

jB3 – Drawbar Organ after Hammond B3 Version 3.0 for jOrgan 3.20



Hammond B3 with Leslie speaker and bench, from Flickr by Peter Gorges

History

Hammond organs have been around since the late 1930s, but most enthusiasts consider the B3 to be the grand opus of the Hammond Organ Company, built from 1955 to 1974. Combined with a Leslie speaker, the B3 created the typical “Hammond Sound.”

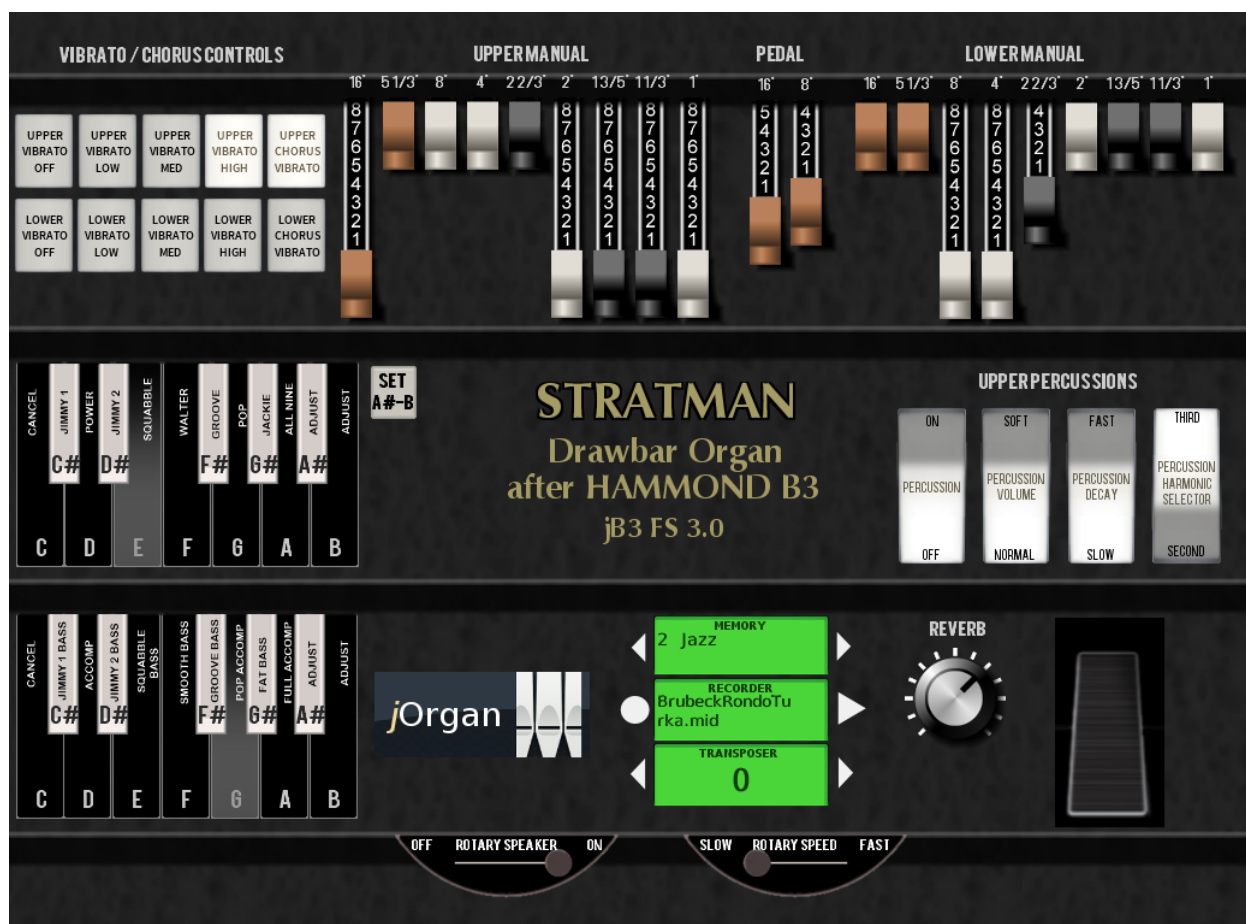
The Virtual Model, the jB3 for jOrgan

All switches and functions of the Hammond B3 are emulated, along with a multi-speed Leslie.



jB3 3.0 - Recorded Samples!

The jB3 2.0 includes sounds digitally sampled from a real Hammond organ. Samples were recorded from an A-102 (identical to a B3 except for the case, pictured above—serial number plate pictured at the lower right) and were processed and looped with the assistance of Lars Palo. The recorded samples give authentic attacks, mellow voicing, a hint of electromechanical noise and a slight wobble in the upper range, especially noticeable in the 1 1/3' and 1' drawbars.



Preset Keys

The preset keys work as they would on a real Hammond, only they can be set by the user. A memory with the Standard/Liturgical, Jazz, Theater, Rock, Schnellbecher 1 (Std), Schnellbecher 2, and my own revision of the Standard presets is included in the download package.

The A# and B presets [ADJUST] for both upper and lower manuals can be set with the [SET A#-B] button. First press [CANCEL], prepare your drawbar registration, press [SET A#-B] and then the desired [ADJUST] preset.

To change the presets for C# through A, there is a hidden [SET C#-A] button. It is hidden so that the C# through A presets are not overwritten by mistake. You can find the [SET C#-A] button at the top of the list of elements in Construct Mode. Move [SET C#-A] to the console, change your presets as in the paragraph above, and then hide [SET C#-A] again, if desired.

Upper Percussion

On a real B3, the 1' drawbar would be silenced when the percussion was switched on, and the percussive voice would only be heard on the B adjustable preset. I've reproduced that effect here, only the percussion can also be heard with the all presets. To have the 1' drawbar sound with percussion, turn off the [Perc. On, Up 1' Mute] switch on the Rotary Simulation console.

(See <http://theatreorgans.com/hammond/faq/hammond-faq.html#SEC4>)

Keyclick

“Keyclick” gives the characteristic “click” sound on attack. The volume can be adjusted. (See the “Rotary Speaker Simulation” console.) (See <http://theatreorgans.com/hammond/faq/hammond-faq.html#SEC5>)

Reverb

“Reverb” controls the Fluidsynth reverb. More controls are available on the “Rotary Speaker Simulation” console.

Rotary Speaker Simulation

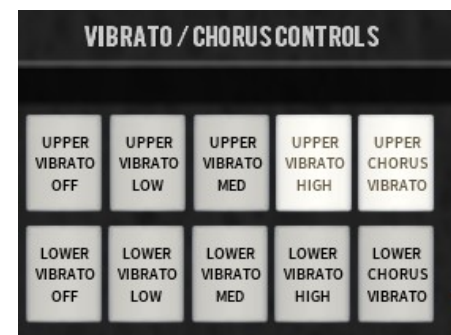
The jB3 gives you several options for Leslie simulation.

- **Fluidsynth Chorus** - The Rotary Speaker (Leslie) simulation is controlled with the “Rotary Speaker” and “Rotary Speed” controls. Eight presets govern the virtual rotary speaker’s eight speeds. These *can* be adjusted by the user. Many Hammond/Leslie simulators emulate the speeding up or slowing down of the Leslie rotors when speeds are changed. While that would be possible to emulate in jOrgan (using regulators, incremeters and synchronizers) the jB3 does not because Fluidsynth Chorus presently makes a crackling sound when its settings are changed during play. Instead, the rotary simulation has eight speeds that can be selected by the user.
- **Mr. Donald** – Mr. Donald is a VST Leslie simulator. All functions of Mr. Donald can be controlled from a jOrgan console. The elements for Mr. Donald are hidden, stored in the group “Rotary Speaker Simulation – Mr. Donald.” If these are to be used, drag them to the desired location on the console. For the connector “jOrgan to Mr. Donald MIDI,” you will need to specify a virtual MIDI cable (Maple MIDI, MIDI Ox or MIDI Yoke) to connect it to the VST, and you will also need to use Jack to connect the audio from jOrgan to the VST to your speaker output.
- **Alesis Microverb 4** – These controls may also work for other hardware reverb/effects. The Alesis Microverb 4 also has several “Lezlie” effects which can be controlled from the jOrgan console. In the “jOrgan to Alesis MIDI” connector, specify the MIDI output connected to your hardware. For Alesis Microverb 4, Bank 28 is selected for Lezlie Off. It switches to bank 171 (“Slow Leslie in Medium Room”). The codes “set 176, set 1, set 0” activate the slow Lezlie, “set 176, set 1, set 127” sets it to fast. Alesis’ Lezlie effect has a gradual speed-up and slow-down, just like a real Leslie. If you use different effects hardware, these same controls may work if you change the appropriate numbers.

Vibrato/Chorus and Some simplification

To my knowledge, the jB3 2.0 had some of the most complex virtual switching mechanisms ever built for a jOrgan disposition, specifically those made to simulate the action of the vibrato knob and switches. For version 3.0, a simpler system was adopted for the vibrato switching.

In version 3.0, the simulated vibrato knob is replaced by two sets of five switches, one set for each manual. For each manual, you have your choice of Vibrato Off, and Vibrato Low, Medium or



High. The last switch turns on the chorus, which works for low medium or high vibrato settings. The vibrato settings work independently of each other. While it doesn't have the same look as the vibrato controls of a B3, it does have all the same functionality.

When chorus was engaged on the original B3, half the sound would be run through the vibrato and half would not have the vibrato, thus making a milder vibrato with a mild celeste effect. In version 3.0, the same effect is achieved by shifting banks to a different preset in the soundfont in which there are two instruments (ranks), one which will be affected by the vibrato, and one which will not, thus perfectly emulating the chorus sound of the B3.

New in version 3.0

- Simpler Vibrato/Chorus controls.
- More accurate chorus emulation.
- Inclusion of the jB3000, a three manual super B3. (See below.)

A Note on Brightness

The Hammond B3 came with speakers in a cabinet. Sometimes these cabinets had an array of 6 inch speakers. A Leslie cabinet would have had a top rotating horn tweeter and a bass rotor. The A-102 had 12 inch built-in speakers. None of these speakers had the capability of producing a sound with a treble as bright as a modern stereo, surround, or virtual organ sound system.

On the A-102 or B3 there was a "Tone control" that adjusted the brightness of the treble—so the apparent brightness of the sound was something that would vary from instrument to instrument, based on the taste of the user.

The jB3's brightness can also be adjusted with the "Brightness" control on the the "Rotary Speaker Simulation" console. With the rotary speaker simulation, brightness is automatically reduced when the rotary speaker is on. To adjust the default (rotary off) brightness, set brightness to the desired level, press [ROT SET] and then press [ROTARY OFF BRT RESTORE]. For a warm "Leslie" sound, I prefer to set the [ROTARY ON BRT REDUCE] lower than the default.

Acknowledgements

I would like to acknowledge Jacques Levy and Jean-Paul N. who have also made virtual Hammonds . It was Jean-Paul N. who first had the idea of simulating a Leslie speaker using the chorus settings.

I am also greatly indebted to Lars Palo for processing, reducing noise, and looping samples from the A-102 for version 2.0.

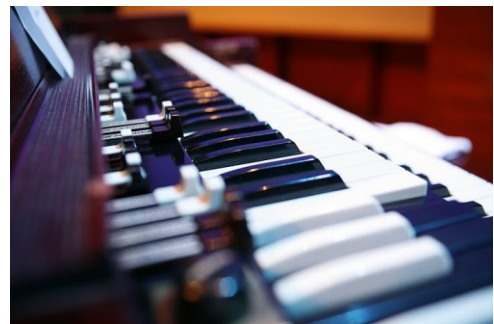


Photo from Picasa by Carl Stormer

jB3000 Expanded Drawbar Organ after Hammond v. 3.0

Background

The B3 was the *magnum opus* of the Hammond Organ Company. The design was in production the longest of any of their models, and many of their models were just redresses of the B3. (For example, the A-100 series was simply a B3 with a case built for home use with its own built-in speaker system.)

The jB3 is the virtual model of the B3, prepared by Stratman Virtual Instruments. The sounds were recorded from an A-102, which is identical to a B3 with the exception of the case. The jB3 expanded the capabilities of a B3 by adding several options for the memory of the presets. Standard/Liturgical, Jazz, Rock and some reworkings of the standard presets were included. In the jB3, all switches of a B3 are emulated. A Leslie simulation using Fluidsynth's chorus settings is also included.

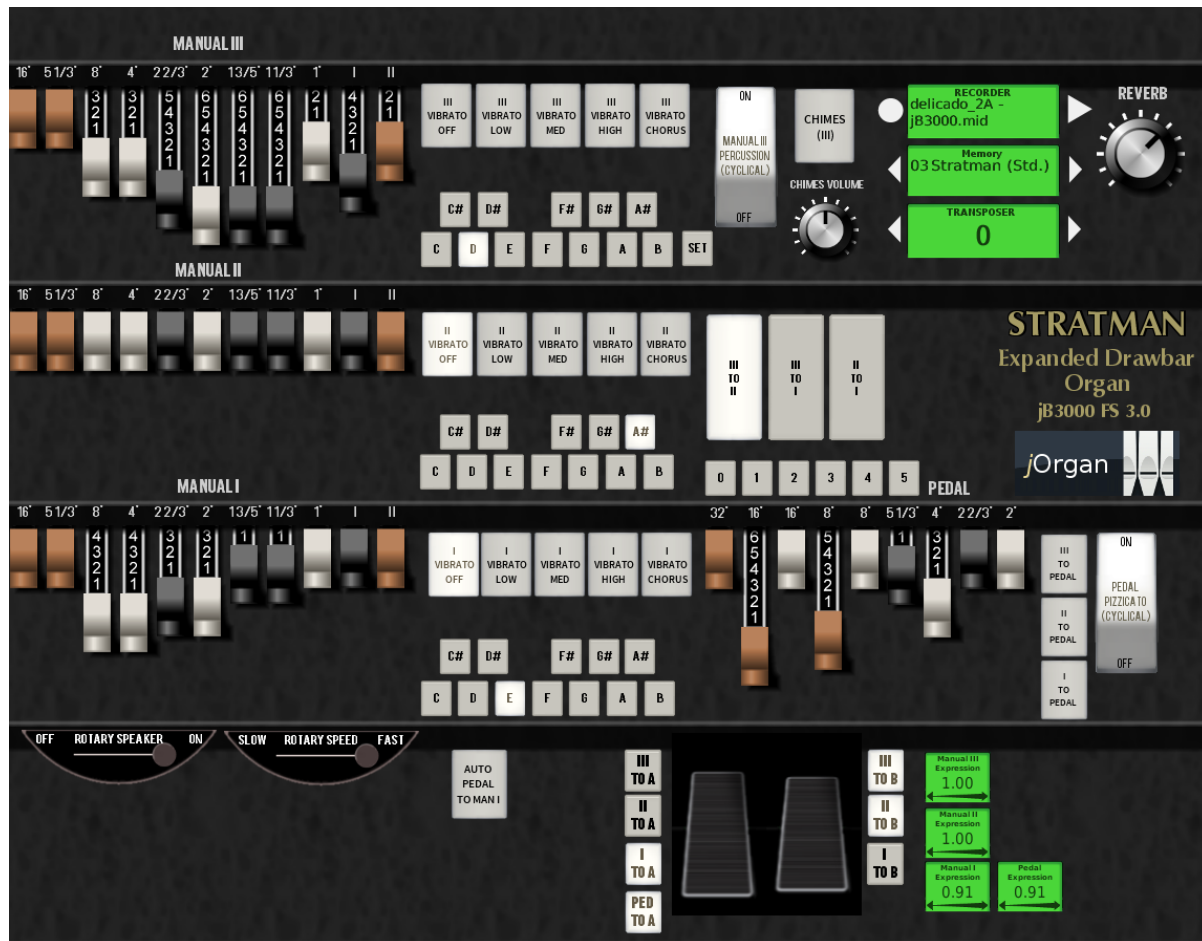
Hammond made other models that went beyond the limitations of a B3. The Hammond H series added two drawbars for higher frequencies. The Model E (also called Concert Model E) and the RT series had 32 note AGO pedalboards and different registration options for the pedals.

Dreaming



Photo: Larry Dee (<http://www.larriedee.com/Bio3.html>)

One day I was daydreaming about including some of these extra features, along with expanding the jB3 to three manuals. There are pictures of three manual Hammonds on the internet (<http://www.larriedee.com/Bio3.html>) but these seem to be after-factory modifications. From looking at model lists, it seems that no three manual Hammonds were ever produced by the factory.



Features

- Three manuals
- H Series style drawbars
- Couplers
- Third manual has a percussion feature
- Third manual also has recorded Deagan chimes
- Manuals can be coupled to each other and to the pedals
- Composite 32', 16' and 8' drawbars for the pedals along with harmonic drawbars for softer registrations or for custom registrations.

Percussion and Coupling

Manual III's percussion feature can be used alone or coupled to another manual. Coupled to another manual, the percussion can serve as a harmonic accent, much the way the B3's percussion accented the

4' or 2 2/3' harmonic, only you have your choice of *any harmonic* at *any volume*. The extra drawbars give additional brightness to a percussion effect.

Some manual III presets are included in the Stratman (Std.) Memory as an example of some possibilities.

C# Organ Harp	00 5200 000 00
D Plucked String	00 3356 662 42
D# Metal Percussion (Chime)	03 0350 110 00
E Piano	00 7642 100 00
F 4' Percussion*	00 0600 000 00
F# 4' and 2 2/3' Percussion*	00 0650 000 00
G 2 2/3' and 1 3/5' Perc*	00 0020 500 00
G# Bright metallic Perc*	00 0004 000 30
A All Octaves Percussion	00 3406 008 03
A# High Octave Percussion*	00 0002 006 01

* For use coupled to another manual with a softer registration



Photo from Flickr by CJ Sorg

REFERENCES

Hammond Wiki <http://www.dairiki.org/HammondWiki/>

Theatre Organ Hammond Web Page <http://www.theatreorgans.com/hammond/>

Hammond Suzuki

http://www.hammondorganco.com/index.php?option=com_content&view=article&id=65&Itemid=119

The Laurens Hammond Story <http://thehammondorganstory.com/>

Hammond FAQ <http://theatreorgans.com/hammond/faq/hammond-faq.html#SEC8>

1946 Hammond Brochure <http://theatreorgans.com/hammond/hammond1946/>

The Hammond Zone <http://www.hammond-organ.com/>

<http://www.thesoundsmith.com/hmd1.htm>

New B3 Owners Manual: <http://www.hammondorganco.com/owner%20manual/NewB3.pdf>

B3 Mark 2 Owners Manual: <http://www.hammondorganco.com/owner%20manual/B3mk2.PDF>

Appendix

Hammond Presets included in the Memory

Standard/Liturgical

SWELL/UPPER

C#	8' Stopped Flute	00 5320 000
D	8' Dulciana	00 4432 000
D#	8' French Horn	00 8740 000
E	8' Salicional	00 4544 222
F	- Flutes 8' & 4'	00 5403 000
F#	8' Oboe	00 4675 300
G	8' Swell Diapason	00 5644 320
G#	8' Trumpet	00 6876 540
A	- Full Swell	32 7645 222

GREAT/LOWER

C#	8' Cello	00 4545 440
D	- Fl 8' & Str 8'	00 4432 220
D#	8' Clarinet	00 7373 430
E	8' Salicional*	00 4544 222
F	- Great w/o Reeds	00 6644 322
F#	8' Open Diapason	00 5642 200
G	- Full Great	00 6845 433
G#	8' Tibia Clausa	00 8030 000
A	- Full Organ w/16'	42 7866 244

* On some models:

E - Diap, Str & Fl 8' [registration unavailable]



Photo from Flickr by John Grabowski

Jazz Registration Presets (From the new Hammond B3)

JAZZ UPPER

C#	"Jimmy 1"	88 8000 000
D	"Power"	88 8800 000
D#	"Jimmy 2"	88 8800 008
E	"Squabble"	80 0008 888
F	"Walter"	80 0080 000
F#	"Groove"	88 8000 008
G	"Pop"	88 8880 000
G#	"Jackie"	88 0888 080
A	"All nine"	88 8888 888

JAZZ LOWER

C#	"Jimmy 1 Bass"	83 8000 000
D	"Accomp"	00 8800 000
D#	"Jimmy 2 Bass"	84 8000 000
E	"Squabble Bass"	82 8000 000
F	"Smooth Bass"	80 8000 000
F#	"Groove Bass"	85 8000 000
G	"Pop Accomp"	00 8840 000
G#	"Fat Bass"	84 8010 000
A	"Full Accomp"	00 8886 540



Photo from Flickr by Fran Zu

Theatrical

SOLO/UPPER

C#	8' French Horn	00 8740 000
D	- Tibia 8' & 2'	00 8408 004
D#	8' Clarinet	00 8080 840
E	8' Novel Solo	08 8800 880
F	16' Theatre Solo	60 8088 000
F#	8' Oboe Horn	00 4685 300
G	16' Full Tibias	60 8807 006
G#	8' Trumpet	00 6888 654
A	16' Full Thtr Brass	76 8878 667

ACCOMPANIMENT/LOWER

C#	8' Cello	00 4545 440
D	8' Dulciana	00 4432 000
D#	8' Vibraharp	00 4800 000
E	- Vox 8' & Tib 4'	00 3800 460
F	8' String Accomp	00 6554 322
F#	8' Open Diapason	00 5642 200
G	16' Full Accomp	43 5434 334
G#	8' Tibia	00 8030 000
A	16' Bombarde	84 7767 666



Photo from Flickr by ftedrahn. Switches on an M3

Rock Registration Presets

In his Hammond disposition, Jacques Levy included a memory set of typical Rock presets. Those presets have been transferred and included in this disposition. The short description of each registration is mine.

ROCK UPPER

C#	Low and full with 1'	86 4000 001
D	Medium and bright	67 3101 113
D#	Medium and brilliant	67 4101 007
E	16' with tierce	88 8000 731
F	16' with 1'	88 8101 008
F#	Low 'n' High	80 3201 108
G	Almost everything	86 6666 668
G#	Medium, full, bright	82 5212 007
A	16' with harmonics	80 0000 777

ROCK LOWER

C#	Bourdon 16'	87 0000 000
D	Full Organ	85 7433 348
D#	16', 8' and 1'	80 7001 006
E	16' and 1'	80 0000 005
F	Bright with low ghost	12 8603 004
F#	Straight and quinty	00 8750 004
G	Full and bright	00 6313 124
G#	Full, not so bright	00 6502 002
A	Full, bright accompaniment	11 7312 115

[Paul F Schnellbecher](http://www.theatreorgans.com/hammond/paul.htm) devised two registration sets, the first one was meant to be an improvement on the Hammond Standard registrations, the second a scheme of his own. A complete document explaining his method can be read here: <http://www.theatreorgans.com/hammond/paul.htm>

Schnellbecher 1 (Standard)

SWELL/UPPER

C#	8' Stopped Flute	00 6142 100
D	8' Dulciana	00 4433 211
D#	8' French Horn	00 8765 321
E	8' Salicional	00 4554 322
F	- Flutes 8' & 4'	00 5623 012
F#	8' Oboe	00 3675 321
G	8' Swell Diapason	00 7765 432
G#	8' Trumpet	00 7877 766
A	- Full Swell	32 7646 346

GREAT/LOWER

C#	8' Cello	00 4544 221
D	- Fl 8' & Str 8'	00 5643 322
D#	8' Clarinet	00 6272 532
E	8' Salicional*	00 4544 443
F	- Great w/o Reeds	00 6845 355
F#	8' Open Diapason	00 8876 542
G	- Full Great	00 7868 576
G#	8' Tibia Clausa	00 8050 200
A	- Full Organ w/16'	42 7868 467



Photo from Flickr by QXZ

Schnellbecher 2

SWELL

C#	Softest Solo Viola Pomp	00 5544 322
D	Softest Accomp Aeoline	00 2221 111
D#	Medium Solo Claribel Fl	00 7835 210
E	Strings VP Ael Dolc	00 4635 244
F	Diaps & Flutes Geig Cbl Clr	00 3736 243
F#	Orch Solo Reed Oboe	00 2465 432
G	Fanfare Tuba	03 7888 777
G#	Brass Solo Trumpet	00 6787 665
A	Full Swell Flues & Trump	32 4858 465

GREAT

C#	Softest Solo St Diap	00 6132 100
D	Softest Accomp Dulciana	00 3432 100
D#	Medium Solo St Diap Fl dAm	00 6633 131
E	MF Flues to 2' Fl Dul Block	31 6725 122
F	Prncpls to 2' 8 4 2-2/3 2	32 4878 266
F#	Great Trumpet Trump	00 8877 665
G	Full Great Prncpls Reeds	32 7858 388
G#	Reed Chorus Tromb Trump Cl	22 6756 455
A	Full Organ incl Tuba	43 6868 388

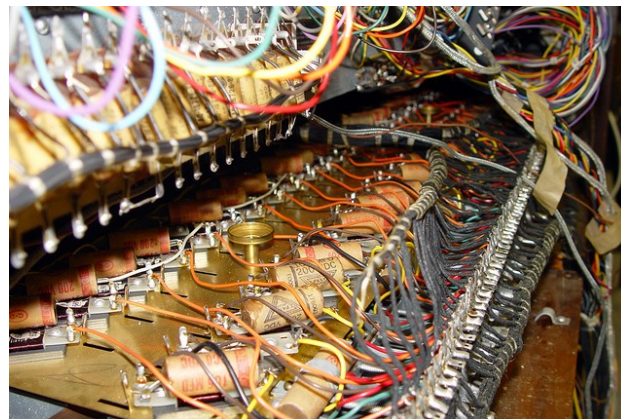


Photo from Flickr by bdu. Interior wiring of an A100

Stratman (Standard)

My version of the standard presets was made by taking a spectrum analysis of another virtual organ (ACO two manual) with the equivalent registrations. The result is a standard set that has more of a dynamic range from soft to loud and better contrasts between registrations.

SWELL/UPPER

C#	8' Stopped Flute	00 5010 000
D	8' Dulciana	00 3211 000
D#	8' French Horn	00 8311 100
E	8' Salicional	00 4322 110
F	- Flutes 8' & 4'	00 7621 000
F#	8' Oboe	00 2323 321
G	8' Swell Diapason	00 7632 000
G#	8' Trumpet	00 4575 862
A	- Full Swell	00 5424 233

GREAT/LOWER

C#	8' Cello	00 2322 100
D	- Fl 8' & Str 8'	00 5322 100
D#	8' Clarinet	00 2133 321
E	8' Salicional*	00 4433 110
F	- Great w/o Reeds	00 8634 233
F#	8' Open Diapason	00 8622 110
G	- Full Great	00 7755 444
G#	8' Tibia Clausa	00 5020 100
A	- Full Organ w/16'	53 7755 444



Flickr photo by Giltronix

From a Conversation with a Classically Trained Organist

"For a Classical organist trying to figure out how a Hammond registers, here's one essay: http://www.stefanv.com/electronics/hammond_drawbar_science.html There's also the essay by Schnellbecher: <http://www.theatreorgans.com/HAMMOND/paul.htm>. Most methods of combining sounds do not consider differences in dynamics between few and more stops engaged. One method that seems to work is to use the harmonics to synthesize solo stops (00 4161 422 approximates a Cromorne), but otherwise to think of the pitches as individual stops. For a "plenum" choose 8, 4, 2 2/3, 2, 1 1/3 and 1 pitches, shape them to your own taste. Think of 1 1/3 and 1 as the mixture. For a cornet, 8, 4, 2 2/3 and 1 3/5, again, shape to taste.

Something that was unfortunate was an early Hammond sales pitch that a Hammond drawbar organ could replicate pipe tone. (See the article about the famous lawsuit brought by the American Guild of Organists: <http://www.1377731.com/hammond/index.html>) Sometimes the equivalent sounds can be close, but it often can be frustrating and disappointing for the classical organist who has to play one for worship.

It's better to appreciate them for their own beauty. The other day I played Bach's "Schmuecke dich" with an 8, 4 accompaniment and a cornet solo and a slow Leslie. Very warm and beautiful. Still not like playing it on Pitea or Burea Church, but beautiful nonetheless."

Other Technical Information

Table of the drawbar pitches and their volume levels relative to each other:

16'	5 1/3'	8'	4'	2 2/3'	2'	1 3/5'	1 1/3'	1'
100%	75%	75%	75%	83%	83%	83%	75%	75%

Vibrato frequency: 6.6 Hz

Pedal drawbar harmonics:

8' 00 8445 430 (plus increase volume to 125%)

16' 86 2210 000 (plus increase volume to 200%)

10



Model A-102 French Provincial styling. Available in Light Cherry or Dark Cherry.

A-100 SERIES

HAMMOND ORGAN

Here is a compact console that has the versatility and tone values of a concert organ. The two 61-note manuals and radial, 25-note pedal keyboard provide the basis for playing the full range of organ literature—from Bach to Gershwin and Ellington. Additionally, there are eighteen pre-set keys (nine for each manual) that provide an instant change of orchestral effects. And, with the customized tone selection feature, you can quickly change the pre-sets—majestic church organ tones; full, throaty Theatre Organ tones; dissonant jazz tones; the string tones of a western music group—or whatever tones you like to hear.

Model A-101 Contemporary styling in Translucent Black also available.

SPECIFICATIONS

DIMENSIONS: Without pedal keyboard and music rack, 47½" wide, 25" deep, 38½" high; with pedal keyboard and music rack, 47½" wide, 43" deep, 45½" high.

WEIGHT: Complete with bench and pedal keyboard, 381 pounds.

MANUALS: Swell and Great, 61 keys each.

PEDAL KEYBOARD: 25 notes, radiating, detachable.

TONAL CONTROLS: 9 pre-set keys and two sets of 9 adjustable harmonic drawbars for each manual. The power amplifier with two 12" speakers and the built-in reverb system with its own 12" speaker provide true response down to the lowest pedal tones—all within one, compact console.

EXPRESSION: One expression pedal, controlling Swell, Great and Pedals; also, equipped with normal and soft volume control.

VIBRATO: Equipped with Hammond Selective Vibrato which provides three degrees of true vibrato and three degrees of Vibrato Chorus, on the upper manual or the lower manual or both simultaneously.

MUSIC POWER OUTPUT: 27 watts.

Hammond Promotional Material for the A-100 series. From <http://www.personal.psu.edu/meb26/INART55/hamorgan.html>

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