower to upper manual up to highest of all keys pressed. Lower notes range is transposed two octaves up (useful for left-hand 16’ accompaniment chords on single manual keyboards).

Updates



Updates of the operating software are provided as DFU files and can be transferred to the device under Windows with HX3.6 Manager or with the DreamDFU app included in the update directory.

A macOS version of the app named DreamDFU_kbp is available for download on the update server. Before you start using the app, please read the important note in the attached README file.

Put the HX3.6 device into DFU mode as described in the Start menu section, or by holding down the rotary knob when switching on. Then start DreamDFU. A file selection dialog opens where you can select the update package for your device. For a regular complete update select the file hx36_upd.dfu from the updates subdirectory. Wait until the unpacking is complete (displayed on the menu panel). Wait until the unpacking is complete (displayed on the menu panel). Exit the DFU mode by restarting after the unpacking has been completed.

DSP Files

While sound generation for the organs takes place completely in hardware in an FPGA, HX3.6 uses a digital signal processor (DSP) for reverb effects (EFX) and General MIDI (GM) instruments. 128 GM sounds are installed as a so-called soundbank.

The DSP firmware and the DSP soundbank are normally included in the update package, but can also be updated separately via DFU. This comes into consideration if you want to do without the factory installed GM sounds and use other reverb programs. Please note: The USB-B socket on our old HX3 Extension Board mk4 has no direct connection to the DSP chip and therefore cannot be used for DSP updates.

In the update directory you will find the following files:

- DSP Firmware (file dsp_fw.dfu) with reverb and GM synthesizer sound generation),
- DSP Firmware (file dsp_fw_nogm.dfu) with reverb and more reverb programs, but without GM synthesizer sound generation),
- DSP default soundbank (file dm_bank.dfu), default soundbank for the DSP-GM synthesizer, contains the sounds specified by the GM2 standard),
- Optional soundbank (file ext_bank.dfu) with higher quality piano sounds for the DSP-GM synthesizer.

Reverb programs

0: Off

Factory installed:

1: Short Room

2: Room A

3: Room B

If you want to do without the GM sounds and prefer to use other reverb programs instead, put the HX3.6 device into DFU mode and install the file “dsp_fw_nogm.dfu “. After that run the ini-file "reverb_noGM" from the scripts directory in the updater. Then these further reverb programs are available for selection:

4: Small Hall A

5: Small Hall B

6: Large Hall A

7: Large Hall B

8: Short Plate

9: Vocal Plate

In the editor (parameters #2001 to #2003), select the desired reverb programs for the settings Reverb 1, 2 and 3.

MIDI Control

HX3 accepts MIDI key on/off events (default: channel 1 to upper manual, 2 to lower manual, channel 3 to bass pedal) as well as various MIDI CCs with selectable compatibility sets. MIDI dynamics slightly affect key click noise. SysEx data other than its own is always ignored.

You can connect second keyboard, bass pedal or MIDI controller to the MIDI IN jack. A MIDI merge interface is required to connect multiple input devices.

Optionally, the USB port can be used for MIDI over USB (bidirectional). **Please note: If the USB port is used, no cable may be connected to MIDI IN.**

HX3 functions that are relevant for the organ player may be remote-controlled by MIDI commands. For details please see HX3 MIDI Implementation. Settings are possible via the menu system or with the HX3 Manager. To recall presets via MIDI use bank select LSB (CC #32, changeable via menu). To recall voices use MIDI Program Change on the respective channel.

General

Connect MIDI Out of your MIDI controller or master keyboard to HX3 MIDI input. HX3 cannot determine the setting of any MIDI controller value until you touch/use it once. As default, all HX3 controllers are OFF. Do not use any controller button or drawbar unless HX3 is ready to accept its data (Preset/Drawbar main menu appears on the display); it is a good idea to power up HX3 first and later your MIDI master keyboard or master controller.

MIDI CC #7 (default, CC number variable) controls master volume. MIDI CC #11 (default, CC number variable) controls swell pedal/expression if no expression pedal connected to HX3. If you use your HX3-attached swell pedal, any MIDI expression message will be overwritten. If the attached swell pedal is not actuated, MIDI expression messages are accepted. Any valid MIDI CC command will overwrite the HX3's own analog controllers and switches until they are changed on the HX3 itself.

Note: Some MIDI controllers as well as organ keyboards (like Hammond® XK and SK series) allow 2nd and 3rd harmonic percussion ON at same time. HX3 implementation regards "2nd ON" as "Percussion ON" tab in this case.

Panic button

In case of stuck notes just press the upper or lower menu panel button to switch the tone generator off.

How To …?

How do I store drawbar settings as preset?

The Voice memories 0 ... 15 only record the drawbar settings for the manuals and the pedal. Saving takes place in the Voice main menu or a sub-menu for the drawbar setting. Press the knob until "Save AAAA to Voice #XX" ("AAAA" stands for Upper, Lower or Pedal) appears. Select the destination Voice preset number and press the knob again to confirm.

In any other menu, the current drawbar setting is stored as Voice 0 along with all other settings as the Common Preset. Press the knob until "Save to Preset #XX" appears in the display. ("XX" stands for the destination preset number). Select the destination preset number as desired and press the rotary knob again to confirm.

In which way does the live preset 0 differ from other presets?

Traditionally, the live preset 0 is not a real preset, but instead applies the current “live” settings of the drawbars and control switches. If you select a preset different from 0, your live settings will remain stored. If you return to preset 0, the live settings will be recalled. In addition to that, the HX3 preset 0 preserves other parameter settings, which are cannot be set “live” by drawbars or other controls. It also determines the power-up settings.

How do I copy a stored preset to another preset?

Press the rotary knob twice to navigate to the preset/drawbar menu. Select the preset you wish to copy. Keep the button pressed until “Save to Preset #XX” appears on the display. (“XX” representing the current preset number and the target preset number, respectively). Turn the rotary knob to select the target preset number. Press the rotary knob until “Saved to Preset #XX” appears on the display.

How do I access the General MIDI instruments?

Go to the submenu of the manual or pedal to which you want to assign a GM instrument. Turn the knob until you reach the GM program selection. Briefly press the knob and select the desired instrument. Set the desired level at the next menu position. If you do not want the GM instrument to sound as a layer with the organ, set the drawbars to zero.

Serial numbers and licenses

HX3 is protected against forgery by licence numbers. If not set appropriately after firmware update, HX3 will refuse to work after 2 minutes. Licences may be re-installed by means of the HX3 Manager at any time.

Please contact KeyboardPartner to obtain a valid licence key. We need your serial number (issued on startup and by HX3 Manager application) to generate new licences for you.

Documents library, Download repository:

updates.keyboardpartner.de

Join the **HX3 community** at http://forum.keyboardpartner.de

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