

HX3 Tapering Editor

There is no manual for the tapering editor as this was supposed to be a production utility only.

"Taperings" are binary level descriptions of each keyboard note of each busbar (resp. contact), so each tapering consists of $64 * 9 = 576$ level bytes (to make FPGA's life easier, 64 notes are used instead of 61; last three notes are void). The level value is derived from (variable) generator levels (91 resp. 96 notes) divided by contact wire resistance. The contact wire resistances are the same for all taperings, exactly following the B3 wiring scheme:

www.keyboardpartner.de/hammond/diagrams/KeyboardTapering.png

The Hammond factory curve is the 1972 generator levels column. All other taperings are derived from these values.

The scroll bars to the right will alter it more or less randomly for "1955", "1961" and "Recapped" columns, so there is no need to change all 576 levels individually.

All 4 taperings will be saved by clicking "Save All", but I would recommend starting with a single save, giving it a new file name (like "taper_test.dat" or so).

In Tapering app, go to "Generator Levels" tab and click in one of the columns 1955 to Recap. Graphic will show this generator levels for this column. You may adjust individual levels by numeric entry or by dragging teal points in graphic (or just click on desired level, please try out). Table will alter affected level of **generator note**, so multiple keyboard notes are affected. It might be sufficient to increase the highest generator note levels.

The tapering includes a deliberate random scattering. The range of the spread is set by "Variation". If you press "Apply", the variation is recalculated. Then the values change each time, unless you have set Variation to 0.

To show busbar (drawbar) note level of a particular note, go to tab "Tapering Levels" and search for corresponding "Wire". Formula is

$$\text{Wire} = (\text{Busbar} * 64) + \text{Note on Keybed}$$

with Busbar number starting with 0 = 16' and lowest "C" key = key #0. For now, the app does not allow individual "Wire" levels. However, you may alter the randomness and offset for notes with "Range" and "Variance" scrollbars. Graphic display will show a single or all busbars ("Display Options").

"Enable HX3.4 Filter correction" must not be checked for HX3.5 boards.

Graphic display will show resulting levels of all contacts. Resulting level of each contact is

generator note level / wire resistance

(and multiplied by a constant factor to get "handy" integer results). Means: Higher wire resistance yields lower output level. So adjusting levels of 2 2/3 and 4' upper octave might be a little tricky. You have to lower the "Wire resistance" in text file "WiringData.csv" (R column, open CSV with Excel). It has the same order as "Tapering Levels" table. Each busbar ends with a couple of zeroes, so margins between busbars are recognizable.

It consists of 64 lines for each busbar (giving $576 + 1$ lines, plus 64 lines for pedal 16'), again starting with key #0 of busbar #0, assigning a tone generator note # to a wire resistance. When you open the file with a text editor or Excel, you will notice that last twelve notes on 4' end with a

34 ohms and 2 2/3' end with a 50 ohms value. Lower these values to get more output level. Close and restart Tapering app to make changes effective.

To upload a tapering to HX3.5, use HX3.5 Manager Updater page. There are four tapering files in the update directory, representing the four taper setups (1955 to Recapped). Please backup the files, then replace the one you want to change by your file using the same filename.