

## HX3 MIDI Expander

(Firmware version 5.4)



**HX3 MIDI Expander** is a tonewheel organ emulation with all B3 features in a small box, creating the legendary unmatched HX3 sound. Controlled via MIDI, it offers selectable CC-sets for various keyboards. HX3 provides unlimited polyphony, presets, many parameters tweakable by simple menus. In addition, General MIDI sounds like piano and strings are available.

As an option (extended licence required), the new HX3 RealOrgan engine is capable of emulating all electromagnetic organs including the famous H100, combo organs, concert organs of the 70s and 80s like Böhm Orchester and Wersi Helios. This implies up to 15 harmonics, up to 12 drawbars per manual with individual mixtures, including phasing rotor (WersiVoice), mechanical and electronic keying available simultaneously. ADSR envelope available on all drawbars, also H100 percussion and "Harp Sustain". Various tone generator waveforms selectable, for "cheesy" combo organs as well as fully fledged concert organs.

### Features

- Compact organ emulator in aluminum box, 222 x 150 x 42 mm
- Authentic reproduction of generator, tapering, key contacts, percussion and vibrato by FPGA (Field Programmable Gate Array) and physical modelling
- Tunable in range of A = 433 through 447 Hz
- Extremely low internal latency of 50 microseconds Key-to-Audio. However, MIDI transmission delay is about 1 ms per note played.
- Natural key click by "rattling" contacts
- Accurate rotary and 122 amp simulation
- Dual MIDI IN for two keyboards or bass pedal
- LCD display and menu system
- Swell (expression) pedal and footswitch jacks
- Mini-USB for MIDI over USB, firmware updates, parameter editing
- Effects DSP with 3 reverb levels
- 24 voices GM Synth
- Hand-crafted in Germany

Default MIDI setting is channels 1/2/3 for upper/lower/bass, MIDI CC NI B4 with Sustain on CC #64.

**DC input 9 to 12V, 500 mA min., 5.5/2.1 mm plug, plus on center.**

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Please read this manual carefully before using the HX3 Expander.



Only use appropriate power supply as advised. Input voltages exceeding 15V may damage the device.

Designed for indoor use only. Do not use HX3 Expander 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



### The producer/distributor

KEYBOARDPARTNER UG  
Entwicklung elektronischer Musikinstrumente  
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hereby declares, that the product

### HX3 MIDI Expander

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 2004/108/EG  
Niederspannungsrichtlinie 2006/95 EG  
RoHS-Richtlinie 2011/65/EU

Langenhagen, August 2018

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Carsten Meyer / Geschäftsführer

# Jack Connections



The HX3 expander module has two 1/4" mono audio output jacks, two standard MIDI jacks, a DC input jack, a USB connector and two accessory jacks on the back panel.

- **SWELL** 1/4" 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.
- **FOOTSW** 1/4" stereo jack. Single or double footswitch controls simulated rotary 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 footswitch used, Rotary is always on RUN (no plug ring, input grounded by plug sleeve).
- **USB**: USB B-type connector for MIDI over USB, updates, parameter editing. USB port and MIDI IN/OUT cannot be used at the same time.
- **MIDI IN/OUT** factory default secondary MIDI input for additional lower manual, bass pedal or MIDI controller. Internally jumpered to supply +5V/200ma to our Drawbar Controller (phantom voltage). May be changed to act as MIDI OUT by internal jumper swap. See our HX3.5 Mainboard Installation Manual in our library for details.
- **MIDI IN** primary input from MIDI keyboard.
- **DC IN**: Use stabilized DC wall wart 9 to 12V with at least 500mA current output, inner/outer plug diameter 2.1/5.5 mm on DC input jack. Polarity: positive voltage on inner tip.
- **AUDIO1/AUDIO2**: Main audio stereo output. Output level is approx. 300 mV at full swell.

## Volume Control

**Output level** of all output channels is controlled by **Master volume** setting in menu or MIDI CC #7 "Volume", whichever occurs last.

Organ's **swell pedal** position is controlled by an expression 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) directly to the HX3 module.

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

# Menu Panel



On power on, the **presets/drawbar menu** is present. Pressing the rotary knob twice briefly will let you return to the presets/drawbar menu from any other menu position. The menu entry count depends on licence, organ model, and menu configuration.

Turn the rotary knob to select overall Overall **Presets 0 ... 15**. Overall presets consist of voice numbers for upper manual, lower manual, and pedal, tab switch settings (percussion, vibrato etc.), volume and 122 tube amp gain as well as all other effects, except rotary run/fast/slow. LEDs are indicating current percussion and vibrato setting.

Press the up/down buttons to step through the menu (autorepeat if you keep the button pressed). Turn the rotary knob to change a parameter value. A white arrow ◀ indicates the selected entry that may be altered.

Alternatively you may use the rotary knob to scroll through the menu. Press the rotary knob once briefly. Up/down arrows are white (active) and parameter arrow is outlined (inactive) in this mode. Press rotary knob again briefly to change an entry.

Scroll one step upwards in the menu to the **Master Volume** setting. Master Volume sets final volume of all outputs. For best noise performance, higher values are desirable.

Scroll another step upwards to the **TubeAmp Gain** setting. TubeAmp Gain sets volume of the internal rotary tube amp simulation from 0 to full (overdriven tube amp). The simulated Amp will get into decent saturation on increased swell amount and higher gain values as seen on 'real' tube amps. Amount of distortion is controlled by swell pedal.

A star ★ appears on the display, if a parameter value has been changed and now differs from the stored preset. To **store** values as **preset**, keep the encoder knob pressed until the prompt "Saved to Preset #XX" appears on the display. ("XX" representing the current preset number).

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**. Values tagged by **U**, **L**, or **P** are part of the current voice.

40 voices 0 ... 39 are available for each manual and pedal. Voices 0 ... 15 contain the organ drawbar settings. Voices 16 ... 39 select a General MIDI (GM) instrument. GM voices may be predefined by use of the HX3.5 Editor application.

The current voice settings are stored along with the overall preset. Drawbar settings are being stored as voices carrying the same number, while GM instruments will retain their selected numbers.

Independent of the current overall preset you may select any stored voice by choosing its number in the voice menu, and then modify the voice as you like and play it live or store it again along with an overall preset.

The HX3.5 menu is arranged as a loop. So you may reach any menu entry by either pressing the up or the down button. But it is a good idea to memorize the menu positions, enabling you to reach frequently used entries located around the preset/drawbar entry more quickly.

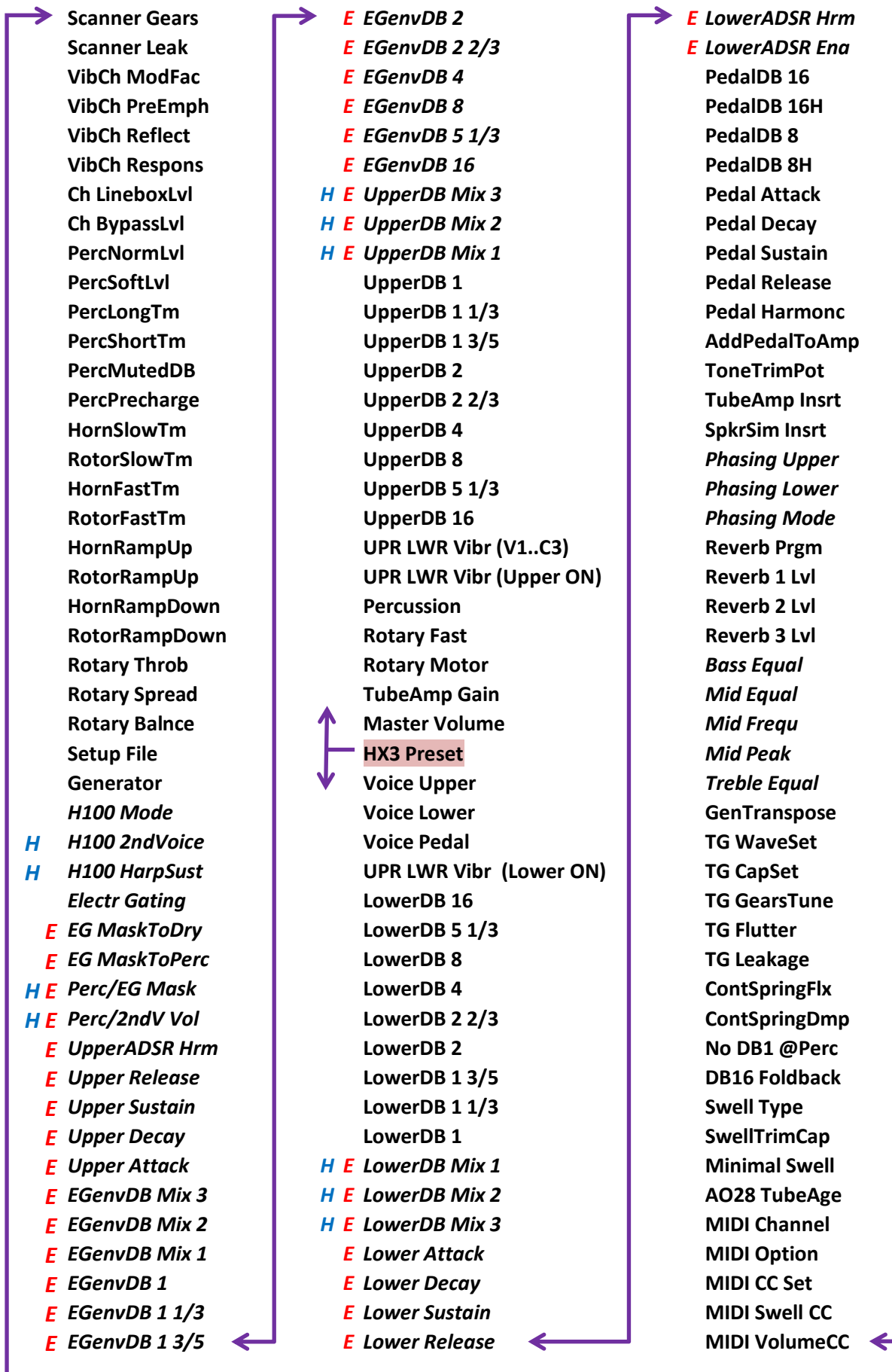
Scroll upwards to the rotary menu:

- **Rotary** Motor On/Off control
- **Rotary** Slow/Fast control

The current status of rotary, percussion, and vibrato is indicated by LEDs.

# HX3 Expander Menü

**Bold** Standard licence    *Italic* Extended Licence    **H** H100 Mode    **E** EG und Versatile Mode



The HX3.5 menu system includes quite a number of entries for tuning the HX3 sound engine. The number differs depending on the licence. For live performances you may prefer a scarcer, clearer menu. No problem: Configure the menu to your desire by using the HX3.5 Editor app.

## Menu Upper/Lower/Pedal

Starting from the preset/drawbar menu, scroll one step downwards to the **voice** settings for upper manual, lower manual, and pedal. The white arrow ◀ is pointing to the selected manual.

- **DrbXXXXXXXXXXXX** – the voice menu indicates upper/lower or pedal drawbar settings as numbers 0 ... 8 (here represented as "X") for 12 drawbars (9 harmonics plus 3 mixtures). For the GM voices the instrument's name is being displayed instead.

Turn the rotary knob to alter a voice setting

## Generator models

Scroll upwards, starting from the preset/drawbar menu, to the organ model settings. Several menu entries are available with Extended Licence only (marked by *italic* letters in the schematic). Also you have a choice of more organ models with the Extended Licence. The number of menu entries depends on the selected organ model as well (default: B3). Menu entries available in H100 mode are marked by **H**. Menu entries available in Electronic Gating (EG) or Versatile modes are marked by **E**.

Navigate to the **Generator** menu entry to select the sound generation type:


- B3 default (91 tones sound generator)
- B3 old (as above, but more leakage, stronger key click)
- M3/M100 (no foldback for higher tones)
- H100 (96 tones sound generator)
- LSI Sine (phase stable frequency dividing generator like Wersi/Böhm)
- LSI Square (as above, more harmonics)
- Conn SNG (free running single sine tone generator, 91 tones, not phase stable)
- CheesyCombo (84 tones generator, phase stable frequency divider, „cheesy sound“, rich harmonics)



## Organ models

The HX3.5 default setting (B3 mode) implies mechanical key contacts, 2 2/3' or 4' percussion, and 9 drawbars per manual.

Select **H100 mode** for the H100 organ model of the H100 including 3 additional mixtures. This activates the respective drawbars. B3 percussion is de-activated in this mode, instead the **Perc/EG** Mask settings are effective. By means of the **Perc/EG** mask you may assign percussion individually to each available harmonic. Percussions always sounds without vibrato and phasing rotor. This mode may be combined with all generator models. In addition to the H100 model the following options are available:

- **H H100 2<sup>nd</sup> Voice** – harmonics selected by **Perc/EG Mask** sound continuously at full level. Percussion bypasses vibrato like on the H100. Combined with drawbar voices on vibrato and 2<sup>nd</sup> Voice activated this results in a neat chorus effect.
- **H H100 Harp Sustain** – activates the Harp Sustain Effect, 4' harmonics fading, polyphonic, no vibrato. Independent of 4' drawbar und 4' percussion
- **Perc/2ndV Vol** – percussion volume and 2nd Voice volume.
- **H E Perc/EG Mask** – select harmonics for the percussion/2<sup>nd</sup> Voice circuit. Each “o”-symbol represents a harmonic from 16' up to Mixture 3. The selected harmonic that may be activated by turning the encoder is underlined. If activated the respective “o”-symbol is filled white.
- **H E UpperDB Mix1 ... UpperDB Mix3** – Upper manual mixture drawbar settings. Mixtures are made up of up to 3 higher harmonics with their individual levels. Please note: Differing from the original H100 the HX3.5 provides three mixtures rather than two.

Select **Electr Gating** (H100 mode OFF) to substitute “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. A ADSR envelope is applied to the harmonics selected by means of the **Perc/EG Mask**. Set up the ADSR envelope by using the following parameters:

- **E Upper Attack** – attack time of the upper manual envelope.
- **E Upper Decay** – decay time of the upper manual envelope.
- **E Upper Sustain** – sustain level of the upper manual envelope.
- **E Upper Release** – release time of the upper manual envelope.
- **E Upper ADSR Hrm** – sets harmonic breakup of individual harmonics over time.

In addition, the following options are available for *Electr Gating*:

- **E EG Mask to Dry** – harmonics selected by *Perc/EG Mask* are bypassing vibrato and phasing rotor “dry”.
- **E EG Mask to Percussion** – harmonics selected by *Perc/EG Mask* are being switched to ADSR, the EG Envelope Drawbars are enabled as polyphone percussion drawbars.
- **H E UpperDB Mix1 ... UpperDB Mix3** – Mixture drawbars for the upper manual. Mixtures are made up of up to 3 higher harmonics with their individual levels.
- **H E Perc/EG Mask** – select harmonics for full ADSR envelope instead of simple on/off. Each “o”-symbol represents a harmonic from 16’ up to Mixture 3. The selected harmonic that may be activated by turning the encoder is underlined. If activated the respective “o”-symbol is filled white.

The fourth keying mode is called **Versatile Mode** and it is obtained by activating both *H100 Mode* and *Electr Gating* at the same time. In this mode you determine by setting the *Perc/EG Mask*, if the respective harmonic is triggered by mechanical keying (OFF) or electronic keying (ON). The options *EG Mask to Dry* and *EG Mask to Percussion* are available as well. The ADSR settings apply to the harmonics that are set to ON in the mask.

## Upper Manual

Scroll upwards, starting from the preset/drawbar menu, to navigate to percussion, vibrato und drawbar settings for the upper manual. Drawbars settings will be stored as voice for the upper manual.

- **Percussion – Percussion** – will step through available percussion combinations of NORM/SOFT, FAST/SLOW, 2nd/3rd (8 options) plus OFF.
- **UPR< LWR Vibr** – Vibrato/chorus ON/OFF for upper manual
- **UPR LWR Vibr<** – Vibrato knob setting V1 to C3
- **UpperDB 16 to UpperDB 1** – drawbar settings for upper manual



## Lower Manual

Scroll downwards, starting from the preset/drawbar menu, to the vibrato und drawbar settings for the lower manual. Drawbars settings will be stored as voice for the lower manual.

The keying mode setting (mechanical or electronic keying) also applies to the lower manual. In H100 mode you have three additional mixture drawbars, in EG mode the ADSR settings are available for the lower manual.

- **UPR LWR< Vibr** – Vibrato/chorus ON/OFF for lower manual
- **LowerDB 16 ... LowerDB 1** – drawbar settings for lower manual
- ***HE LowerDB Mix1 ... LowerDB Mix3*** – Lower manual mixture drawbar settings. Mixtures are made up of up to 3 higher harmonics with their individual levels. Please note: Differing from the original H100 the HX3.5 provides three mixtures rather than two.
- ***E Lower Attack*** – attack time of the lower manual envelope.
- ***E Lower Decay*** – decay time of the lower manual envelope.
- ***E Lower Sustain*** – sustain level of the lower manual envelope.
- ***E Lower Release*** – release time of the lower manual envelope.
- ***E Lower Harmonc*** – sets harmonic breakup of individual harmonics over time.
- ***E LowerADSR Ena*** – select harmonics for full ADSR envelope instead of simple on/off. Each “o”-symbol represents a harmonic from 16’ up to Mixture 3. The selected harmonic that may be activated by turning the encoder is underlined. If activated the respective “o”-symbol is filled white.

## Pedal

Pedal drawbars including ADSR envelope settings are saved as pedal voice.

- **PedalDB 16, PedalDB 8** – drawbar settings for pedals
- **PedalDB 16H, PedalDB 8H** – drawbar settings for pedals, brighter tone
- **Pedal Attack** – pedal ADSR envelope attack time.
- **Pedal Decay** – pedal ADSR envelope decay time
- **Pedal Sustain** – pedal ADSR envelope sustain level
- **Pedal Release** – pedal ADSR envelope release time (often called string bass “sustain” on other organs)
- **Pedal Harmonc** – harmonic breakup of individual harmonics over time. Set to lower values to obtain a „picked bass“ effect.
- **AddPedalToAmp** – inserts the pedal signal before the tube amp simulation. If switched to OFF, the pedal signal will not be routed through the tube amp.

## Defaults Group

Scroll downwards to various default settings; change to desired value by turning incremental encoder knob. Save changes to preset by pressing knob for more than 2 seconds.

- **ToneTrimPot** – mimics TONE pot on simulated AO28 amp; well, a little bit more on high values.
- **TubeAmp Insrt** – activates 122 amp simulation, otherwise amp is bypassed. TubeAmp Gain has no effect if off.
- **SpkrSim Insrt** – activates rotary cabinet simulation, otherwise horn/rotor simulation is bypassed (recommended for use of external rotary cabinet).
- **Phasing Upper** – activates Phasing Rotor (PHR) for the upper manual (insert effect)
- **Phasing Lower** – activates Phasing Rotor (PHR) for the lower manual (insert effect)
- **Phasing Mode** – selects Phasing Rotor options:
  - **We/Boe** – toggles between Wersivoice (ON) and Böhm Phasing (OFF)
  - **Ensemble** – Strings effect using multiple modulation
  - **Celeste** – deep modulation with feedback
  - **Fading** – slow phasing effect
  - **Weak** – soft modulation, may be combined
  - **Deep** – deeper modulation, may be combined
  - **RotFast** – Rotary effect, fast
  - **PHR Ramp up** – Ramp up effect for rotary slow/fast, may be combined

A slow rotary effect is in place if no option is selected. *Weak*, *Deep*, *RotFast* und *RampUp* may be combined with this effect. You obtain two more vibrato effects by selecting *We/Boe* and *Ensemble* or *Ensemble* and *Fading* at the same time. These effects may serve as additional vibrato channel for the H100 emulation, for example.

- **Reverb Prgm** – selects one of 3 different reverb programs. For each program, amount of reverb may be adjusted.
  - **Reverb Lvl 1** reverb amount of reverb program 1
  - **Reverb Lvl 2** reverb amount of reverb program 2
  - **Reverb Lvl 3** reverb amount of reverb program 3
- **Bass Equal** – Boost/reduce lower frequencies below 500 Hz
- **Mid Equal** – Boost/reduce middle frequencies, parametric:
- **Mid Frequ** – Filter frequency adjustable from 200 Hz to 4 kHz
- **Mid Peak** – Filter quality factor Q, adjustable from 0,5 (wide band) to 2 (narrow)
- **Treble Equal** – Boost/reduce lower frequencies above 2 kHz
- **GenTranspose** – allows transposition by up to +24 or -24 half note steps. Notes beyond 5 octave limits of console organ will not produce any sound due to accuracy of physical model.

## Generator Group

- **TG WaveSet** – selects harmonic content of tone generator. Will be changed according automatically with organ model selection, but may be overridden by this menu:
  - **0...3** – B3, clean to rich harmonics (new to old organ), increasing harmonic distortion on lower notes
  - **4** – Clean LSI/transistor sine generator
  - **5** – Sawtooth-like tone
  - **6** – Squarewave-like tone
  - **7** – Cheesy Combo organ
- **TG CapSet** – sets tone generator age and characteristic:
  - 1955 (very aged caps, mellow sound)
  - 1961 (aged wax caps, jazz-type sound)
  - 1972 (new “red” caps, rock-type sound)
  - Recapped (more aggressive)
  - Straight (no tapering, equal loudness)
  - Cheesy (emphasises higher notes)
- **TG Gears Tune** – sets organ generator tuning in range from A = 433 through 447 Hz
- **TG Flutter** – adjusts tone generator "sloppyness" (spring clutch tension, bearing precision).
- **TG Leakage** – sets tone generator leakage (crosstalk noise of adjacent notes, “growl”)
- **ContSpringFlx** – adjusts key contact spring flex, affects click frequency
- **ContSpringDmp** – adjusts key contact spring damping, affects click length
- **No DB1 @Perc** – enables 1’ drawbar cancelling when percussion ON (as original B3®)
- **DB16 Foldback** – controls foldback behaviour on 16’ lowest octave. Foldback is configurable in 4 settings:
  - foldback with full level,
  - foldback with muted level (original B3 behaviour),
  - no foldback ("all way down") with full level (like H-100®) or
  - no foldback ("all way down") with muted level.

## Preamp Group and Misc.

Along with ToneTrimPot (see above), adjusts behaviour and response of the emulated AO28 preamp chassis and transformer/tube saturation.

- **Swell Type** – controls preamp loudness behaviour on swell pedal changes:
  - Hammond AO28 (“deep” loudness curve)
  - Böhm/Wersi (shallow loudness curve)
  - Linear
- **SwellTrimCap** – adjusts organ output volume like the trim cap in B3 swell pedal control. Higher values add more punch and output transformer saturation effects.
- **MinimalSwell** – adjusts the minimum volume in heel position of the swell pedal.
- **AO28 TubeAge** – controls emulated AO28 preamp tube aging (higher triode distortion k2 in 12BH7 output stage).

## Commons Group

- **MIDI Channel** – sets MIDI base receive channel 1 to 10 (upper manual, lower manual is on +1, pedals on +2).
- **MIDI Option** – sets MIDI routing behaviour to:
  - Local Tx – own MIDI events are sent on MIDI OUT
  - Inp 1 Thru – MIDI IN 1 is routed to MIDI OUT as THRU
  - Inp 2 Thru – do not use
  - USB InThru – USB MIDI IN is routed to MIDI OUT as THRU
- **MIDI CC Set** – sets recognized MIDI CC set to
  - NI B4 d3c – Native Instruments B4, Doepfer d3c controller (default),
  - VoceDrawbar,
  - KeyB/Duo,
  - Hamichord,
  - Hammond XK,
  - Hammond SK (Note: Hammond changed MIDI CC set between XK and SK series, so try out which will fit)
  - BoehmSempra (full MIDI implementation of all parameters, see MIDI documentation)
  - Custom CC (not implemented yet).
- **MIDI Swell CC** – sets accepted swell/expression CC number (default #11).
- **MIDI VolumeCC** – sets accepted overall volume CC number (default #7).

## Vibrato Group

Detailed modelling of scanner vibrato features lots of adjustable parameters. Avoid randomly changing parameters; they are intended for real organ enthusiasts – you should know what you're doing.

- **Scanner Gears** – adjusts scanner drive gear and thereby vibrato frequency.
- **Scanner Leak** – adjusts leakage of higher notes in scanner compartment due to parasitic capacitances.
- **VibCh ModFac** – adjusts amplitude modulation caused by delay line on all vibrato/chorus knob settings.
- **VibCh PreEmph** – adjusts treble increase when vibrato/chorus is switched on. Effect on chorus is obvious, while increase on Vibrato is more subtle.
- **VibCh Reflect** – sets amount of reflected signal on LC linebox due to aged caps. Higher values lead to a ,celeste'-like effect as found on model M100.
- **VibCh Respons** – sets upper frequency response of LC linebox.
- **Ch LineboxLvl** – adjusts ,wet' modulated amount when in chorus mode.
- **Ch BypassLvl** – adjusts ,dry' unmodulated amount when in chorus mode.

## Percussion Group

- **PercNormLvl** – adjusts percussion level in PERC ON, NORMAL tab setting.
- **PercSoftLvl** – adjusts percussion level in PERC ON, SOFT tab setting.
- **PercLongTm** – adjusts percussion decay rate in PERC ON, SLOW tab setting (higher value = faster).
- **PercShortTm** – adjusts percussion decay rate in PERC ON, FAST tab setting (higher value = faster).
- **PercMuteDB** – sets drawbar muting amount while in Perc NORM. No mute will happen if value set to 125.
- **PercPrecharge** – sets percussion circuit recovery time; if set to lower values, staccato notes yield muted percussion.

## Rotary Group

- **HornSlowTm** – Rotary simulation horn revolution time when set to SLOW
- **RotorSlowTm** – Rotary simulation rotor revolution time when set to SLOW
- **HornFastTm** – Rotary simulation horn revolution time when set to FAST
- **RotorFastTm** – Rotary simulation rotor revolution time when set to FAST
- **HornRampUp** – Rotary simulation horn acceleration from SLOW to FAST.
- **RotorRampUp** – Rotary simulation rotor acceleration from SLOW to FAST.
- **HornRampDown** – Rotary simulation horn brake time from FAST to SLOW.
- **RotorRampDown** – Rotary simulation rotor brake time from FAST to SLOW.
- **Rotary Throb** – Rotary simulation "throb" modulation factor
- **Rotary Spread** – Rotary simulation stereo spread (width).
- **Rotary Balnce** – Rotary simulation volume balance horn/rotor.

## Updates/Scripts

Update installation instructions and firmware images are made available through our HX3.5 Repository on <https://github.com/keyboardpartner/HX35>. Follow instructions given on the Github page.

- **Setup File** – Selection of an update oder setup script from a SD card. For details please see [http://wiki.keyboardpartner.de/index.php?title=HX3.5\\_DSP-Updates](http://wiki.keyboardpartner.de/index.php?title=HX3.5_DSP-Updates)

## Factory Reset

To retrieve the factory defaults, press the MenuPanel encoder knob when powering on until “Factory Reset” prompt appears, then confirm by pressing “up” button. Note: A factory reset will void your presets!

## Serial Numbers and Licences

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 HX3.5 Editor at any time.

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



# MIDI Control

HX3 MIDI Expander accepts MIDI key on/off events (default: channel 1 to upper manual, 2 to lower manual, channel 3 to bass pedals) 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.

Both MIDI jacks act as MIDI inputs with equal priority for connection of two master keyboards or keyboard and bass pedal. Connecting a third MIDI device requires a MIDI Merge Interface.

All HX3 functions that are relevant for the organ player may be remote-controlled by MIDI commands.

## General

Connect MIDI out of your MIDI controller/keyboard to one of the two HX3 MIDI inputs. HX3 does not introduce any audio latency, so delays are only due to MIDI transmission.

Since MIDI is a one-way interface, 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 (drawbar preset displayed). It is a good idea to power up HX3 before your MIDI master keyboard or master controller.

HX3.5 supports MIDI over USB through its USB port connected to a USB host, typically a PC. The USB connection is also suitable for controlling HX3.5 by the HX35 Editor application, firmware updates via MIDI SysEx, and DSP updates via DFU data transfer.

**The USB port and MIDI IN 2 cannot be used at the same time. Please remove any cable from MIDI IN 2 before using the USB port.**

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.

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

See Commons Group section to select the desired MIDI CC set. Factory default is Native Instruments B4, which provides the most versatile command set.

More details including tables of all valid MIDI commands are to be found in the KeyboardPartner library article "Using HX3 with MIDI controllers".

## Using HX3 with Voce MIDI Drawbars

Using your HX3 board with Voce MIDI Drawbars is straightforward, as the Voce module supports only one MIDI channel (i.e. upper manual). Please note that Voce MIDI Drawbars does not send drawbar data unless you press the "Drawbar/Save" button, so it's LED lits up.

## Using HX3 with Doepfer d3c or other NI B4 drawbar controller

The Doepfer d3c drawbar controller is a very nice and rugged piece of gear, so we recommend it for use with our HX3 board. It has support for foot controllers and foot switches. The Keyswerk/Böhm db4 is also compatible with NI B4 CC set.

Upper, lower and bass drawbars work as usual. It is a good idea to set all to zero before switching on as this is a “known state” for HX3. Also the Percussion and Vibrato buttons work as described in d3c manual.

There is a small drawback, anyway: Default HX3 Vibrato setting is V1 (but upper/lower vibrato OFF), while the V1 LED will not light when powering up the d3c (there is no “V0” on a real Hammond!). So pressing the V1 button will not change the sound – just it’s LED turns on.

The “Brightness” knob controls AO28 “tone” parameter in HX3. There is no key click emulation in HX3 (it is just there!), so you may not adjust key click (a real Hammond does not have key click adjustment, either). The “Key Click” knob controls the bass sustain instead. You may argue “a real Hammond does not have a bass pedal sustain, too”. Right, but many aftermarket kits are installed, so this is OK (for me).

Do not use the “Harmonic content” knob as it sends the “Percussion” button’s controller number like a continuous controller. Why that? No idea. This is definitely of no use.

Preset buttons may be used, but in a restricted way. First, HX3 yields 15 presets per manual, not 127 like NI B4. When selecting “Bank 1”, all 12 available preset buttons work on upper manual. When selecting “Bank 2”, all 12 preset buttons work on lower manual.

Doepfer d3c resends the program change message when changing the bank, which may be annoying. Choose bank 2, lower preset first, then bank 1, upper preset.

BTW: Bank buttons do not send bank select messages, they just add an offset to the preset buttons. Blame Doepfer for that.

Doepfer d3c preset 1 is the HX3 “Live” (preset 0) position. It will be saved temporarily (until HX3 switched off) when switching to a preset sound (2 to 12). If you return to preset 1 “Live”, your last drawbar/button setting will be recalled.

## Using HX3 with Hammond XK/SK series

HX3 supports most of Hammond XK MIDI controller functions. For convenience, some controllers have been relocated to other HX3 functions:

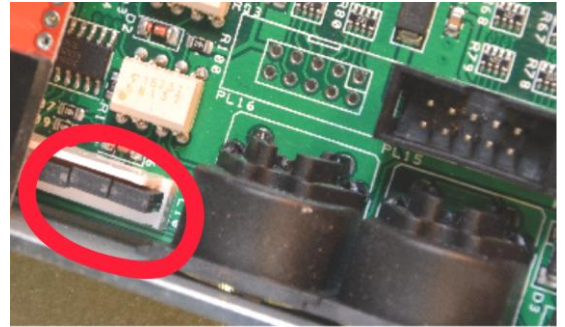
- XK Overdrive knob controls HX3 Rotary tube **Amp Volume**
- XK Reverb button controls HX3 lower manual **Vibrato On**
- XK Tube On button controls HX3 Reverb

## Using HX3 with HX3 DrawbarController

HX3 Drawbar Controller is specially designed to be used with HX3 MIDI Expander and provides convenient operation. It will merge incoming MIDI data on MIDI MERGE input to its own controller data.

For use with HX3 Plexi Expander, you may utilize its “phantom” power supply feature (power over MIDI cable). Phantom supply is usually set by factory – check if your expander supplies phantom voltage. In case it does not, you may use a separate wall wart for the HX3 Drawbar Controller or need to open the device and set two jumpers to enable phantom supply on the HX3 MIDI Expander.

To configure phantom supply insert two jumpers to jumper header PL18 on positions 7-8 and 9-10 as shown in picture. Connect 5-wire MIDI cable (supplied) to HX3 MIDI Expander MIDI IN/OUT and to HX3 Drawbar Controller MIDI OUT. HX3 Drawbar Controller will now be phantom powered by the HX3 MIDI Expander through the MIDI cable.



**Attention: Always connect wall wart to HX3 MIDI Expander. Never connect the wall wart to Drawbar Controller when phantom power is enabled. Doing so may damage the devices.**

## HX3 Apps

**HX3.5 Editor** for Windows application is a convenient way to update or maintain your HX3 MIDI Expander. It allows for firmware and sound engine updates, parameter tweaking and preset setup for experienced users.

**Download library:** <https://github.com/keyboardpartner/HX35>

**Document library:** [http://wiki.keyboardpartner.de/index.php?title=HX3.5\\_Main\\_page](http://wiki.keyboardpartner.de/index.php?title=HX3.5_Main_page)

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

## How to ...

*How do I store drawbar settings as preset?*

Once you have adjusted the drawbars just keep the rotary knob pressed until “Saved to Preset #XX” appears on the display. (“XX” representing the current preset number). Drawbar settings are stored as voice along with the overall preset carrying the same number.

Voices may be selected individually by their numbers. Alter the voice number to recall other drawbar settings for the manual the voice is assigned to, while all other settings will remain unchanged as stored in the preset. If you recall the preset the voice will regain its former settings.

### *How do I copy a stored voice to another preset?*

In the menu, select the voice to be copied. Keep the rotary knob pressed until “Save Voice to Preset #XX” appears on the display. (“XX” representing the target preset number). Turn the rotary knob to select the target preset number to desire. Press the rotary knob until “Saved to Preset #XX” appears on the display.

### *How do I copy a stored preset to another preset?*

Press the rotary knob twice to navigate to the preset/drawbar menu. Keep the button pressed until “Save Preset #XX to #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?*

In the menu, select the voice for the manual you wish to assign a GM instrument to. Turn the encoder knob to select a voice number in the range of 16...39. These are the available GM voices, which may be preassigned using the HX3.5 Editor. You may store the selected GM voice as preset just like the drawbar settings. However, the GM voice will retain its voice number.

### *How do I store my TubeAmpGain setting as preset?*

You may store the TubeAmpGain setting as well as any other effect parameters as part of the active preset by simply keeping the rotary encoder knob pressed until “Saved to Preset #XX” appears on the display. (“XX” representing the current preset number). However, Rotary Motor ON/OFF and Rotary FAST ON/OFF are always live and not part of a preset.

### *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. This is also true for the HX3 MIDI Expander that is controlled by an external keyboard via MIDI. 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 HX3.5 preset 0 preserves other parameter settings, which are cannot be set “live” by drawbars or other controls. It also determines the power-up settings.

## KEYBOARDPARTNER UG

Entwicklung elektronischer Musikinstrumente

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Email: [info@keyboardpartner.de](mailto:info@keyboardpartner.de)

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