



Skx

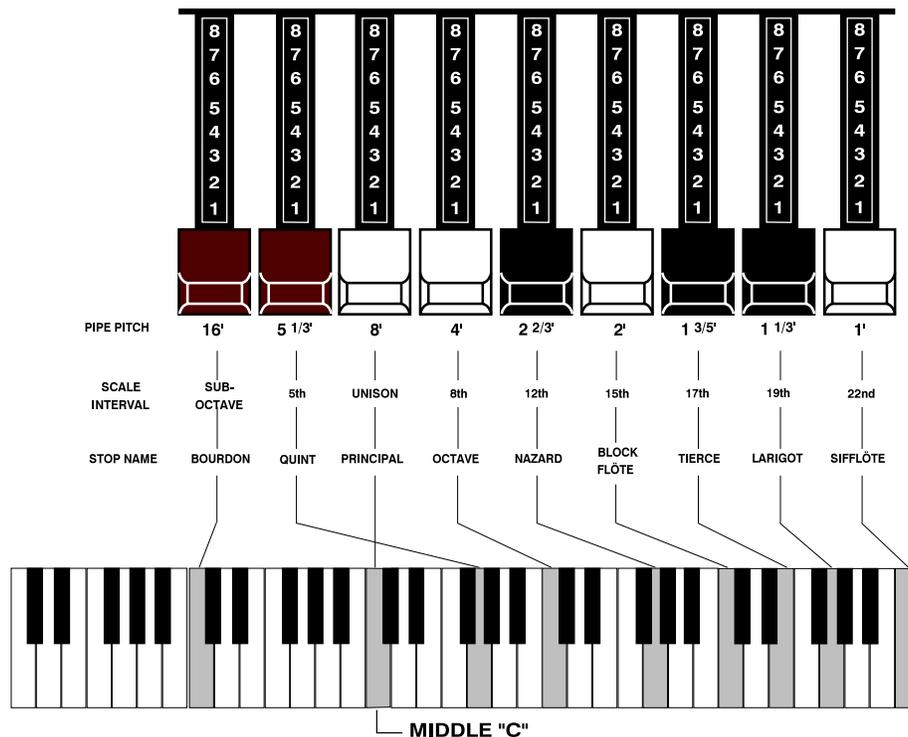
**DRAWBARS
&
PERCUSSION**

DRAWBARS & PERCUSSION

◆ Manual Drawbars

Your Hammond SKX has two sets of nine Drawbars, one for each Manual. Drawbars, often called Tonebars, are the heart and the basis of the renowned Hammond Sound and have been used since the first Hammond Organ Model A introduced in 1935.

There are approximately 253,000,000 possible sound combinations that can be produced by these Drawbars. Each Drawbar consists of sine waves of different pitches. The illustration below shows how each Drawbar relates to the keyboard when middle "C" is pressed.

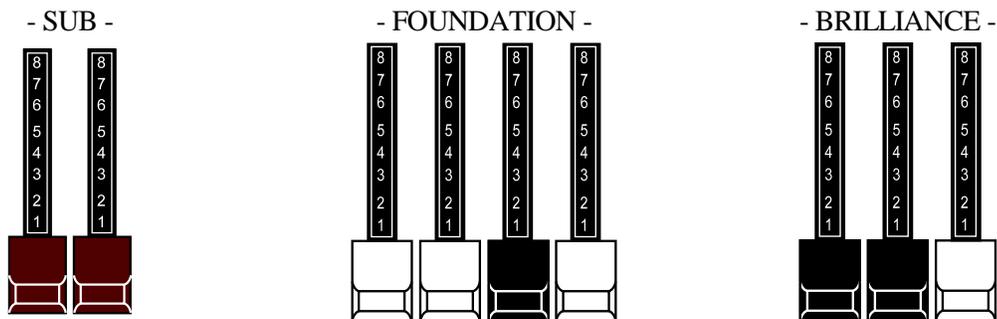


Each Drawbar is marked with a number followed by a footage mark. For example, the first white Drawbar is marked "8'". This is pipe organ terminology indicating that the pipe used to produce the lowest note on the keyboard on a pipe organ is actually eight feet long. The numbers from "1" to "8" on each Drawbar represent degrees of loudness - number 1 being the softest, and number 8 being the loudest.

Drawbars are divided into 3 groups of sound as well as 3 groups of color. We will first look at the 3 sound groups.

Sound Groups

You may think of these sound groups in terms of the three levels - The Sub being the deep pitches, the Foundation being the mid range of pitches and the Brilliance being the high pitches.



TRY THIS:

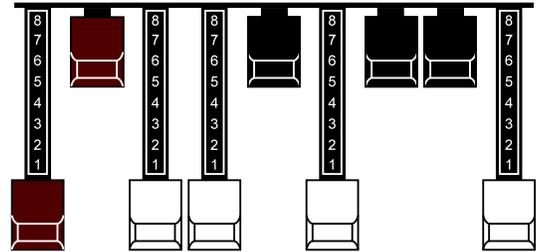
1. Make sure all Drawbars are "IN" (off).
2. Hold down a "C" chord, starting with "E" above middle "C", ("E", "G" & "C" notes) with your right hand on the manual (or the Upper Manual of the SK-2).
3. Starting with the first white Drawbar, pull out and push in each of the Foundation Drawbars one group at a time until you have a sound that you like.
4. While still holding the "C" chord down, pull each of the brown Sub Drawbars out until you like the sound.
5. Now do the same with the Brilliance Drawbars.

It's that easy to create your own custom Drawbar settings.

Color Groups

White Drawbars

The first white Drawbar represents the “fundamental” or “8' base” tone. All of the other white Drawbars are octave intervals or harmonics of the fundamental tone. The tonal brilliance is greatly increased by adding white Drawbars, but the harmonics added are always in “consonance” or harmony.



- CONSONANT HARMONICS -

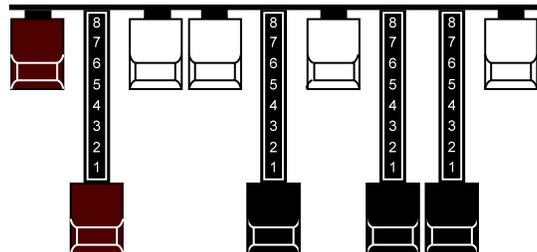
TRY THIS:

1. Make sure all Drawbars are “IN” (off).
2. Hold down middle “C” on the manual (or the Upper Manual on the Sk2).
3. Pull the first white Drawbar all the way out.
4. Now, one by one, pull the other white Drawbars out in sequence.

As you add each Drawbar, you will hear the addition of the same note an octave higher in each case.

Black Drawbars

The Black Drawbars on the Hammond Organ represent the dissonant (discordant) harmonics which are also necessary in building rich tone colors. The mellowness of a horn, the pungency of strings, and the brilliance of reed voices owe much of their character to the presence of these harmonics in different degrees.



- DISSONANT HARMONICS -

TRY THIS:

1. Make sure all Drawbars are “IN” (off).
2. Hold down middle “C” on the manual (or the Upper Manual on the Sk2).
3. Pull the first white Drawbar in the second group of Drawbars for the Swell Manual, marked 8', all the way out.
4. Now pull the 3 Black Drawbars in the second group of Drawbars for the Swell Manual all the way out.

The sound produced by the Drawbars is that of a clarinet.



Brown Drawbars

In addition to the white and black Drawbars, there are two brown Drawbars in the group. These two Drawbars produce “sub-octave” effects. The first brown Drawbar is the sub-octave of the fundamental Drawbar. It is “one octave” lower in sound.

TRY THIS:

1. Make sure all Drawbars are “IN” (off).
2. Hold down middle “C” on the manual (or the Upper Manual on the Sk2).
3. Pull the first white Drawbar all the way out.
4. While continuing to hold middle “C” down, pull the first brown Drawbar all the way out.

You will now hear the sound of “C” one octave lower being added.

The second brown Drawbar is the “sub-octave” of the third harmonic. Both of these Drawbars are used to add depth and richness to many combinations. They also increase the range of the manual by one octave since a solo registration of the “8 foot,” or normal pitch, can be set up using the first brown Drawbar as the fundamental and played one octave higher.

TRY THIS:

1. Make sure all Drawbars are “IN” (off).
2. Hold down middle “C” on the manual (or the Upper Manual on the Sk2).
3. Pull the first white Drawbar all the way out.
4. While continuing to hold middle “C” down, pull the first brown Drawbar all the way out. You will now hear the sound of “C” one octave lower being added.
5. Now pull the second brown Drawbar in the same group out, and you will hear it add a richness to the sound of the “C” note that you are holding down.

Tone Families By Shape

Regardless of the size of a pipe organ or its number of stops, all of its voices are related to four basic families of tone. The four basic families - Flute, Reed, String and Diapason - can be quickly set up on the Drawbars by relating a pattern or shape to each family.

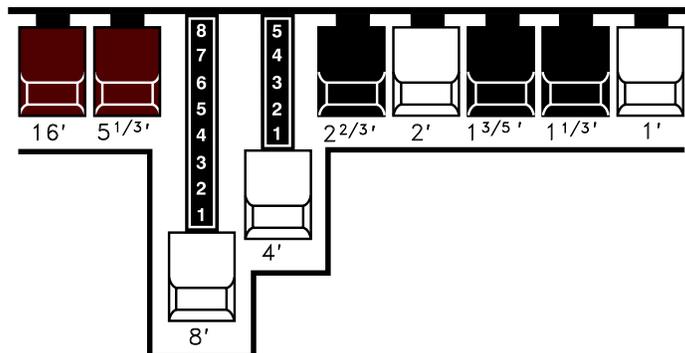
These are the generalities which apply to the tonal resources of the organ, and in themselves produce pleasant and usable effects. However, real beauty of tone is secured in two ways. The first way is to use registrations which have been devised by organists. The second way, and eventually the one that best expresses your own feeling for the music, is to create your own tonal effects, experimenting with and perfecting tones which you use to play your favorite selections.

The Hammond Organ Drawbars allow you not only to set up any tonal effect you want, but also to make many fine variations of the tone. Only with the Hammond Drawbars can you play exactly the shade of tone you want for every selection and, perhaps even more important, for every size and type of room in which you play.

With the Hammond Organ Drawbars, a touch of a finger is all that is needed to make the tone quality softer or more brilliant, richer in one harmonic or another.

Typical Drawbar Registration Patterns For The Four Families Of Organ Sound

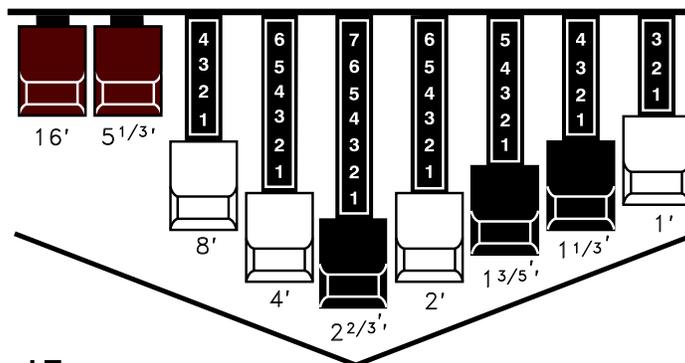
Flute family (2 step pattern)



Flute Tones

Accompaniment Flute 8' I	00 8460 000
Accompaniment Flute 8' II	00 3220 000
Accompaniment Flute 8' III	00 8600 000
Chorus of Flutes 16'	80 8605 002
Orchestral Flute 8'	00 3831 000
Piccolo 2'	00 0006 003
Stopped Flute 8'	00 5020 000
Tibia 8'	00 7030 000
Tibia 4'	00 0700 030
Tibia (Theater) 16'	80 8605 004
Wooden Open Flute 8'	00 8840 000

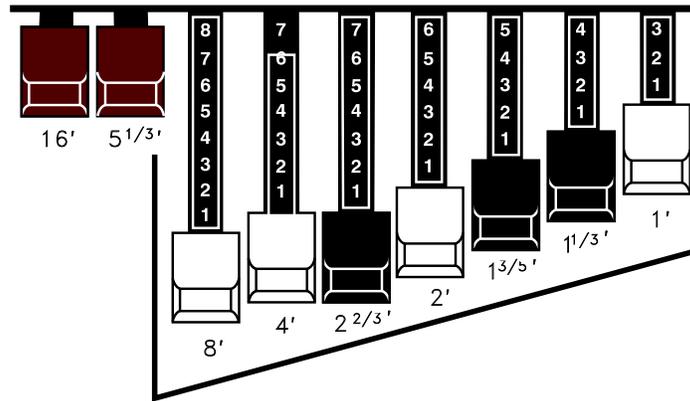
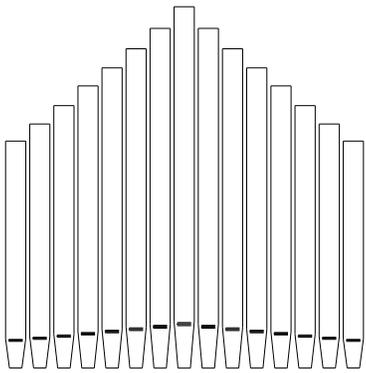
Reed family (triangle pattern)



Reed Tones

Bassoon 16'	44 7000 000
Clarinet 8'	00 6070 540
English Horn 8'	00 3682 210
Flugel Horn 8'	00 5777 530
French Horn	00 7654 321
Kinura 8'	00 0172 786
Oboe 8"	00 4764 210
Trombone 8'	01 8777 530
Trumpet 8'	00 6788 650
Tuba Sonora 8'	02 7788 640
Vox Humana 8'	00 4720 123

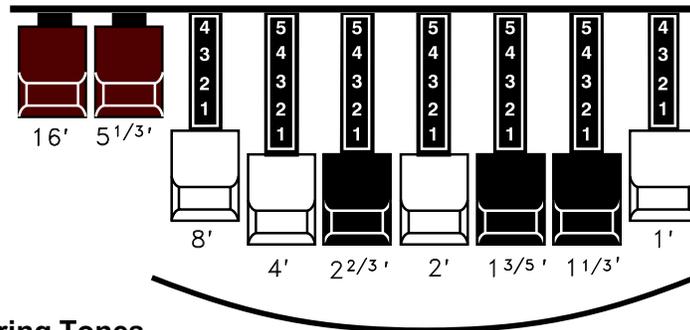
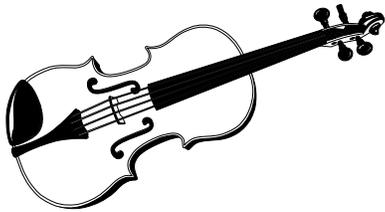
Diapason family (check mark pattern)



Diapason Tones

Accompaniment Diapason 8'	00 8874 210
Chorus Diapason 8'	00 8686 310
Diapason 8'	00 7785 321
Echo Diapason 8'	00 4434 210
Harmonic Diapason 16'	85 8524 100
Harmonic Diapason 8'	00 8877 760
Harmonic Diapason 4'	00 0606 045
Horn Diapason 8'	00 8887 480
Open Diapason 8'	01 8866 430
Solo Diapason	01 8855 331
Wood Diapason 8'	00 7754 321

String family (bow pattern)



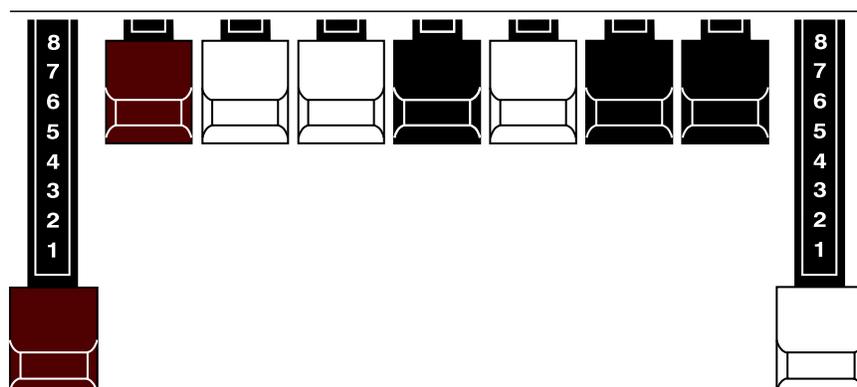
String Tones

Cello 8'	00 3564 534
Dulciana 8'	00 7770 000
Gamba 8' I	00 3484 443
Gemshorn 8'	00 4741 321
Orchestral String 8'	00 1464 321
Salicional 8'	00 2453 321
Solo Viola 8'	00 2474 341
Solo Violin 8'	00 3654 324
Viola da Gamba 8'	00 2465 432
Violina 4'	00 0103 064
Violone 16'	26 3431 000

Jazz and Pop Drawbar Registrations

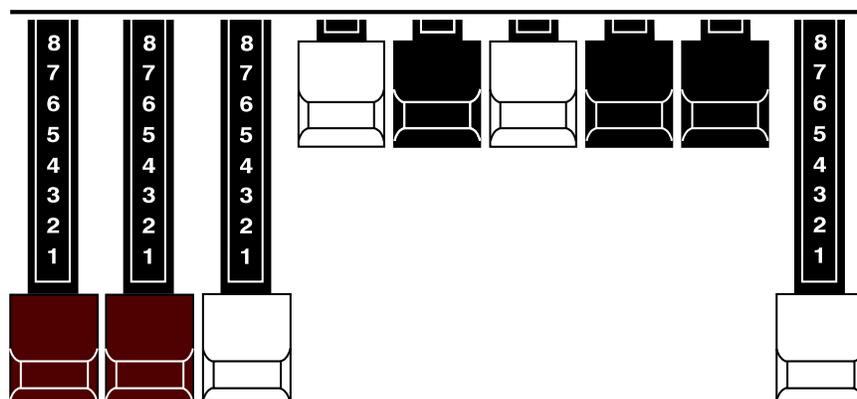
On the Hammond Organ, any harmonic may be emphasized individually, or on the other hand, eliminated completely. Even the fundamental may be eliminated. Because of this fact, many unusual and striking effects can be developed.

A POP ORGAN TONE - 80 0000 008



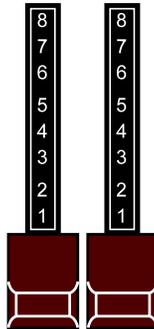
The above is an example of what can be done using the Drawbars to create new sounds. This is a very popular combination used by many pop organists. The effect of two harmonics five octaves apart gives a beautiful tone color for playing slower songs or ballads.

A JAZZ ORGAN TONE - 88 8000 008



There are many hundreds of Drawbar combination which are not imitative of any instrument, but which are immediately recognized as "Hammond Sounds". The above combination is an example. The basic Hammond Organ jazz sound is gotten with the first three Drawbars, such as 88 8000 000. When the last white Drawbar is used along with the first three Drawbars, a very pleasing effect is created. For playing slower songs, you may wish to try a little less of the last white Drawbar - for example, 88 8000 005. The 8th harmonic will still be heard, but will not be as prominent.

◆ Pedal Drawbars



The two brown Drawbars located between the Drawbars for the Swell and Great Manuals control the sounds produced by the Pedals or Bass section. The first Pedal Drawbar produces a tone at 16' pitch for a deep foundation bass, while the second Pedal Drawbar produces a tone at 8' pitch, or one octave higher.

ORGAN VOLUME Rotary Control

The **ORGAN VOLUME Rotary Control** is located to the left of the Drawbars. Use this Rotary Control to raise or lower the volume of the Upper, Lower and Pedal Drawbar tones. Turn this control to the right to increase the total volume, and to the left to decrease the total volume.



NOTE: If you have an Expression Pedal connected, it will express up to the amount determined by the setting of the ORGAN VOLUME Rotary Control.

Try Your Own Drawbar Registrations

Part of the fun of playing your Hammond SKX is to experiment with your own Drawbar arrangements. It is not essential that you use the registration set up on any music you may have or attempt to duplicate exactly the sound you may hear on a favorite song. These registrations merely represent the preference of the composer, arranger or player and many not be your choice of tonal color at all. You may find that the acoustics of the room in which you are playing may make it desirable to vary slightly the registrations used. You may especially wish to supply a little more or a little less "brilliance" by varying the amount of the higher-pitched Drawbars used. Do not hesitate to experiment with tonal colors - there are many thousands of beautiful tones in the instrument and part of the enjoyment of using Drawbars lies in creating new sounds to make your music more interesting.

Changing Drawbar Registrations

Sometimes making dramatic changes of tone color in registration can be very effective in a musical presentation. However, some selections may require changes of tone that are very "contrasty" in character and occasionally they come at a point in the music where it will difficult to make them and continue to play without a break in your music. In this case, it is recommended that you figure out ahead of time what Drawbar changes need to be made and save them to a Patch for later recall. This is explained in the **PATCHES & FAVORITES** section.

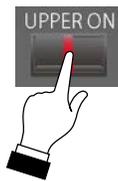
In other cases, the registration change may need to be more subtle - for example, on a big pipe organ, a change of tone can be affected by turning one or more stops "on" or "off" such that the change of tonal color represents an addition or subtraction from the basic tone. This method of changing tonal colors gives you a very smooth and natural flow of music. It is therefore suggested that you practice making very simple Drawbar changes - one Drawbar, or two at most - which you can do in a split second, and which will give you a noticeable change of tone yet one that is a natural transition from the tone you have been using.

◆ Registering the Drawbars

IMPORTANT NOTE: Before doing the following examples, make sure that the “ON” Touch Tabs for both of the EXTRA VOICE sections (“UPPER ON,” “LOWER ON”) are “OFF” (red LED not lit).

TRY THIS:

1. Make sure the UPPER ON Touch Tab in the ORGAN section is “ON” (red LED lit).



2. Create a Drawbar registration - for example, 88 8800 008. You can confirm the registration by consulting the Information Center Display.

NOTE: To see the Drawbar registration displayed numerically, touch the PLAY Touch Button repeatedly until the numbers show on the top line of the display.

3. Play some notes on the Upper Manual. You will hear the notes play with the Drawbar registration you just set up.

Now, we will add a Lower Manual Drawbar registration.

TRY THIS:

1. Make sure the LOWER Touch Tab in the ORGAN section is “ON” (red LED lit).



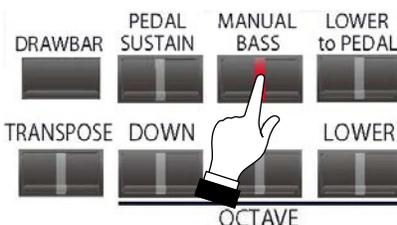
2. Create a Drawbar registration - for example, 00 8400 000. You can confirm the registration by consulting the Information Center Display.

3. Play some notes on the Lower Manual. You will hear the notes play with the Drawbar registration you just set up.

Finally, here is how to add a Pedal or Bass registration.

TRY THIS:

1. Using the Pedal Drawbars, create a Pedal Drawbar registration - for example, 60. You can confirm the registration by consulting the Information Center Display.
2. If you do not have a MIDI Pedal Clavier connected to the **SKX**, touch the **MANUAL BASS** Touch Button to transfer the Pedal tones to the Lower Manual.



3. Play some notes on the left end of the manual. You will now hear the notes play with Pedal tones added.

◆ **Please Read**

On the **SKX**, Drawbar parameter changes for the Pedal department (“P”) will **not** be heard unless the **MANUAL BASS** Touch Tab is “ON” or a MIDI Pedal Clavier is connected.

NOTE: You will notice that two (2) Drawbar positions are shown for the Pedals in the Information Center Display. On most Hammond Organs with two manuals and pedals, there are two Drawbars for controlling the Pedal tones - one at “16” pitch and the other at “8” pitch. The **SKX** faithfully embodies this feature with two Pedal Drawbars, which are explained on page 10.

◆ DRAWBAR Edit Menu

This Advanced Feature Menu allows you to make various changes to the characteristics of the Drawbars.

Accessing the DRAWBAR Edit Menu using the Touch Buttons:

1. From the PLAY Screen, touch the MENU/EXIT Touch Button to see the first screen of the MENU Mode. You will see “A” displayed in the extreme upper left corner of the Information Center Display. You will also notice that the word “DRAWBAR” is blinking.
2. Touch the ENTER Touch Button once.

Accessing the DRAWBAR Edit Menu using a Shortcut:

Touch the DRAWBAR Touch Button.



You are now in the DRAWBAR Edit Menu. You may now use the PAGE NAVIGATION Touch Buttons in conjunction with the VALUE Rotary Control to make various changes to the characteristics of the Drawbars. These changes are explained starting on the next page.

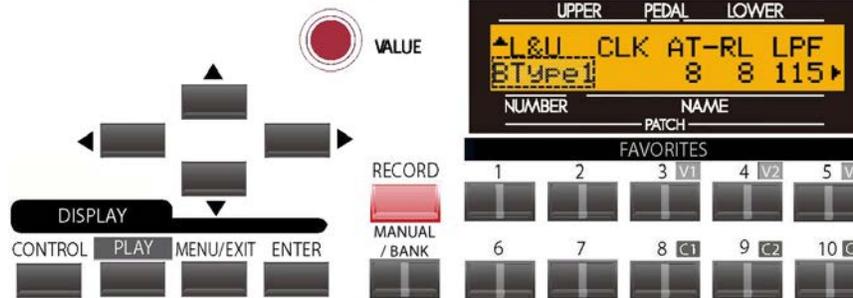
Keyboard Selection

Use the PAGE UP and PAGE DOWN Touch Button to scroll **up** through the Keyboard choices. You can select “L&U” “Lower and Upper” or “PED” (Pedal) The current choice will blink.

The following paragraphs will show how to change the Drawbar parameters for “L&U” (Lower and Upper Manuals)

DRAWBAR Edit Menu L&U - Page 1

If you followed the instructions on the previous page, Page 1 of the DRAWBAR Edit Menu displays. The legend underneath “L&U” should now be blinking.



Drawbar Voice Mode

This Advanced Feature allows you to change the overall sound of the Drawbars. You can select, “BType1”, which reproduces the sound of the B-3 tone-wheel generator, “BType2,” which is similar to BType1, but with more leakage noise and “flutter,” “Mellow,” which produces a very pure sine-wave tone quality, “Vx,” which reproduces the sound of a vintage British combo organ, “Farf,” which reproduces the sound of a vintage Italian combo organ, or “Pipe,” which produces authentic pipe organ tones.

Turn the VALUE Rotary Control to the **right** to go **forward** through the choices.

Turn the VALUE Rotary Control to the **left** to go **backward** through the choices.

NOTE: The first three Drawbar Voice Modes are traditional Tone Wheel settings. You can customize each one of these Drawbar Voice Modes to your liking. This is explained in the **CUSTOM TONE WHEEL** section of this Guide.

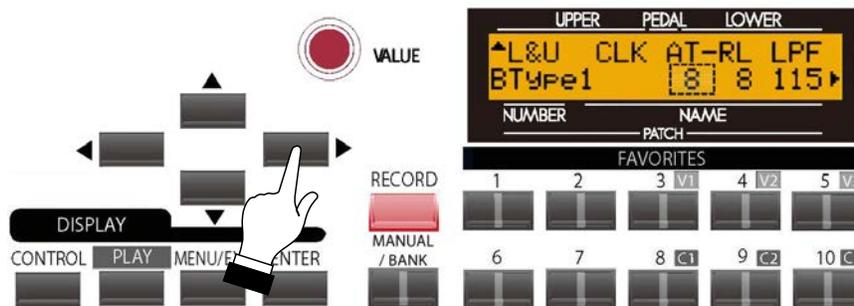
IMPORTANT NOTE: The “Vx.” “Farf.” and “Pipe” Voice Modes change the operation of the Drawbars from the traditional Hammond Harmonic Drawbar functions. This is explained starting on page 40 of this Guide.

What Is “Key Click?”

On a tone-wheel Hammond Organ, each time a key is depressed with an active Drawbar registration, a Key Click (or Key Pop) is heard just before the note sounds. This is due to the fact that, unlike other electrical or electronic musical instruments, the sound is always present at the key contacts. Therefore, touching a playing key will likely intercept the sound wave at some point along its excursion, creating a “spike” or attack transient. This transient is heard as “Key Click.” Since the generated sound is interrupted when a key is both pressed and released, there is a Release Key Click as well as an Attack Key Click.

The Key Click Advanced Features on your **SKX** allow you to replicate this characteristic of vintage tone-wheel organs.

*From the previous screen, touch the **PAGE RIGHT** Touch Button once. The number underneath the letters “AT” should now be blinking.*



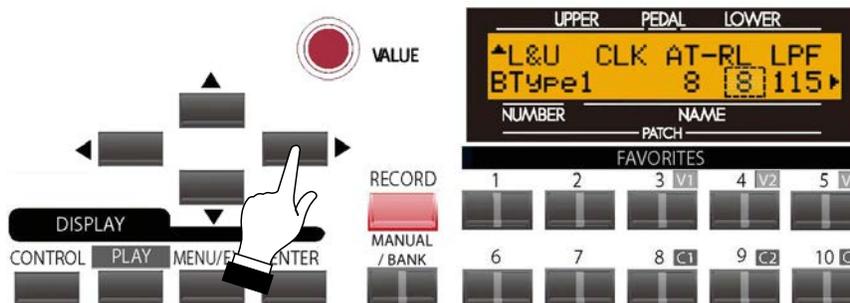
Attack - Key Click

This Advanced Feature allows you to change the amount of Attack Key Click, or the click that is heard when a note is first played..

Turn the VALUE Rotary Control to the **right** to **increase** the amount of Attack Key Click.

Turn the VALUE Rotary Control to the **left** to **decrease** the amount of Attack Key Click.

From the previous screen, touch the PAGE RIGHT Touch Button once. The number underneath the letters “RL” should now be blinking.



Release - Key Click

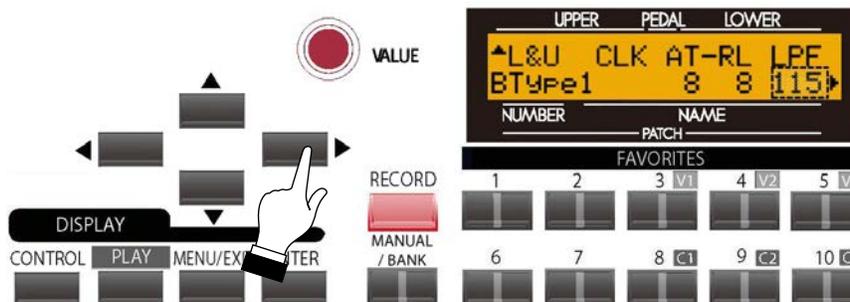
This Advanced Feature allows you to change the amount of Release Key Click, or the click that is heard when a note is released.

Turn the VALUE Rotary Control to the **right** to **increase** the amount of Release Key Click.

Turn the VALUE Rotary Control to the **left** to **decrease** the amount of Release Key Click.

NOTE: One or more Drawbars must be active (pulled out) in order to hear the Key Click effect.

From the previous screen, touch the PAGE RIGHT Touch Button once. The number underneath the letters “LPF” should now be blinking.



Low-Pass Filter (LPF)

This Advanced Feature allows you to adjust the tone quality of both the Attack and Release Key Click tones.

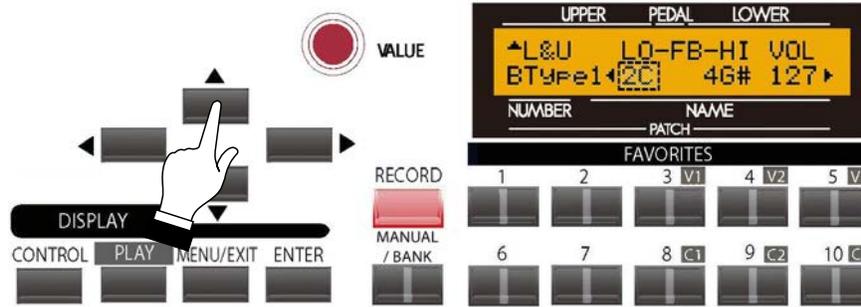
Turn the VALUE Rotary Control to the **right** to make the Key Click **brighter**.

Turn the VALUE Rotary Control to the **left** to make the Key Click **mellower**.

NOTE: “LPF” is an abbreviation for **L**ow-**P**ass **F**ilter, or a circuit which allows only low frequencies to pass through. The more filtering is applied, the duller the sound, while less filtering will result in a brighter sound.

DRAWBAR Edit Menu L&U - Page 2 - FOLDBACK

From the previous screen, touch the PAGE RIGHT Touch Button once. Page 2 of the DRAWBAR Edit Menu should now display. The Information Center Display should now look like this:

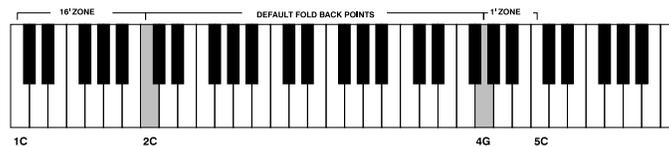


Drawbar Fold Back

There are two function selections to the Drawbar Fold Back Advanced Feature Menu of the **SKX**: (1) Select how low the Sub-Fundamental Drawbar will play on each manual (from “2C” down to “1C”). (2) Set the upper frequency limit for each manual (from “4G” to “5C”).

On the earliest model Hammond Organs, the Sub-Fundamental Drawbar (the one marked, “16”) would continue to play all the way down to the lowest “C” (“1C”). Newer models such as the Hammond Models X-66, X-77 and Concorde do the same, however, the 8th harmonic Drawbar (the one marked “1”) continues to play up the manual to the next to highest “C” (“5C”) on the manual.

On a B-3, the lowest note produced by the Sub-Fundamental Drawbar is the 2nd “C” (“2C”) from the left end of the manual, while the highest note that can be played by the 8th harmonic Drawbar is the 4th “F#” from the left end of the manual. The lower and higher keys on the manual “Fold Back,” in that they repeat the pitches played by other notes.



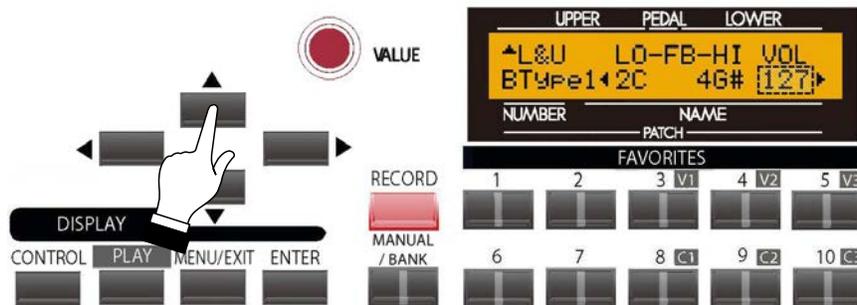
This Advanced Feature allows you to set the upper and lower frequency limits of the Drawbars.

Use the PAGE LEFT and PAGE RIGHT Touch Buttons to select either “LO” or “HI.” “LO” refers to the lower limit of the Sub-Fundamental or first brown Drawbar while “HI” refers to the upper limit of the pitches called up by the high-pitched Drawbars (the last four Drawbars). The selected parameter will blink “on” and “off.”

Turn the VALUE Rotary Control to the **right** to move the Foldback point **higher**.

Turn the VALUE Rotary Control to the **left** to move the Foldback point **lower**.

From the previous screen, touch the PAGE RIGHT Touch Button once. The number underneath the letters “VOL” should now be blinking.



Drawbar Volume

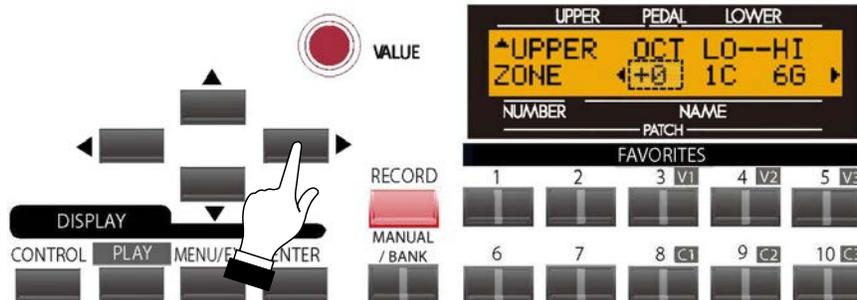
This Advanced Feature allows you to adjust the level of the entire Drawbar section of the instrument.

Turn either the ORGAN VOLUME or the VALUE Rotary Control to the **right** to **increase** the overall volume of the Drawbar tones.

Turn either the ORGAN VOLUME or the VALUE Rotary Control to the **left** to **decrease** the overall volume of the Drawbar tones.

DRAWBAR Edit Menu L&U - Page 3 - UPPER

From the previous screen, touch the **PAGE RIGHT** Touch Button once. Page 3 of the DRAWBAR Edit Menu should now display. The Information Center Display should now look like this:



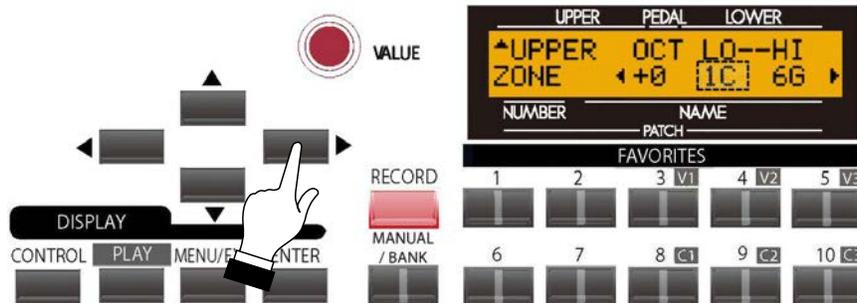
Upper Manual Octave

This Advanced Feature allows you to select the Octave range in which the Upper Manual will play. You can select “-2” (up to two octaves down) through +2” (up to two octaves up).

Turn the VALUE Rotary Knob to the **right** to move the Upper Manual Octave up.

Turn the VALUE Rotary Knob to the **left** to move the Upper Manual Octave down.

From the previous screen, touch the **PAGE RIGHT** Touch Button once. The number underneath the letters “LO” should now be **blinking**.



Drawbar Zone - Lower Limit - Upper Manual

This Advanced Feature allows you to set the **lowest** note the Upper Manual Drawbars will play. The data chart below shows the options you may select.

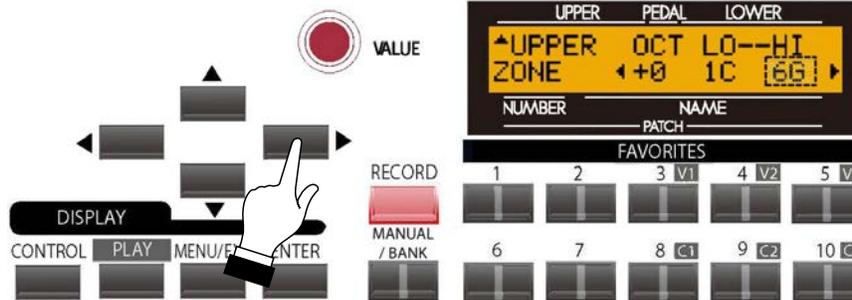
DRAWBAR ZONE - Lower Limit Options - Upper Manual
Options
1C ~ 6C

Turn the VALUE Rotary Control to the **right** to **increase** the number and move the lower limit farther **right**.

Turn the VALUE Rotary Control to the **left** to **decrease** the number and move the lower limit farther **left**.

NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The number underneath the letters “HI” should now be blinking.



Drawbar Zone - Upper Limit - Upper Manual

This Advanced Feature allows you to set the **lowest** note the Upper Manual Drawbars will play. The data chart below shows the options you may select.

DRAWBAR ZONE - Upper Limit Options - Upper Manual	
Options	
1C ~ 6C	

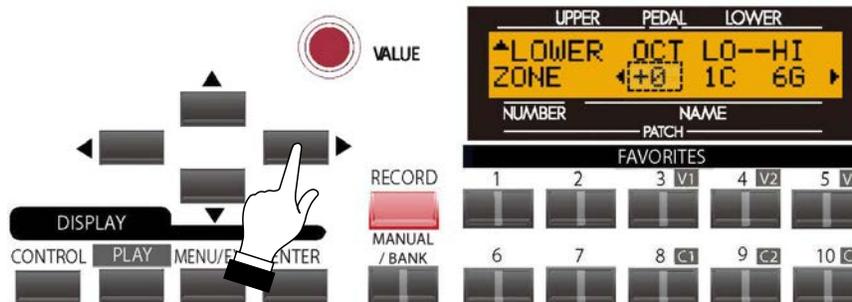
Turn the VALUE Rotary Control to the **right** to **increase** the number and move the lower limit farther **right**.

Turn the VALUE Rotary Control to the **left** to **decrease** the number and move the lower limit farther **left**.

NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

DRAWBAR Edit Menu L&U - Page 4 - LOWER

From the previous screen, touch the **PAGE RIGHT Touch Button** once Page 3 of the DRAWBAR Edit Menu should now display. The Information Center Display should now look like this:



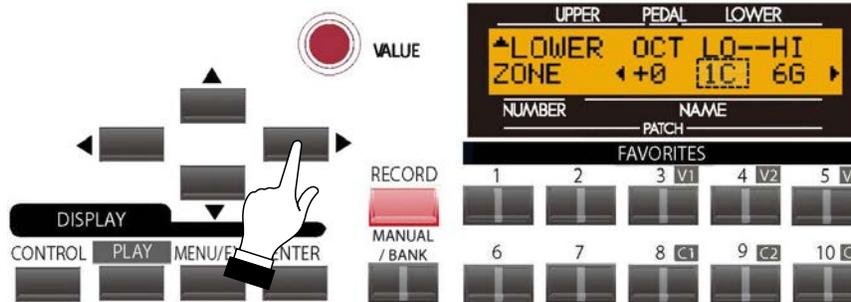
Drawbar Octave - Lower

This Advanced Feature allows you to select the Octave range in which the Lower Manual Drawbars will play. You can select “-2” (the sound is two octaves below the regular pitch), “-1” (the sound is one octave below the regular pitch), “+0” (the sound is at normal pitch), “+1” (the sound is one octave above the regular pitch) or “+2” (the sound is two octaves above the regular pitch),

Turn the VALUE Rotary Control to the **right** to **raise** the Octave.

Turn the VALUE Rotary Control to the **left** to **lower** the Octave.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The number underneath the letters “LO” should now be blinking.



Drawbar Zone - Lower Limit - Lower Manual

This Advanced Feature allows you to set the **lowest** note the Lower Manual Drawbars will play. The data chart below shows the options you may select.

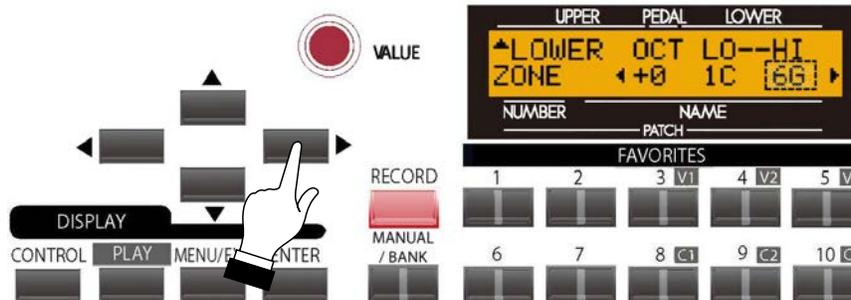
DRAWBAR ZONE - Lower Limit Options - Lower Manual	
Options	
1C ~ 6C	

Turn the VALUE Rotary Control to the **right** to move the lower limit farther **right**.

Turn the VALUE Rotary Control to the **left** to move the lower limit farther **left**.

NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The number underneath the letters “HI” should now be blinking.



Drawbar Zone - Upper Limit - Lower Manual

This Advanced Feature allows you to set the **lowest** note the Lower Manual Drawbars will play. The data chart below shows the options you may select.

DRAWBAR ZONE - Upper Limit Options - Lower Manual	
Options	
1C ~ 6C	

Turn the VALUE Rotary Control to the **right** to move the lower limit farther **right**.

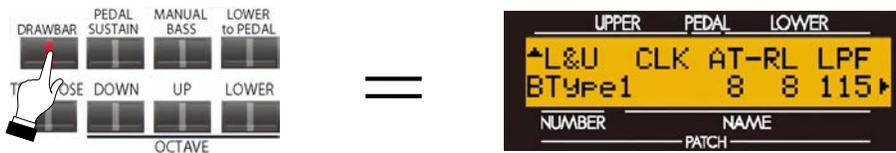
Turn the VALUE Rotary Control to the **left** to move the lower limit farther **left**.

NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

◆ DRAWBAR Edit Menu PEDAL

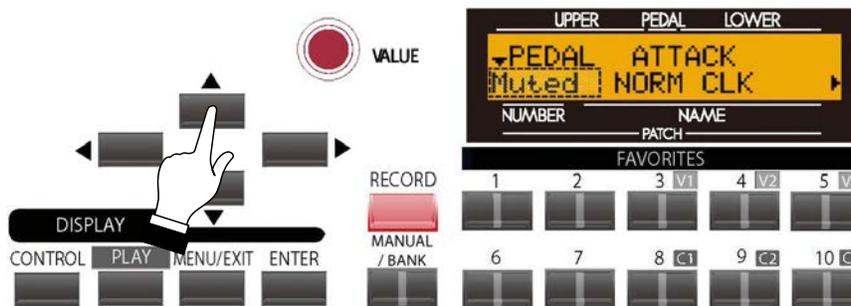
To access the Drawbar Edit Menu for the PEDAL Drawbar sounds, do the following:

1. Access the DRAWBAR Edit Menu. The quickest way to do this is to use the Shortcut shown below:



You are now in the DRAWBAR Edit Menu.

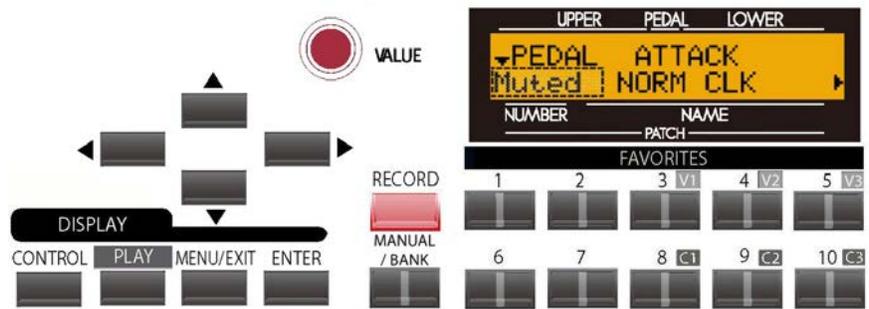
3. Now touch the PAGE UP Touch Button once. The Information Center Display should now look similar to this:



You may now use the PAGE NAVIGATION Touch Buttons in conjunction with the VALUE Rotary Control to make changes to the characteristics of the Pedal Drawbars. These changes are explained starting on the next page.

If you followed the steps described on the previous page to get to the screen shown below, the word underneath the word “PEDAL” should be blinking. If it is not, touch the PAGE LEFT Touch Button repeatedly until it is.

DRAWBAR Edit Menu PEDAL - Page 1 - Pedal Voicing



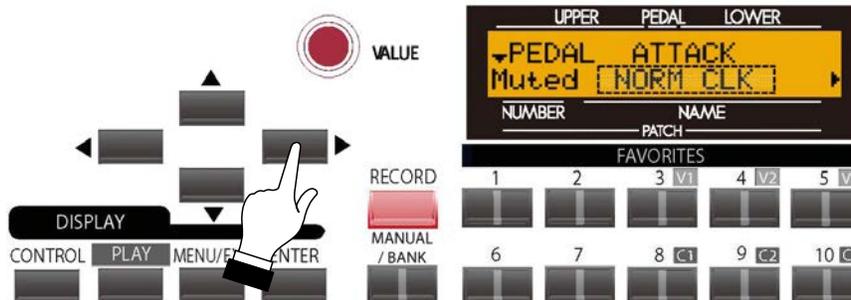
This Advanced Feature allows you to change the overall sound of the Pedal Drawbar tones. The data chart below shows the options you may select.

PEDAL DRAWBAR VOICING Options	
Description	Function
Norm	The Pedal voicing of a vintage Hammond Organ.
Muted	Very mellow Pedal tones.
Synth1	A sawtooth waveform with a “wow” type filter envelope.
Synth2	A dull square wave, or “clarinet” type sound.
Finger	Electric finger bass
Pick	Electric pick bass
Slap	Electric slap bass

Turn the VALUE Rotary Control to select the Pedal Voicing that you prefer.

DRAWBAR Edit Menu PEDAL - Page 1 - Pedal Attack/Key Click

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The words just underneath the word **“ATTACK”** should now be blinking.



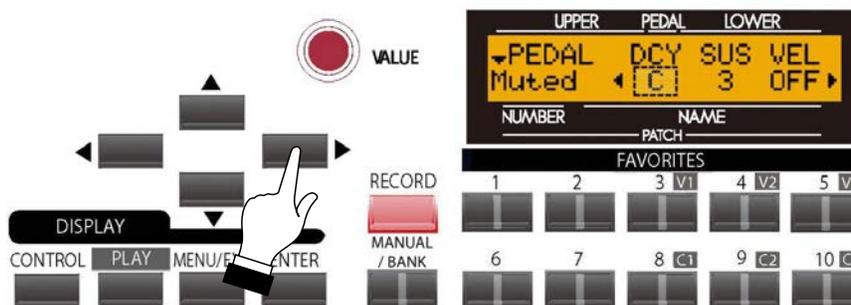
This Advanced Feature allows you to change the type of Attack for the Pedal tones that you prefer. The data chart below shows the options you may select.

DRAWBAR PEDAL ATTACK Options	
Description	Function
SLOW ATTK	No click and a slow attack.
NO CLK	An instant attack but no click.
SOFT CLK	An instant attack and a soft click.
NORM CLK	An instant attack and a normal amount of click.
MAX CLK	An instant attack and the maximum amount of click.

Turn the VALUE Rotary Control to select the Pedal Attack that you prefer.

DRAWBAR Edit Menu PEDAL - Page 2

From the previous screen, touch the **PAGE RIGHT Touch Button** once. Page 2 of the **DRAWBAR PEDAL Edit Menu** should now display. The legend just underneath the word **“DCY”** should now be blinking.

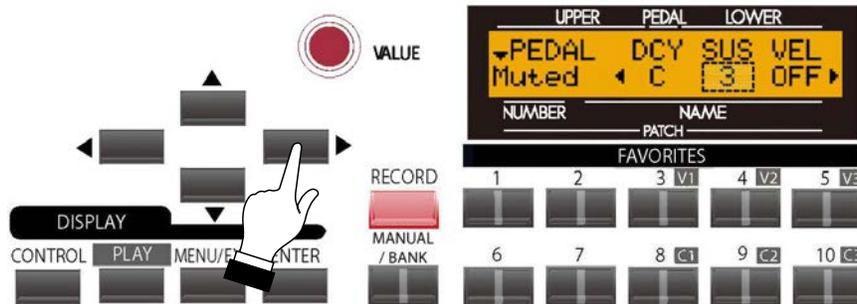


Pedal Decay

Using this Advanced Feature, you can select whether a Pedal note sounds continually or fades away while you are holding a Pedal down. You can select **“C”** (no decay - pedal sounds at the same volume for as long as it is held) or various lengths of Decay from **“1”** (shortest) to **“5”** (longest).

Turn the VALUE Rotary Control to select the Pedal Decay amount that you prefer.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend just underneath the word “**SUS**” should now be blinking.



Pedal Sustain

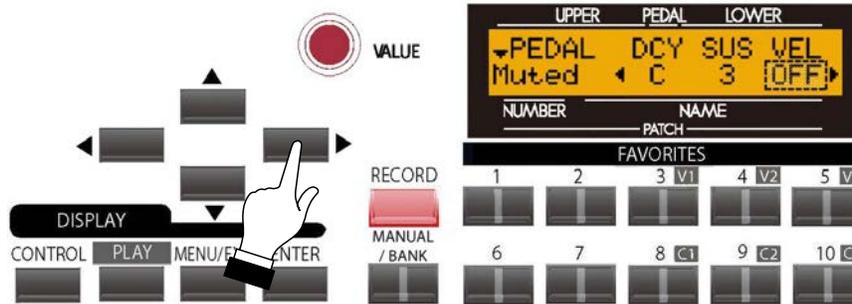
This Advanced Feature allows you to change the amount of Pedal Sustain, or length of time the Pedal note will continue to sound after the pedal is released. You can select from “1” (shortest) to “5” (longest).

Turn the VALUE Rotary Control to select the amount of Pedal Sustain that you prefer.

NOTE: The PEDAL SUSTAIN Touch Tab must be “ON” (LED lit) in order to enable this feature.

NOTE: You can access this Advanced Feature Menu Page directly by touching and holding the PEDAL SUSTAIN Touch Tab.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend just underneath the word **“VEL”** should now blink.



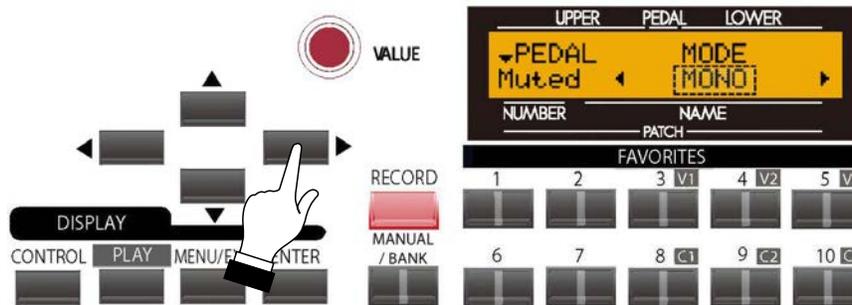
Pedal Velocity

This Advanced Feature allows you to determine how the notes will respond to key velocity. You can select “OF” or “off” (standard organ touch - the notes sound at the same volume regardless of a light or heavy key pressure) and “1 ~ 4”. “1” is the most exaggerated velocity curve while “4” is a gentler curve. “2” and “3” are curves in between.

Turn the VALUE Rotary Control to select the setting that you prefer.

DRAWBAR Edit Menu PEDAL - Page 3

From the previous screen, touch the **PAGE RIGHT Touch Button** once. Page 3 of the **DRAWBAR PEDAL Edit Menu** should now display. The legend just underneath the word **“MODE”** should now be blinking.



Pedal Mode - Polyphony

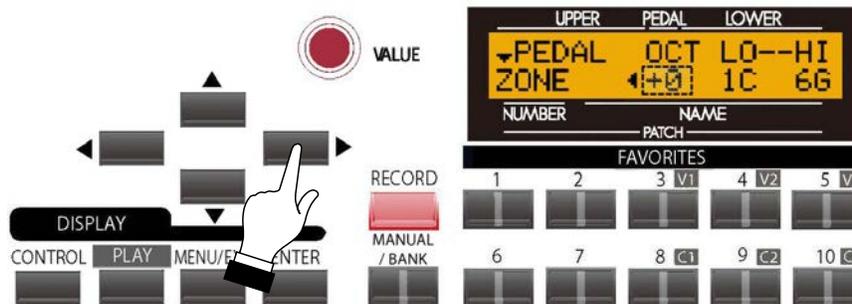
This Advanced Feature allows you to select the playing mode of the Pedals. The data chart below shows the options you may select.

Pedal Mode Options	
Description	Function
POLY	Polyphonic - more than one pedal note can sound at a time, as on a vintage organ.
MONO	Monophonic low-note select - if more than one pedal is played only the lowest note will sound.
LAST	Monophonic last-note select - if more than one pedal is played the last played note will sound.

Turn the VALUE Rotary Control to make your selection.

DRAWBAR Edit Menu PEDAL - Page 4

From the previous screen, touch the **PAGE RIGHT** Touch Button *once*. Page 4 of the **DRAWBAR PEDAL** Edit Menu should now display. The legend just underneath the word **“OCT”** should now be blinking.



Drawbar Octave - Pedals

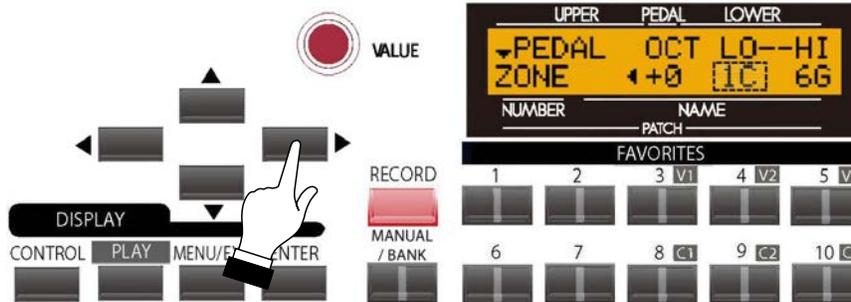
This Advanced Feature allows you to select the Octave range in which the Pedal Drawbars will play. The data chart below shows the options you may select.

Octave Options	
Description	Function
-2	The sound is two octaves below the regular pitch.
-1	The sound is one octave below the regular pitch.
0	The sound is at normal pitch.
+1	The sound is one octave above the regular pitch.
+2	The sound is two octaves above the regular pitch.

Turn the VALUE Rotary Control to the **right** to **raise** the Octave.

Turn the VALUE Rotary Control to the **left** to **lower** the Octave.

From the previous screen, touch the **PAGE RIGHT** Touch Button once. The number underneath the letters “LO” should now be blinking.



Drawbar Zone - Lower Limit - Pedals

This Advanced Feature allows you to set the **lowest** note the Pedal Drawbars will play. The data chart below shows the options you may select for your particular **SKX**.

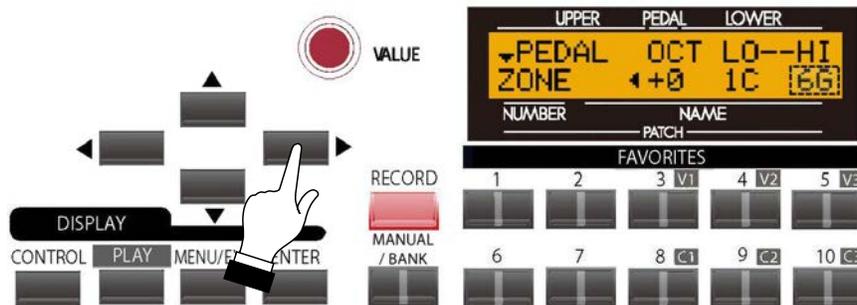
EXTRA VOICE ZONE - Lower Limit Options	
Options	
1C ~ 6C	

Turn the VALUE Rotary Control to the **right** to **increase** the number and move the lower limit farther to the **right**.

Turn the VALUE Rotary Control to the **left** to **decrease** the number and move the lower limit farther to the **left**.

NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

From the previous screen, touch the **PAGE RIGHT** Touch Button once. The number underneath the letters “HI” should now be blinking.



Drawbar Zone - Upper Limit - Pedals

This Advanced Feature allows you to set the **lowest** note the Pedal Drawbars will play. The data chart below shows the options you may select for your particular **SKX**.

EXTRA VOICE ZONE - Lower Limit Options	
Options	
1C ~ 6C	

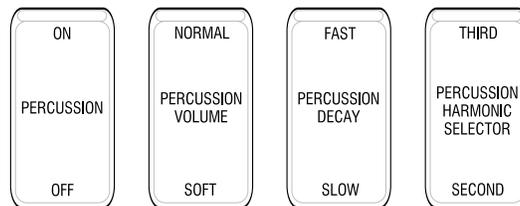
Turn the VALUE Rotary Control to the **right** to **increase** the number and move the lower limit farther to the **right**.

Turn the VALUE Rotary Control to the **left** to **decrease** the number and move the lower limit farther to the **left**.

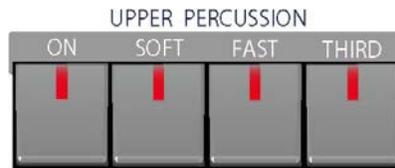
NOTE: The Upper Limit number **can not** be lower than the Lower Limit number.

◆ PERCUSSION - Touch-Response Percussion

An important component of the Hammond Sound is **Touch-Response Percussion Control**. On a vintage Hammond console organ, this feature is controlled by four tilting tablets on the extreme right of the control panel which look like this:



The PERCUSSION controls on the **SKX** consist of four separate Touch Tabs, located immediately to the right of the Drawbars, which control harmonic Percussion tones playable from the Upper Keyboard. They control all the same functions as the tilt tablets on a vintage Hammond.



IMPORTANT NOTE: To hear the tones produced by the Percussion Voice Touch Tabs, the keys of the Upper Keyboard normally must be played in a detached (non-Legato) manner. If you play a single note and then hold it down while playing other keys, the Percussion voice will not play again until you release all keys and again play detached notes.

ON

The tone for this harmonic is the same as the sound derived from the 4' Drawbar. Combining this Percussion tone with the Drawbars will produce bright and clear sounds.



SOFT

This control regulates the volume of the Percussion tone. When it is in its normal state (LED not lighted), the Percussion effect will be very prominent compared to the tones produced by the Drawbars. When this Touch Tab is "ON" (LED lighted) the Percussion effect is lower in volume or much less prominent.



FAST

When this Touch Tab is in its normal state (LED not lighted), the Percussion tone will decay (die away) slowly like a chime. When FAST is "ON" (LED lighted), the Percussion effect will decay rapidly like a xylophone or glockenspiel.



THIRD

This harmonic tone is the same one produced by the 2 2/3' Drawbar. Combining this Percussion tone with the Drawbars will produce powerful and heavy sounds.

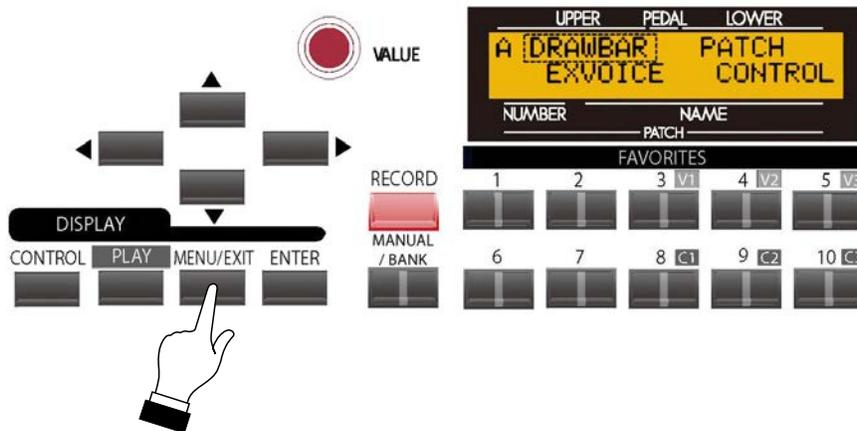


◆ PERCUSSION Edit Menu

This Advanced Feature Menu allows you to make various changes to the characteristics of the Percussion.

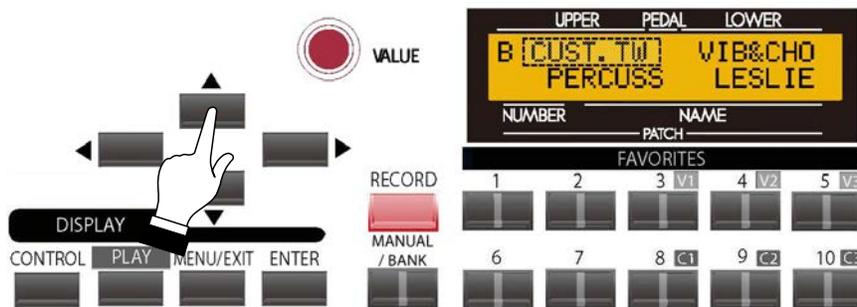
Accessing the PERCUSSION Edit Menu Using the MENU/EXIT Touch Button:

- From any of the PLAY Mode screens, touch the MENU/EXIT Touch Button **once**. The Information Center Display should now look like this:



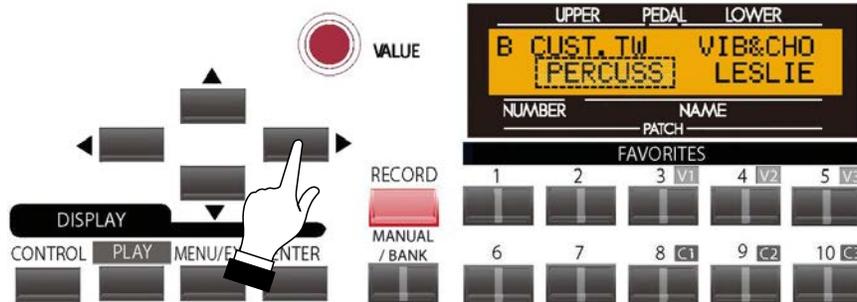
The word "DRAWBAR" should now be blinking.

- Touch the PAGE UP Touch Button **once**. The "B" screen of the MENU Mode will now display.



You will now see "CUST.TW" in the upper left corner of the Information Center Display, and it will be blinking.

3. Touch the PAGE RIGHT Touch Button. The word, “PERCUSS” will now blink.



4. Touch the ENTER Touch Button.

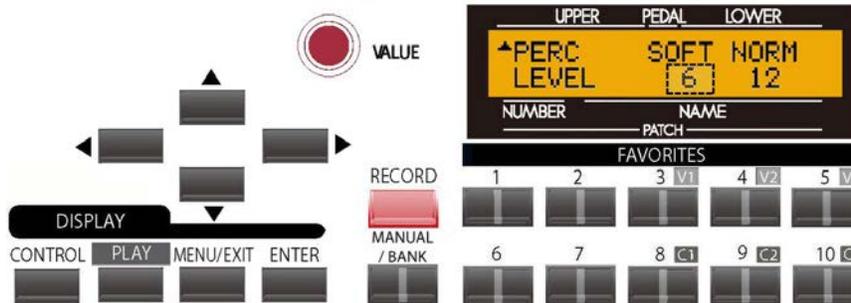
Accessing the PERCUSSION Edit Menu Using the Shortcut:

Touch and hold any of the four PERCUSSION Touch Tabs. After approximately 1 second, you will see the screen shown on the next page.

You are now in the PERCUSSION Edit Page. You may now use the PAGE NAVIGATION Touch Buttons in conjunction with the VALUE Rotary Control to make various changes to the Percussion. These changes are explained starting on the next page.

If you followed the instructions on the previous page, you should now see Page 1 of the PERCUSSION Edit Menu. The number underneath the word “SOFT” should now be blinking.

Percussion Edit Page 1 - Percussion Level



This Advanced Feature allows you to set the overall volume level of the Percussion tones. This will allow you to balance the amount of "normal" and "soft" Percussion sound (the choices provided by the Touch Tabs) with the sound produced by the Drawbars. You can set the levels separately for the “SOFT “ and “NORM” (normal) Percussion Touch Tab settings.

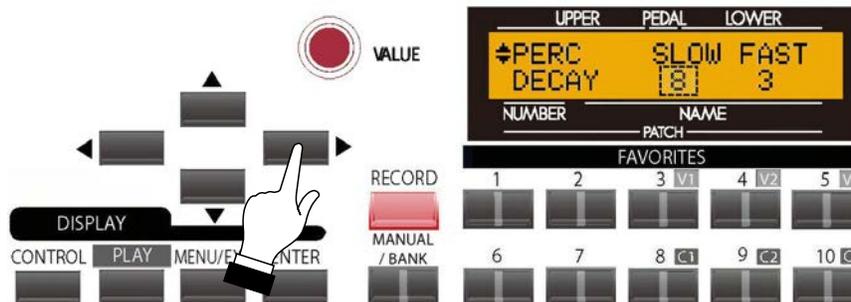
Use the PAGE LEFT and PAGE RIGHT Touch Buttons to select either “SOFT” or “NORM” (Normal). When you have made your selection:

Turn the VALUE Rotary Control to the **right** to **increase** the level.

Turn the VALUE Rotary Control to the **left** to **decrease** the level.

Percussion Edit Page 2 - Percussion Decay

From the previous screen, touch the PAGE RIGHT Touch Button until Page 2 of the Percussion Edit Menu displays. The number underneath the word “SLOW” should now be blinking.



This Advanced Feature allows you to set the overall decay (the rate at which the Percussion tone dies away while a key is held) of the Percussion tones. You can adjust the “SLOW” and “FAST” decay amounts separately so as to customize the Percussion Decay to your liking.

IMPORTANT NOTE: This Advanced Feature replicates the PERCUSSION CUTOFF control found on the preamp of a vintage Hammond Organ.

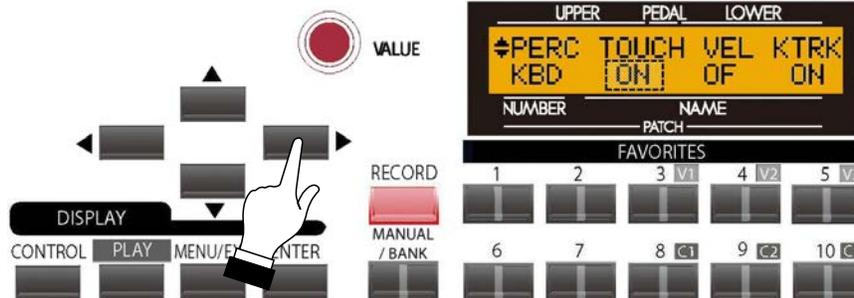
Use the PAGE LEFT and PAGE RIGHT Touch Buttons to select either “SLOW” or “FAST.” When you have made your selection:

Turn the VALUE Rotary Control to the **right** to **lengthen** the Decay.

Turn the VALUE Rotary Control to the **left** to **shorten** the Decay.

Percussion Edit Page 3

From the previous screen, touch the **PAGE RIGHT Touch Button** once. Page 3 of the **PERCUSSION Edit Menu** should now display. The letters underneath the word **“TOUCH”** should now be blinking.



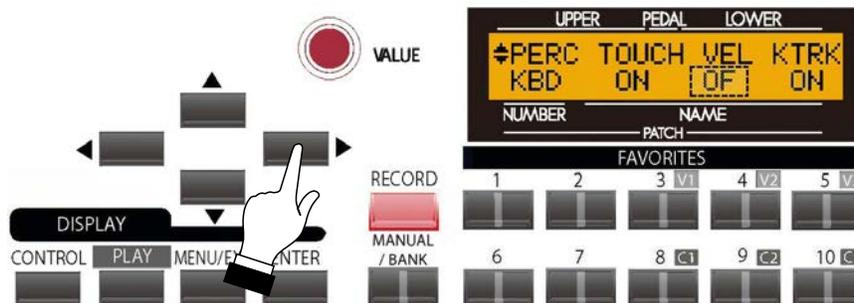
Percussion Touch

This Advanced Feature allows you to turn "ON" or "OFF" the Percussion Touch-Response. When turned "ON" Percussion tones will sound only if you play the keys in a detached manner (non-legato). Any degree of detachment is sufficient. This replicates the Touch-Response Percussion function on the original models B-3, C-3, RT-3 or A-100. When turned "OFF," each key will sound when played regardless of whether other keys are being held. This replicates the Percussion function on the X-66, Concorde and later model Hammond Organs.

Turn the VALUE Rotary Control to turn Percussion Touch "ON" or "OFF."

Percussion Velocity Sensitivity

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The letters underneath the word **“VEL”** should now be blinking.



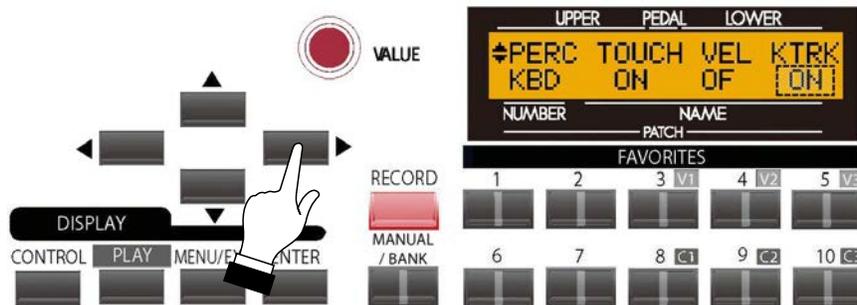
When turned "ON," the volume of the Percussion tone is controlled by how fast keys are played. The faster keys are played, the louder the Percussion sounds. The more slowly keys are played, the softer the Percussion sounds. When turned "OFF," each key will sound at the same volume level when played.

Turn the VALUE Rotary Control to turn Percussion Velocity Sensitivity "ON" or "OFF."

NOTE: Although vintage Hammond Organs do not have this feature, a player more accustomed to a piano touch may want to try this feature, and may find the Touch-Response Percussion somewhat easier to use.

Percussion Key Tracking

*From the previous screen, touch the **PAGE RIGHT** Touch Button once. The letters underneath the word “KTRK” should now be blinking.*

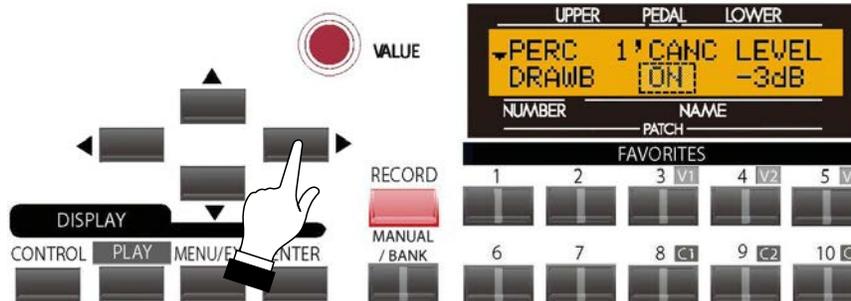


On the original Hammond Organs with Touch-Response Percussion Control, such as the B-3, C-3, RT-3 and A-100, the Percussion sounds would taper off slightly at higher frequencies. This Advanced Feature is designed to replicate this characteristic of the Percussion.

Turn the **VALUE** Rotary Control to turn Percussion Velocity Key Tracking "ON" or "OFF."

Percussion Edit Page 4

From the previous screen, touch the **PAGE RIGHT** Touch Button repeatedly until Page 4 of the **PERCUSSION** Edit Menu displays. The Information Center Display should now look like this:



The letters underneath the word **"1'CANC"** should now be blinking.

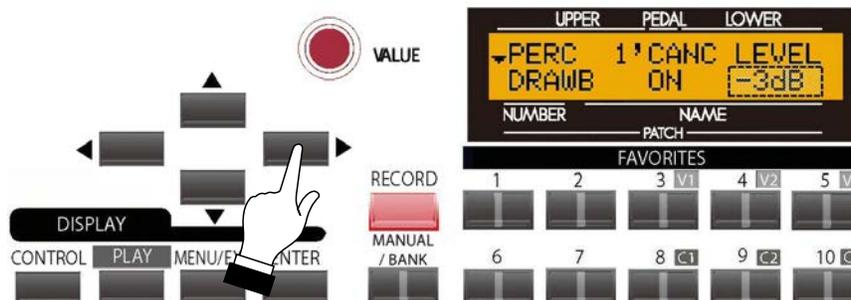
Percussion Drawbar Cancel

When Percussion Drawbar Cancel is turned "ON," the 8th harmonic Drawbar will be canceled when Percussion is "ON". This replicates the original Hammond Organs with Touch-Response Percussion Control, such as the B-3, C-3, RT-3 and A-100 series. When this feature is turned "OFF," the 8th harmonic Drawbar (1') will continue to sound while Percussion is "ON". This replicates later Hammond Organs with Percussion.

Turn the **VALUE** Rotary Control to turn Percussion Drawbar Cancel "ON" or "OFF."

Percussion Drawbar Level

From the previous screen, touch the **PAGE RIGHT** Touch Button once. The letters underneath the word **"LEVEL"** should now be blinking.



The legend underneath the word **"LEVEL"** should now be blinking.

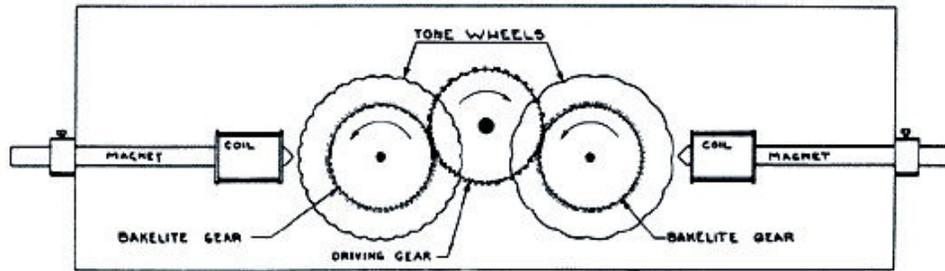
This Advanced Feature allows you to set the Drawbar Level when Percussion is "ON" at normal volume (SOFT Touch Tab "OFF"). When **"-3db"** is chosen, the Drawbars will be reduced by -3db (-3 decibels) in loudness when Percussion is "ON" at normal volume. This replicates the original Hammond Organs with Touch-Response Percussion Control. When **"0db"** is chosen, the volume of the Drawbars will stay at the same level, or "0db," when Percussion is "ON" at normal volume.

Turn the **VALUE** Rotary Control to select either "-3db" or "0db."

NOTE: A "decibel" is a unit of measurement for the loudness of a sound wave.

◆ What Are “Tone Wheels?”

Tone Wheels (or “phonic wheels”) are the method by which vintage Hammond Organs generate tone. Each individual frequency is generated by a steel disk $1\frac{7}{8}$ " in diameter and containing a number of high and low points called **teeth** on its outer edge. (See the illustration below.) These disks are the Tone Wheels. The most common tone-wheel generator has a total of 96 tone wheels. In order to generate all the different frequencies, the tone wheels have different numbers of teeth - some wheels have 2 teeth, others have 4 teeth, others have 8, 16, 32, 64, 128, up to 192 teeth. On a B-3-type organ, only 91 of the 96 wheels generate musical notes - five of the wheels are blanks, or wheels having no teeth, to maintain balance. On later Hammond models such as the H-100 and X-77-series, the last 5 tone wheels are cut with 256 teeth, allowing them to play frequencies 91 through 96.



Notice in the drawing above that the tone wheels are placed so that they rotate next to magnetized rods. Each rod has a small coil of wire wrapped around one end. The tip of the magnet at the coil end is ground to a sharp edge and mounted near the edge of the tone wheel. Every tone wheel that produces a note has a magnet associated with it.

Notice also that the tone wheels are geared together. A constant-speed motor drives the gears which in turn cause the tone wheels to rotate. As the wheels rotate they do not touch the magnets, but pass very close to them. Each time a high spot passes the magnet, it generates a very small electrical current in the coil.

The number of high spots or teeth passing the magnet each second determines the musical note produced. If, for example, 440 teeth pass the magnet each second, 440 electrical impulses will be generated which, when converted into sound with a speaker, will sound the note, “A-440.”

After going through a number of other processes, the electrical impulses finally reach the amplifier, which strengthens them enough to drive a speaker system, which in turn converts the electrical signal into audible tone. It is this audible tone which is heard as the “Hammond Sound.”

What is “Leakage?”

As explained above, each tone wheel rotates next to a magnet, making a total of 91 or 96 magnets, one for each tone wheel. The tone wheels are mounted in separate bins in order to isolate them from each other and prevent the magnets from intercepting frequencies from neighboring wheels; however, a small amount of current may still “leak” through, producing a phenomenon called **Leakage**. Leakage is usually heard as a “hash” type sound consisting of many frequencies sounding at once. The phenomenon can be thought of as similar to white noise but with somewhat more definition, with individual pitches more discernable. A properly calibrated B-3 will have a minimum of this effect; however, an instrument which has been subjected to hard use over a period of time may exhibit more leakage noise.

What Is “Motor Noise?”

The tone-wheel generator is secured to the console by means of four bolts. These bolts have reversible sleeves which can be positioned so that the entire tone-wheel generator can be suspended inside the console to keep vibration to a minimum and to prevent the console from amplifying the noise made by the synchronous motor. However, when moving the organ, these bolts can be reversed to secure the generator directly to the console shelf to prevent damage. The organ can be operated with the generator either suspended or bolted down; however, when the generator is bolted down, more motor noise will be heard.

◆ Creating your own Custom Tone Wheels

As stated on page 11, the first three Drawbar Voice Modes - “B-type1,” “B-type2,” and “Mellow” - are designed to reproduce the sound of traditional Hammond Organs. Within each of these three Voice Modes are four different settings designed to reproduce specific characteristics of vintage Hammond Organs.

During the time the vintage Hammonds - B-models, C-models, A-100, etc. - were being manufactured, each individual organ was subjected to a very rigorous series of checks and tests to insure the quality of each unit, and to insure that all the units representing a particular model series, such as the B-3, all sounded alike. However, since the very newest B-3-type organ is at least 37 years old - production of tone-wheel organs having ceased in 1975 - and since the vintage instruments long antedate digital technology, they are dependent for their sound on analog components. Several factors such as the rate at which different components age, the fact that similar components used different materials throughout the lifespan of the model series, etc. may affect the sound of a particular unit. Thus, a B-3 manufactured in 1959 may well have a slightly different tone than one made in 1969, not necessarily because of the year but because of slight differences in component values among other factors.

Over the years, a great deal of arcane folklore - a great deal of it falling into a category best described as “old wives’ fables” - has sprung up regarding such topics as the superiority or inferiority of this or that period of time during which vintage Hammonds were manufactured, the superiority or inferiority of types of materials for certain components, etc. Some of these differences do exist, but as noted above, they are more likely to be the result of factors not necessarily having anything to do with the age of the instrument. Many characteristics of the Hammond Organ, especially as heard in much jazz and rock music, have to do with the overall condition of the instrument - whether it has been in a home for the bulk of its life and played only rarely, whether it has been used by a touring musical ensemble and been moved frequently, perhaps even dropped occasionally, or even whether it has sat in a recording studio with sporadic or no maintenance, etc.

Because of these many factors - again, some real, some contrived - and because different people therefore mean different things when they say “Hammond Sound” or “B-3 Sound,” the Custom Tone Wheel feature is included to allow you to find the nearest approximation of what you want your “Hammond Sound” to be. The following pages will explain the feature in more depth.

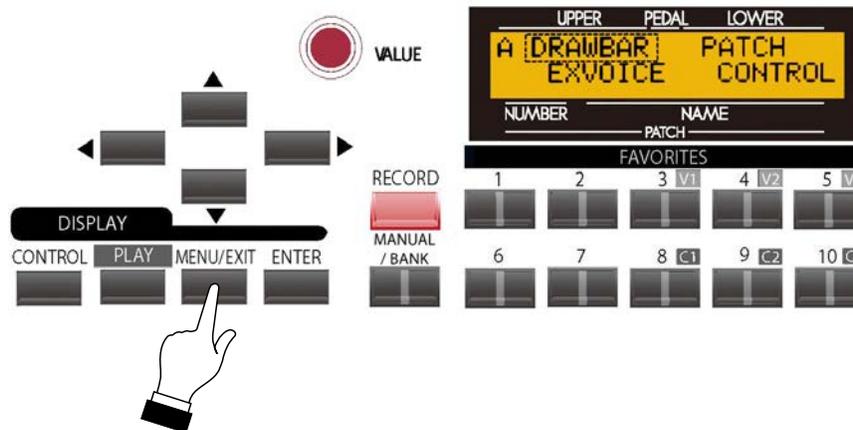
SPECIAL NOTE: The characteristics of Drawbar Voice Types “Btype1” and Btype2” apply equally to all Hammond Organs based on the B-3 design, which includes models B-3, C-3, A-100 series, RT-3 and D-100 series. Contrary to popular myth, there is NO inherent difference between a B-3 and a C-3 - they were manufactured to the identical specification except for the cabinet design. The A-100 and D-100 had slightly different circuitry due to the need to drive self-contained speakers; however, they were calibrated the same as the B-3 and C-3 so that they sounded identical when connected to either an external Hammond speaker or an external Leslie Speaker. For the sake of brevity, “B-3” will be used to refer to all models based on the same platform.

◆ CUSTOM TONE WHEEL Edit Menu

This Advanced Feature Menu allows you to select from among a library of different Tone Wheel settings so that each of the three Tone Wheel Drawbar Voicings - “Btype1,” “Btype2,” and “Mellow” - will have the sound you want, as well as create your own Custom Tone Wheels.

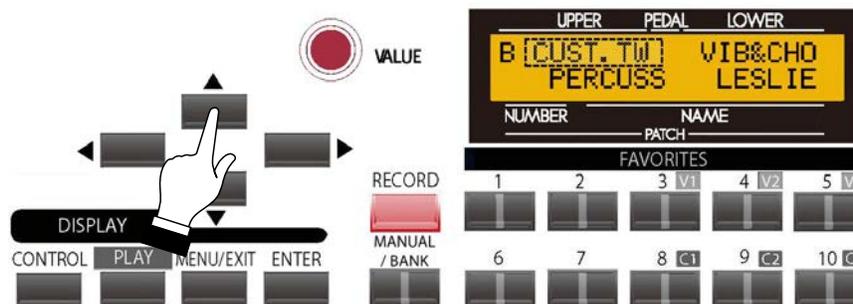
To access the CUSTOM TONE WHEEL Edit Menu, do the following:

1. From any of the PLAY Mode screens, touch the MENU/EXIT Touch Button **once**. The Information Center Display should now look like this:



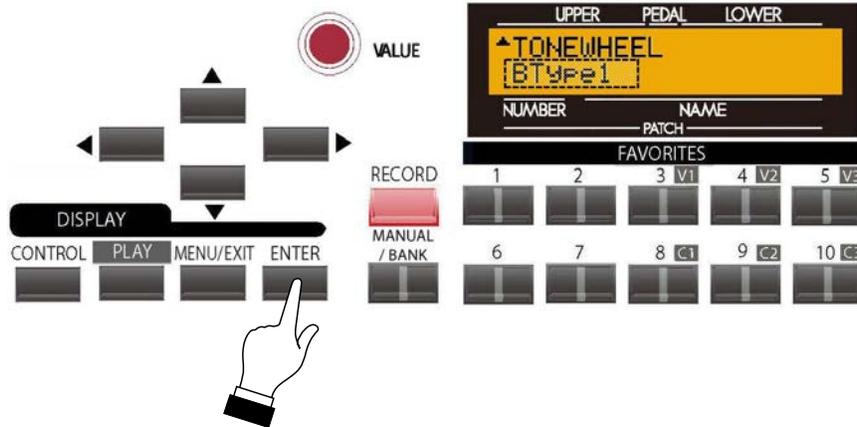
The word “DRAWBAR” should now be blinking.

2. From the A Screen, touch the PAGE UP “▶” Touch Button **once**. The Information Center Display should look like this for the B Screen of the Menu Mode:



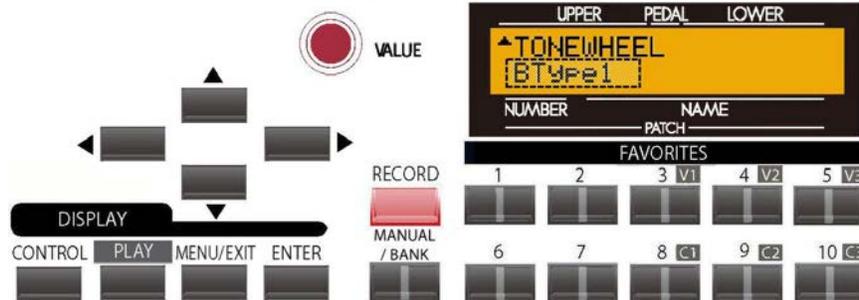
The word “CUST.TW” should now be blinking.

3. Touch the ENTER Touch Button **once**. The Information Center Display should now look like this:



You are now in the CUSTOM TONE WHEEL Edit Menu. You may now use the PAGE NAVIGATION Touch Buttons in conjunction with the VALUE Rotary Control to create Custom Tone Wheels. These changes are explained starting on the next page.

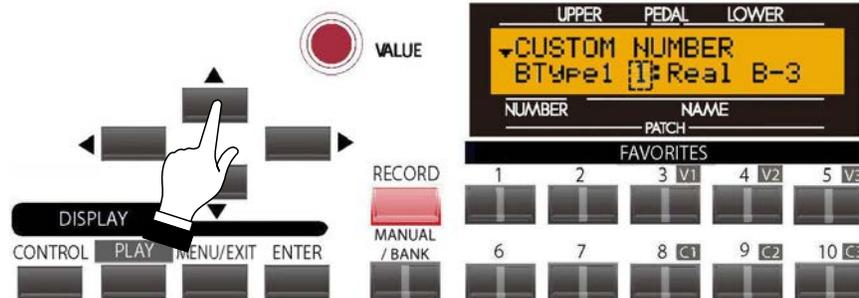
If you followed the instructions on the previous page, you should now see Page 1 of the CUSTOM TONE WHEEL Edit Menu. The legend underneath the word "TONEWHEEL" should now be blinking.



CUSTOM TONE WHEEL Edit Menu - Voicing Type

Use the VALUE Rotary Control to select "Btyp1," "Btype2" or "Mellow."

- After you have made your selection, touch the PAGE UP Touch Button to access the choices for the selected Drawbar Voicing Type:



CUSTOM TONE WHEEL Edit Menu - Voicing Presets

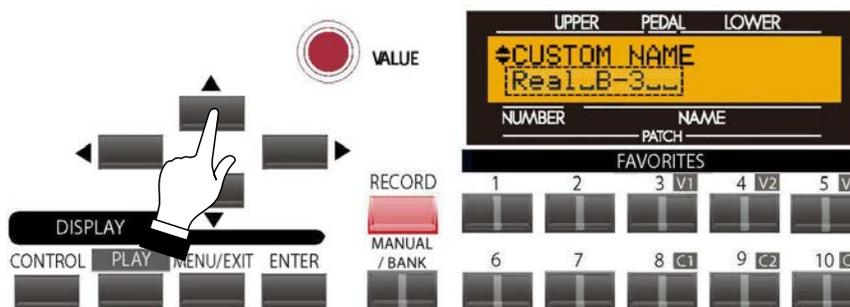
There are four choices available for "Btype1" and "Btype2:"

- "Real B-3" - Replicates a B-3 in good condition. Contains moderate motor hum and leakage noise.
- "80's Clean" - Based upon a very "clean"-sounding B-3. The motor hum or leakage noise has been removed, the "vibration" caused by the wow-flutter of the motor remains.
- "Noisy" - Similar to "Real B-3, but with more motor hum and leakage noise.
- "Noisy 60" - Similar to "Noisy," but with more leakage noise.

There are also four choices of sound for the "Mellow" setting:

- "Full Flats" - Pure sine waves, with all frequencies sounding at the same volume.
- "Husky" - Pure sine waves, but with a slight bass and mid-frequency boost.
- "Flute Lead" - Pure sine waves, but with reduced bass and treble, the opposite of "Husky".
- "Cheap Tr.s" - Reduced bass response, producing a sound similar to low-grade AM radio.

From the previous screen, touch the PAGE UP Touch Button once. Page 2 of the CUSTOM TONE WHEEL Edit Menu should now display. The Information Center Display should look similar to this:



CUSTOM TONE WHEEL Edit Menu - CUSTOM NAME

This Advanced Feature allows you to name a Custom Tone Wheel setting. This would normally be the final step after you have made the rest of your parameter settings and are satisfied with the results. You should have also saved your settings.

NOTE: Naming a Custom Tone Wheel is covered in more detail on page 39.

Use the PAGE LEFT and PAGE RIGHT Select Touch Buttons to select the character to be edited.

Turn the VALUE Rotary Control to the **right** to scroll **forward** through the characters.

Turn the VALUE Rotary Control to the **left** to scroll **backward** through the characters.

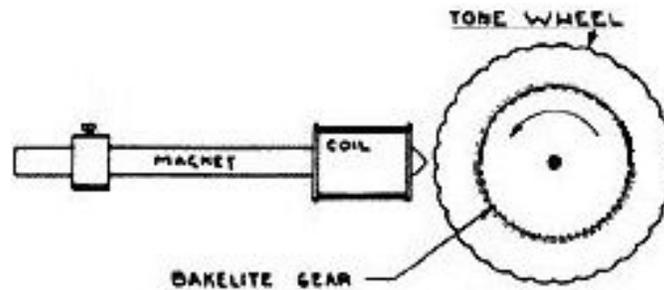
The available characters include: Punctuation Marks (space - . ' &), Numeric Characters (0~9), Upper-case Letters ("A ~ Z"), and Lower-case Letters ("a ~ z").

CUSTOM TONE WHEEL Edit Menu - WHEEL

This Advanced Feature Menu Page allows you to change of the characteristics of all 96 tone wheels individually.

What Is “Generator Calibration?”

Because each frequency on a Hammond Organ is generated independently and the circuitry and hardware necessary to generate each tone is quite complex, there is the potential for a great deal of variation in sound from one frequency to another.



The above diagram shows how a single frequency is generated. As explained on page 25, there is one tone wheel for each frequency. The number of tone wheels which generate actual frequencies varies with the model. Organs based on the original Hammond design - the model A and its derivatives (B-3, C-3, etc.) had 91 tone wheels that sound, while later models such as the “H” series and the X-77 had 96 (the extra five tone wheels being used to generate higher frequencies).

As explained previously, each tone has a magnetized rod associated with it. When the tone wheels rotate, a very small electrical current is generated in the coil each time a high spot passes the magnet. The strength of the current determines the loudness of the resulting musical note.

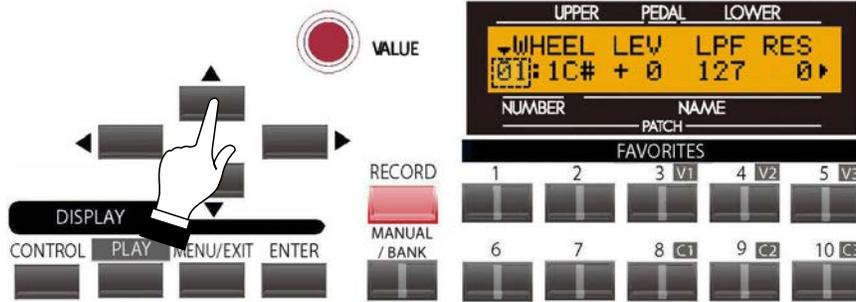
At the Hammond tone-wheel factory, the distance of each magnet to each tone wheel - as well as the number of windings for each coil - was very carefully controlled to insure that each frequency would play at the correct volume. In other words, the generator on each tone-wheel organ was very carefully **calibrated**. However, a number of third-party technicians would re-calibrate generators to change the sound in various ways - make the sound brighter, etc. The CUSTOM TONE WHEEL Advanced Feature Menu allows you to “re-calibrate” the digital tone wheels of your instrument to create exactly the tone quality you desire.

NOTE: In order to use this Advanced Feature, you should already have some idea of the type of sound you want. Also, you should be prepared that getting the results you want may require some “trial-and-error” before you are satisfied with the results.

Selecting a Tone Wheel to Edit

TRY THIS:

- From the previous screen (page 41), touch the PAGE UP Touch Button **once**. The Information Center Display should now look like this:



Shown above is Page 3 of the CUSTOM TONE WHEEL Edit Menu.

Notice that the number on the extreme left of the lower line is blinking. This number represents the currently selected Tone Wheel.

Using the VALUE Rotary Control to select Tone Wheels

Turning the VALUE Rotary Control will allow you to scroll through the Tone Wheels. You can select from “1” (“1C”) through “96” (“8B”). Simply turn the control until you find the number you want.

Using the Drawbars and Keyboard to select Tone Wheels

If you want to find a certain Tone Wheel quickly, you can use the Drawbars and the playing keys to select it.

Each individual Drawbar will play a different portion of the Tone Wheels. The data chart below shows how the Tone Wheels are allocated to each Drawbar

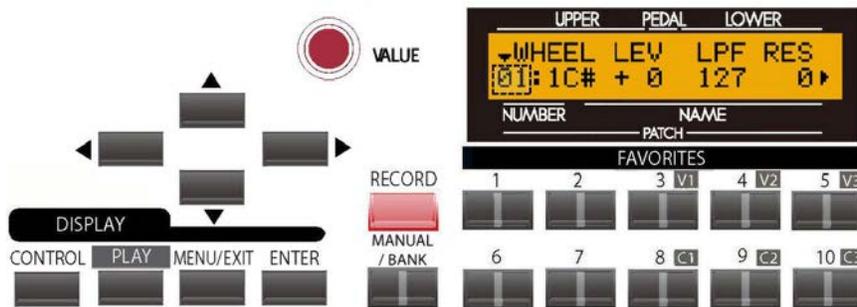
Drawbar Voice Options	
Drawbar	Tone Wheels
16'	+Wheels 1 ~ 61
5 1/3'	Wheels 20 ~ 80
8'	Wheels 13 ~ 73
4'	Wheels 25 ~ 85
2 2/3'	*Wheels 32 ~ 92
2'	*Wheels 37 ~ 96
1 3/5'	*Wheels 41 ~ 96
1 1/3'	*Wheels 44 ~ 96
1'	*Wheels 49 ~ 96

+ - The lower note limit of this Drawbar is determined by the Drawbar Foldback setting.

* - The upper note limit of this Drawbar is determined by the Drawbar Foldback setting.

TRY THIS:

1. Make sure all the Drawbars are “OFF” (pushed in).
2. Make sure the Information Center Display shows Screen 3 of the CUSTOM TONE WHEEL Edit Menu. The Information Center Display should look similar to this:



Notice that the number on the extreme left of the lower line is blinking. This number represents the currently selected Tone Wheel.

3. Pull out a Drawbar - for example, the first white (“8”) Drawbar. Notice that the number on the extreme left of the lower line has now changed, as has the note name.

When you pull out a Drawbar without touching any playing keys, the lowest note represented by that Drawbar will display.

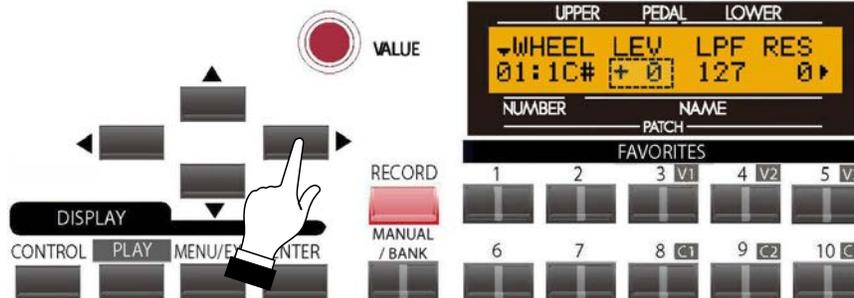
Now, suppose you want to select a specific Tone Wheel to edit. To do this:

4. Press and hold a note on the Upper Manual.
5. While holding down a key, move a Drawbar - for example, the first black ($2\frac{2}{3}$) Drawbar.

The number shown in the Information Center Display will be the number of the Tone Wheel associated with that key and that Drawbar. You can now edit the selected Tone Wheel.

After you have selected a Tone Wheel to edit, you can change the characteristics of that Tone Wheel. This is explained starting on the next page.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend underneath the word “LEV” should be blinking.



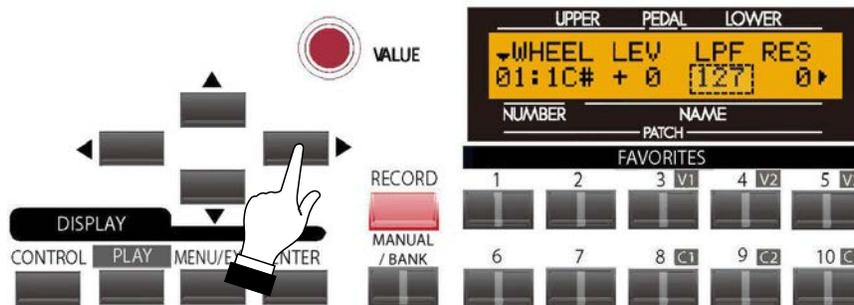
LEV - Tone Wheel Level

This Advanced Feature allows you to adjust the volume or level of the selected Tone Wheel. You can select from “-20” (lowest level) through “+2” (loudest level). The numbers represent **decibels**, or units of volume.

Turn the VALUE Rotary Control to the **right** to **increase** the level of the selected Tone Wheel.

Turn the VALUE Rotary Control to the **left** to **increase** the level of the selected Tone Wheel.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend underneath the word “LPF” should be blinking.



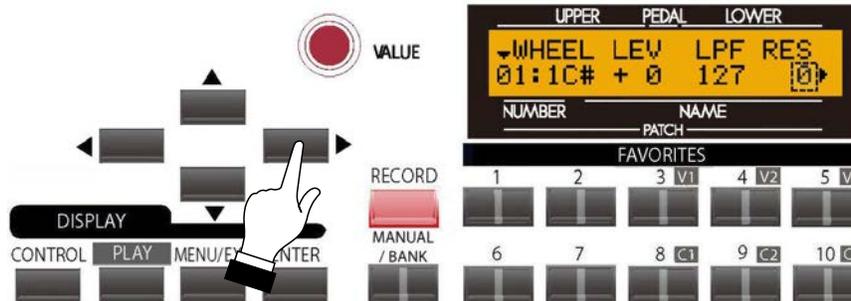
LPF - Low-Pass Filter

This Advanced Feature allows you to control the high-frequency content, including Leakage Noise, of the selected Tone Wheel. You can select from “0” (minimum number of high frequencies and only the fundamental of the Tone Wheel is heard) through “127” (maximum high-frequency content and Leakage).

Turn the VALUE Rotary Control to the **right** to **increase** the highs of the selected Tone Wheel.

Turn the VALUE Rotary Control to the **left** to **increase** the highs of the selected Tone Wheel.

From the previous screen, touch the PAGE RIGHT Touch Button once. The legend underneath the word “RES” should be blinking.



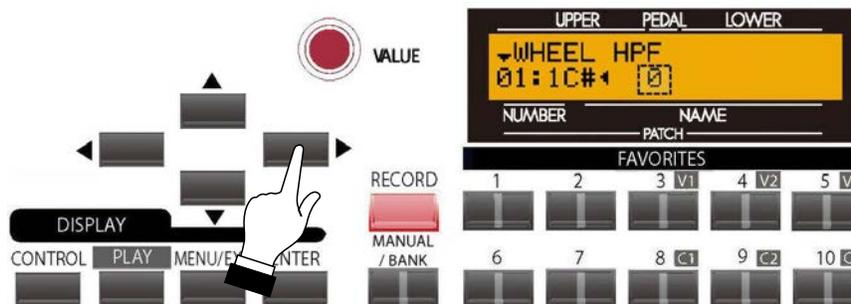
RES - Tone Wheel Resonance

This Advanced Feature allows you to adjust the level of the Low-Pass Filter (LPF). You can select from “0” (high frequencies at their lowest level) through “127” (high frequencies at their highest level).

Turn the VALUE Rotary Control to the **right** to **boost** the high frequencies.

Turn the VALUE Rotary Control to the **left** to **reduce** the high frequencies.

From the previous screen, touch the PAGE RIGHT Touch Button once. The legend underneath the word “HPF” should be blinking.



HPF - High-Pass Filter

This Advanced Feature allows you to adjust the level of the High-Pass Filter (HPF). You can select from “0” (low frequencies at their lowest level) through “127” (low frequencies at their highest level).

Turn the VALUE Rotary Control to the **right** to **boost** the low frequencies.

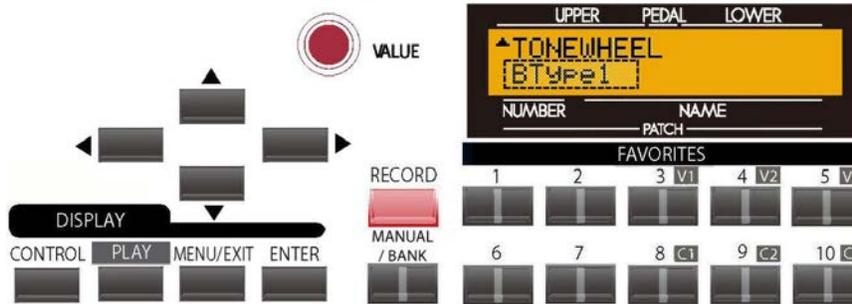
Turn the VALUE Rotary Control to the **left** to **reduce** the low frequencies.

IMPORTANT NOTE: If you change any of the Custom Tone Wheel settings, you **must** save them in order for them to be remembered. If the changes are not saved, they will be lost when power to the instrument is switched “OFF.”

Saving a Custom Tone Wheel

TRY THIS:

1. Access the CUSTOM TONE WHEEL Edit Menu using the procedure described on page 30. You should now see Page 1 of the CUSTOM TONE WHEEL Edit Menu.



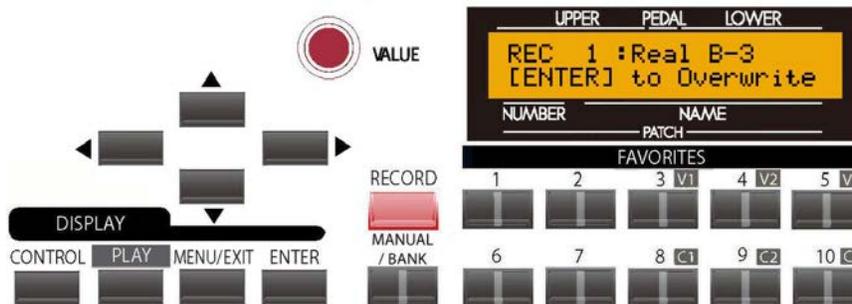
2. Use the VALUE Rotary Control to select the Custom Tone Wheel you want to modify.

SPECIAL NOTE: If you want to create a new Custom Tone Wheel, you can do so by using the VALUE Rotary Control to scroll past number “4.” If you do this you will see the number “5” and a blank name. In this way, you can create a Custom Tone Wheel without disturbing any of the preprogrammed Custom Tone Wheels. If, on the other hand, you want to make changes or modifications to the preset Custom Tone Wheels, select one of them before proceeding to step 3 below.

3. Make whatever changes you want to the editable parameters - Level, Resonance, etc.
4. After you have made all your edits and you have the sound you want, Touch and Release the RECORD Touch Button.



The Information Center Display should now look similar to this:



- If you DO NOT wish to save the parameters you have changed, touch the MENU/EXIT or PLAY Touch Button.

If you want to overwrite the Custom Tone Wheel with your new edited settings, touch the ENTER Touch Button. The bottom line of the Information Center Display will scroll the following:

Recording . . .

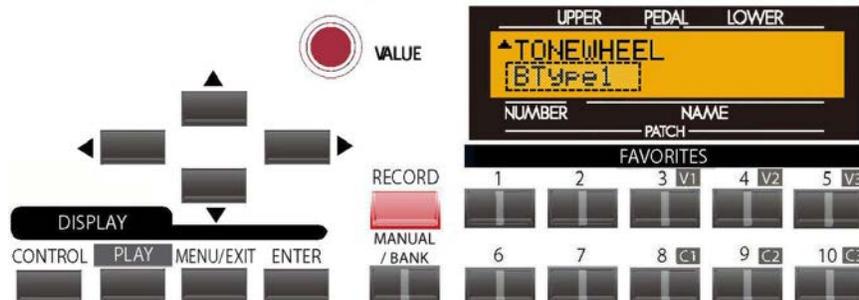
After the above stops scrolling, your edits have been saved.

IMPORTANT: It is recommended that you create and then save a Custom Tone Wheel before re-naming it. It is also recommended that you rename your Custom Tone Wheel after saving it.

Naming a Custom Tone Wheel

TRY THIS:

- Access the CUSTOM TONE WHEEL Edit Menu using the procedure described on page 32. You should now see Page 1 of the CUSTOM TONE WHEEL Edit Menu.



- Use the PAGE UP and PAGE DOWN Touch Buttons to select the Custom Tone Wheel you want to rename.
- After you have made your selection, Name your Custom Tone Wheel by doing the following:

Use the PAGE LEFT and PAGE RIGHT Select Touch Buttons to select the character to be edited.

Turn the VALUE Rotary Control to the **right** to scroll **forward** through the characters.

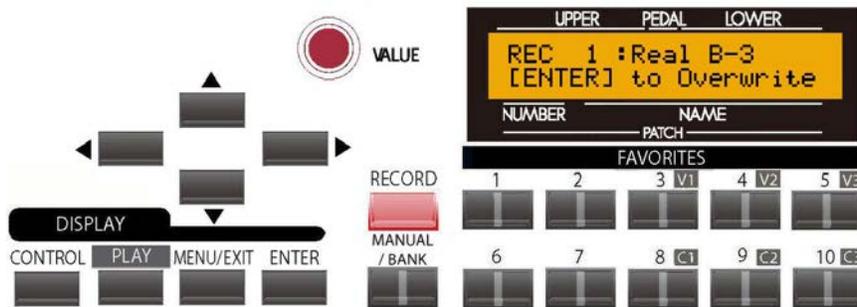
Turn the VALUE Rotary Control to the **left** to scroll **backward** through the characters.

The available characters include: Punctuation Marks (space - . ' &), Numeric Characters (0 ~ 9), Upper-case Letters ("A ~ Z"), and Lower-case Letters ("a ~ z").

- After you have finished editing, Touch and Release the RECORD Touch Button.



The Information Center Display should now look similar to this:



- If you DO NOT wish to save the parameters you have changed, touch the MENU/EXIT or PLAY Touch Button.

If you want to overwrite the Custom Tone Wheel with your new edited settings, touch the ENTER Touch Button. The bottom line of the Information Center Display will scroll the following:

Recording...

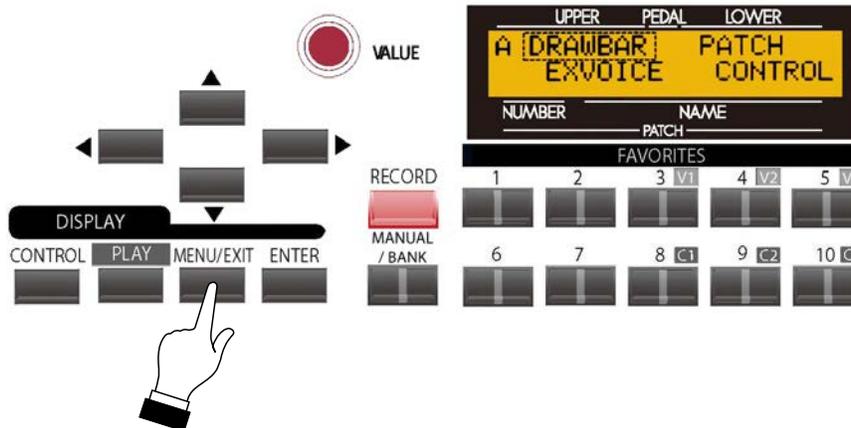
After the above steps scrolling, your Custom Tone Wheel has been renamed.

◆ Drawbar Organ Type

The Drawbars on the **SKX** can be made to control other organ sounds other than traditional Hammond Drawbars. Several makes of combo organs, for example, also used Drawbar-type slider controls to register the sounds, which were actual organ voices rather than individual harmonics as with Hammond Drawbars. This Advanced Feature allows you to use the Drawbars to control other types of organ sounds.

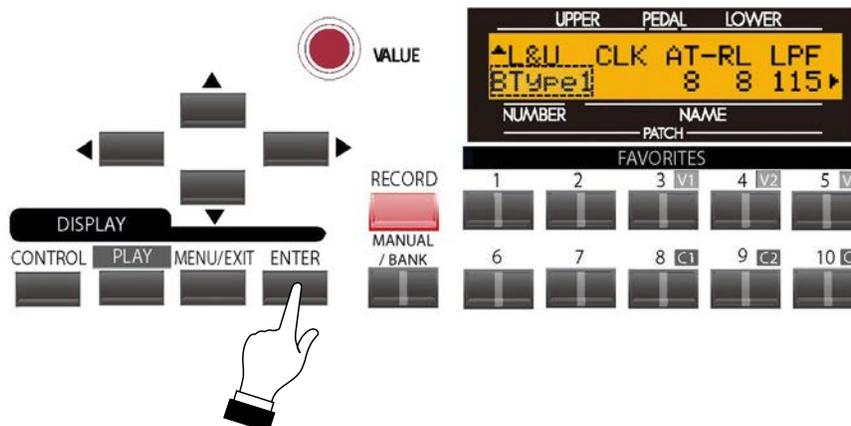
TRY THIS:

- From any of the PLAY Mode screens, touch the MENU/EXIT Touch Button **once**. The Information Center Display should now look like this:



The word “DRAWBAR” should now be blinking.

- Touch the ENTER Touch Button **once**. You will then be in the DRAWBAR Edit Menu, and the Information Center Display should now look like this:



Notice that the legend just underneath “L&U” is blinking.

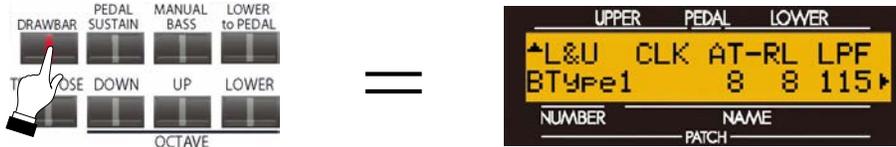
You can now turn the VALUE Rotary Control to select what type of organ sound will be associated with the Drawbars. The first three Drawbar Organ Types are traditional vintage Hammond, or “tone-wheel” settings. However, the last three organ types allow you to use the Drawbars to register other types of organ sounds. This is explained starting on the next page.

Drawbar Organ Type - “Vx”

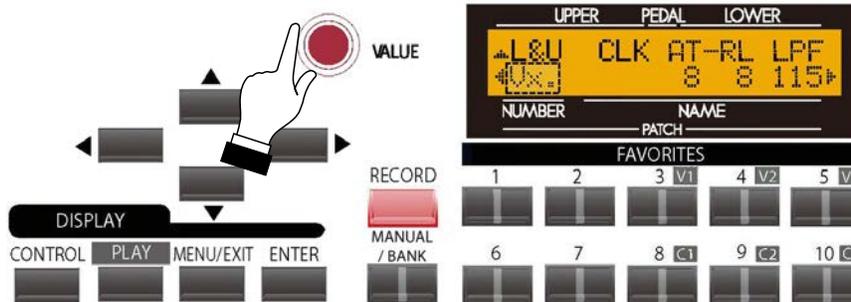
The “Vx” Drawbar Organ Type allows you to use the Drawbars to register the sound of a vintage British combo organ.

TRY THIS:

1. If you have not already done so, access the DRAWBAR Edit Menu. The quickest way to do this is to use the Shortcut shown below:



2. Turn the VALUE Rotary Control until the Information Center Display shows the following:



You may now use the Drawbars to control vintage combo organ tones. The figure below shows how the Drawbars are allocated in “Vx” mode.



The type of combo organ replicated by “Vx” mode had drawbar-type controls, but they functioned differently from Hammond Harmonic Drawbars. Organ. The first four Drawbars control individual pitches, while the next three are “Mixture” Drawbars which cause multiple pitches to sound. “II,” “III” and “IV” refer to the number of pitches represented by that Drawbar.

The last two Drawbars control the type of tone produced by the first seven Drawbars. The eighth Drawbar causes pure tones to sound while the last Drawbar causes brighter and more harmonically complex tones to sound.

NOTE: The first seven Drawbars WILL NOT sound unless one or both of the last two Drawbars are also “out.” These two Drawbars regulate the overall volume as well as timbre of the total Drawbar registration, and can be used separately or together.

Drawbar Organ Type - “Farf”

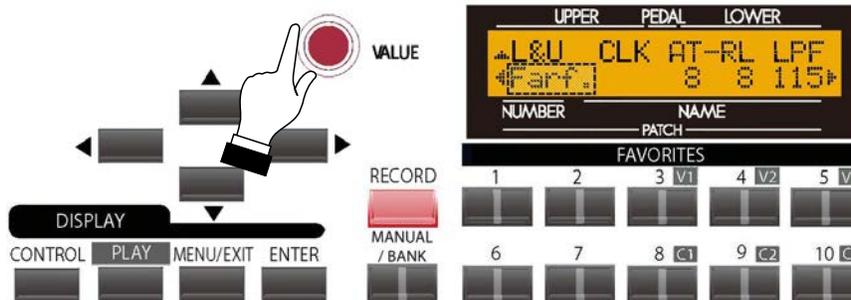
The “Farf” Drawbar Organ Type allows you to use the Drawbars to register the sound of a vintage Italian combo organ.

TRY THIS:

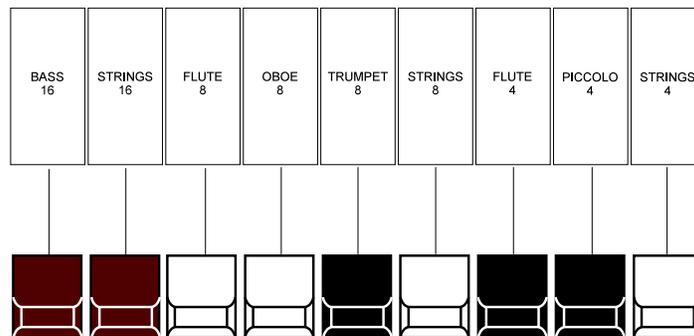
1. If you have not already done so, access the DRAWBAR Edit Menu. The quickest way to do this is to use the Shortcut shown below:



2. Turn the VALUE Rotary Control until the Information Center Display shows the following:



You may now use the Drawbars to control vintage combo organ tones. The figure below shows how the Drawbars are allocated in “Farf” mode.



The above configuration follows the layout of the “Combo Compact” series of combo organ, which used rocker-type tilt tablets rather than Drawbars to turn voices “ON” and “OFF.” On the SKX, the Drawbars are used to control the same sounds. To replicate the effect of tablets, simply pull the Drawbar(s) representing the tone(s) you want “out” all the way. Or, you can create shadings of tones by using the Drawbars in the more traditional fashion.

Drawbar Organ Type - “Pipe”

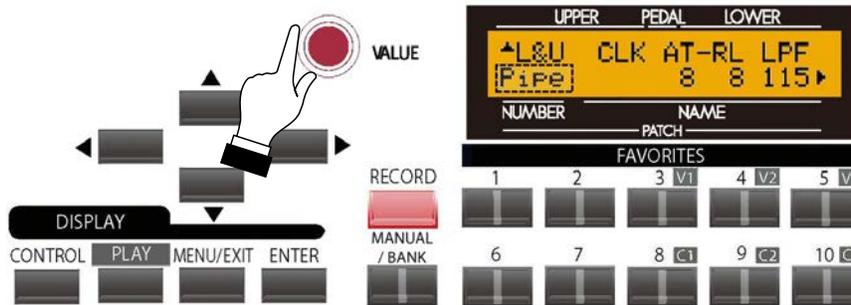
The “Pipe” Drawbar Organ Type allows you to use the Drawbars to register authentic pipe organ tones.

TRY THIS:

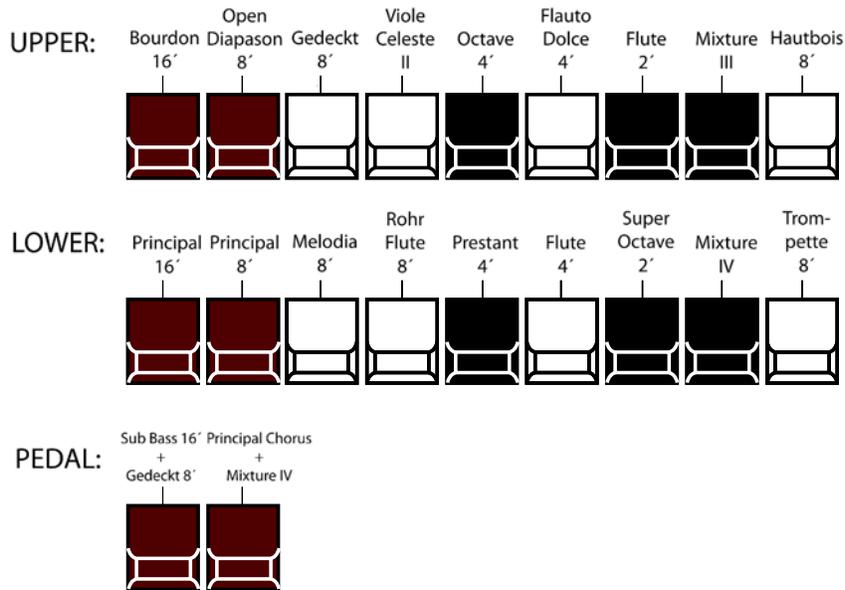
1. If you have not already done so, access the DRAWBAR Edit Menu. The quickest way to do this is to use the Shortcut shown below:



2. Turn the VALUE Rotary Control until the Information Center Display shows the following:



You may now use the Drawbars to control the voices of a classical pipe organ. The figure below shows how the Drawbars are allocated in “Pipe” mode.



IMPORTANT NOTE: When “Pipe” mode is activated, the Drawbars will function similar to drawstops on a traditional pipe organ - pulling a Drawbar “out” will turn the associated Pipe Voice “ON” while pushing the Drawbar “in” will turn the Pipe Voice “OFF.” The Pipe Voices **do not** have gradations of volume - they are either “ON” or “OFF.”

◆ PIPE Edit Menu

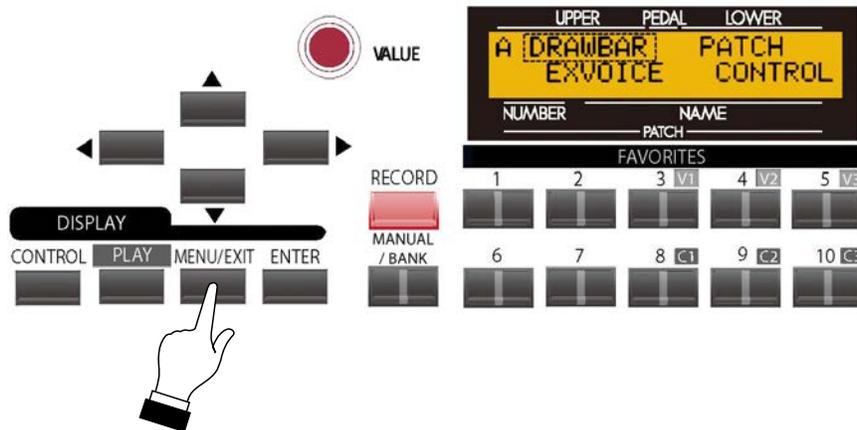
This Advanced Feature allows you to change the characteristics of the Drawbar Pipe Voices.

To edit the Drawbar Pipe Voices, it is recommended that the Drawbar Voice Mode be set to “Pipe” so you can preview the changes you make. To do this:

Follow steps 1 and 2 from the preceding page. The Drawbars will now control the Pipe tones.

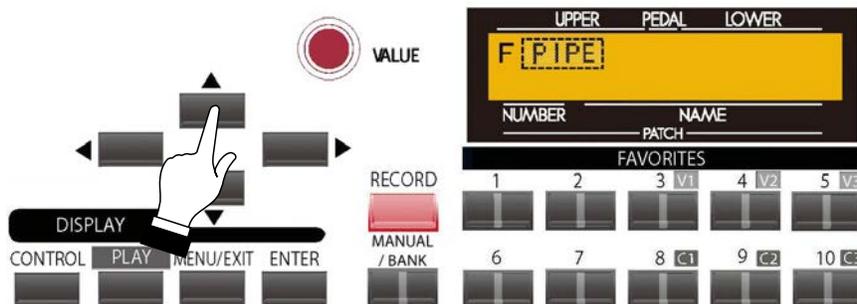
To access the PIPE Edit Menu, do the following:

1. From any of the PLAY Mode screens, touch the MENU/EXIT Touch Button **once**. The Information Center Display should now look like this:



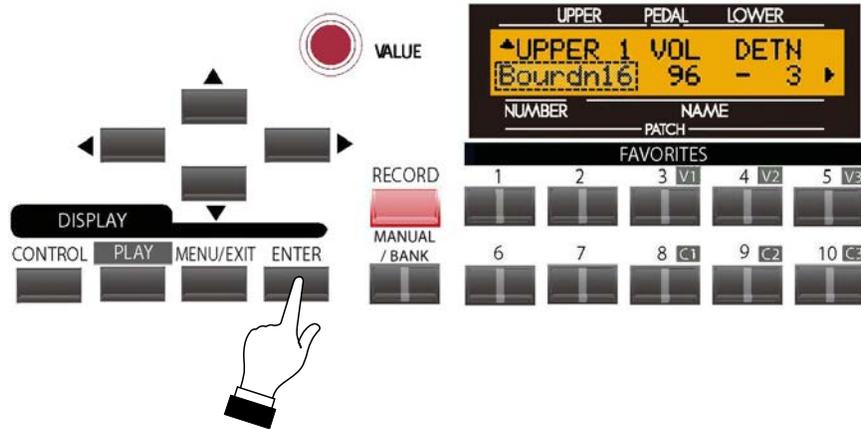
The word “DRAWBAR” should now be blinking.

2. From the A Screen, touch the PAGE UP “▶” Touch Button **five** times. The Information Center Display should look like this for the B Screen of the Menu Mode:



The word “PIPE” should now be blinking.

3. Touch the ENTER Touch Button **once**. The Information Center Display should now look like this:



You are now in the PIPE Edit Menu. You may now use the PAGE NAVIGATION Touch Buttons in conjunction with the VALUE Rotary Control to change the characteristics of the Pipe voices. This is explained starting on the next page.

Selecting a Pipe Voice to Edit

Your **SKX** has a total of 20 Pipe voices - nine (9) for the Upper Manual, nine (9) for the Lower Manual and two (2) for the Pedals. Below is a list of the voices and the screen abbreviations:

UPPER

Bourdon 16' ("Bourdn16")
 Open Diapason 8" ("OpnDiap8")
 Gedeckt 8' ("Gedeckt8")
 Voix Celeste 8' ("VnCelst8")
 Octave 4' ("Octave 4")
 Flute Dolce 4' ("FlDolce4")
 Flute 2' ("Flute 2")
 Mixture 3 ranks ("Mixt.III")
 Hautbois 8' ("Hautboi8")

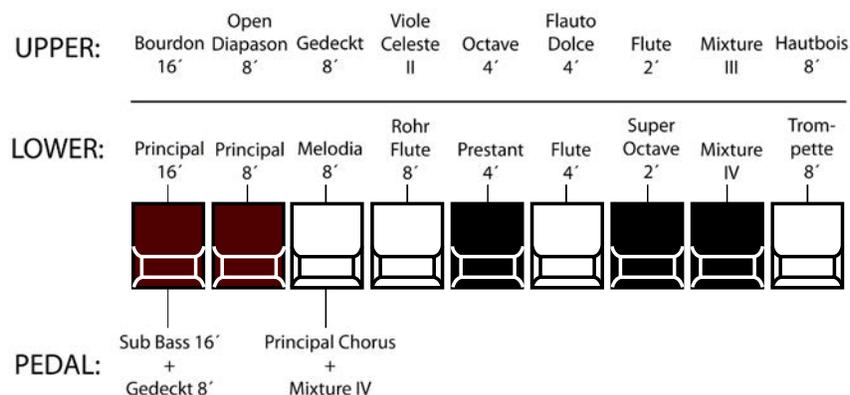
LOWER

Principal 16' ("Princi16")
 Principal 8' ("Princi 8")
 Melodia 8' ("Melodia8")
 Rohr Flute 8' ("RohrFl.8")
 Prestant 4' ("Prestnt4")
 Flute 4' ("Flute 4")
 Super Octave 2' ("SupOct 2")
 Mixture 4 ranks ("Mixt. IV")
 Trompette 8' ("Trompet8")

PEDAL

Sub Bass 16' & Bourdon 8' ("Bass16+8")
 Principal Chorus 8' & Mixture IV' ("")

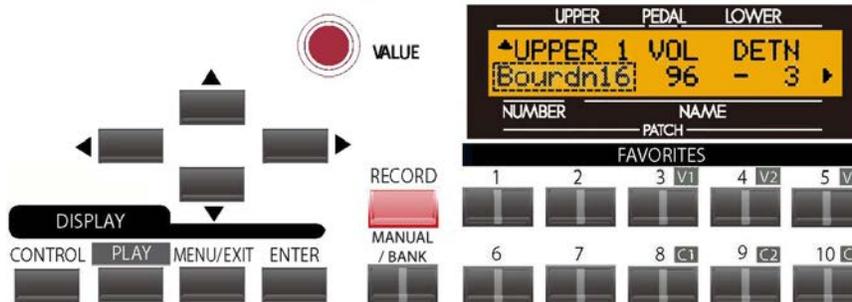
The figure below shows how the Pipe Voices are distributed among the individual Drawbars.



Use the PAGE UP and PAGE DOWN Touch Buttons to select the Pipe voice you wish to edit.

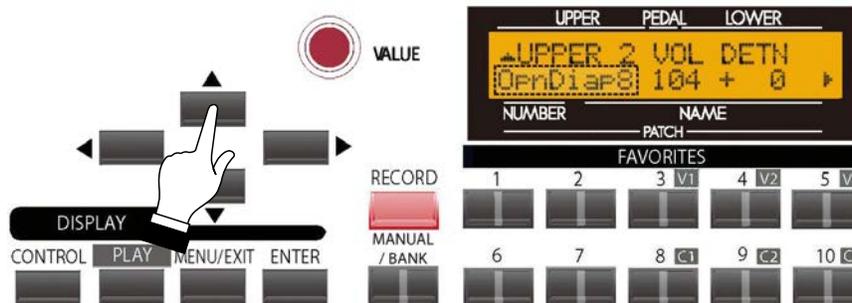
TRY THIS:

1. Follow the instructions on the previous page to see Page 1 of the PIPE Edit Menu:



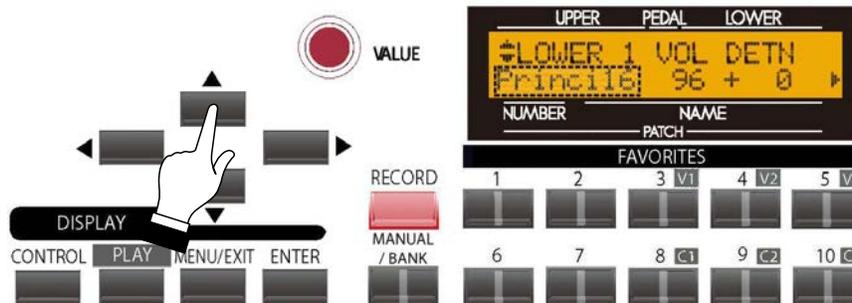
Notice that “Bourdn16” is displayed on the lower line. This means that the characteristics of the “Bourdon 16” Upper Manual Pipe Voice can be changed.

2. Touch the PAGE UP Touch Button **once**. The Information Center Display should now look similar to this:



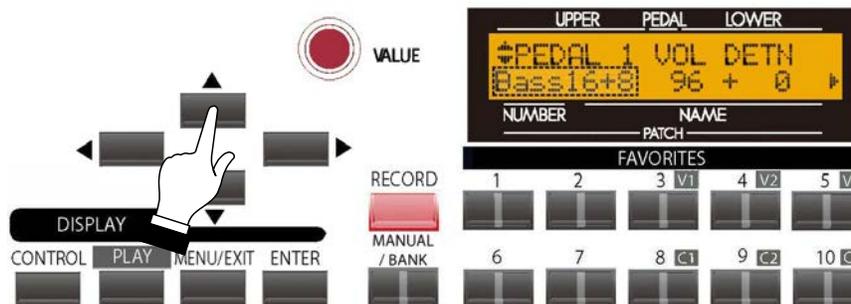
Now you will see “UPPER 2” on the top line of the Information Center Display and “OpnDiap8” on the lower line directly below it. This means that you can now edit the parameters for the “Open Diapason 8” pipe voice.

3. Now touch the PAGE UP Touch Button repeatedly until the Information Center Display looks similar to this:



Now you will see “LOWER 1” on the top line of the Information Center Display and “Princi16” on the lower line directly below it. This means that you can now edit the parameters for the “Principal 16” pipe voice on the Lower Manual.

4. Now touch the PAGE UP Touch Button repeatedly until the Information Center Display looks similar to this:



Now you will see "PEDAL 1" on the top line of the Information Center Display and "Bass16+8" on the lower line directly below it. This means that you can now edit the parameters for the "Bass16+8" pipe voice.

After you have selected which Pipe Voice you want to edit, you can make the following changes:

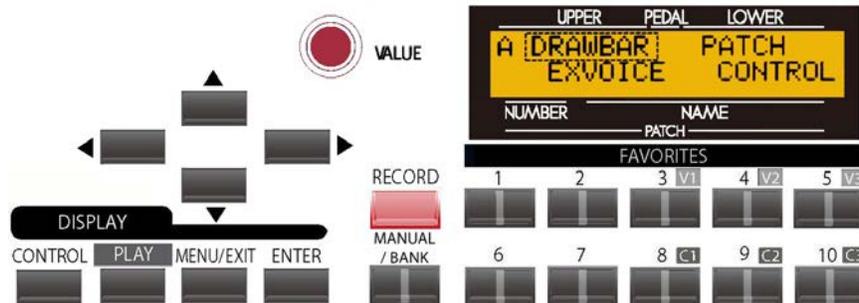
PIPE VOICE EDIT Options	
Description	Function
VOLUME	Allows you to set the Volume for the selected Pipe Voice.
DETUNE	Allows you to detune the selected Pipe Voice.
CHIFF	Allows you to set the amount of Chiff or attack for the selected Pipe Voice.
CUTOFF	Allows you to set the brightness of the selected Pipe Voice by setting its Filter Cutoff point.
PAN L-R	Allows you to set the directionality of the selected Pipe Voice.
IMAGING	Allows you to simulate pipe chest configurations for the selected Pipe Voice.

The following pages give a more detailed explanation of how these Advanced Features work.

PIPE Edit Menu - Page 1

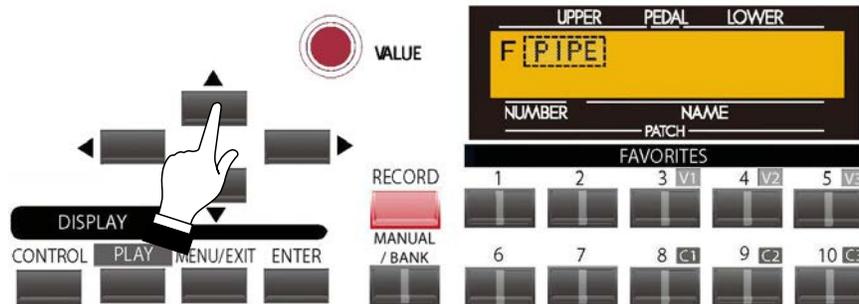
TRY THIS:

- From any of the PLAY Mode screens, touch the MENU/EXIT Touch Button **once**. The Information Center Display should now look like this:



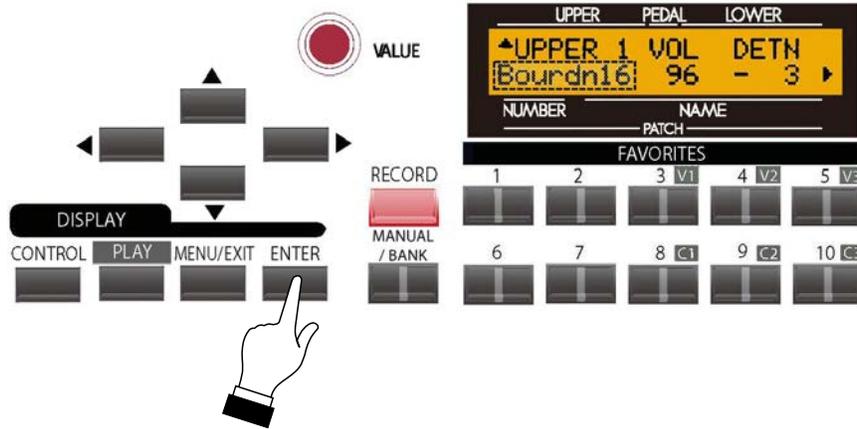
The word “DRAWBAR” should now be blinking.

- From the A Screen, touch the PAGE UP “▲” Touch Button **five** times. The Information Center Display should look like this for the F Screen of the Menu Mode:



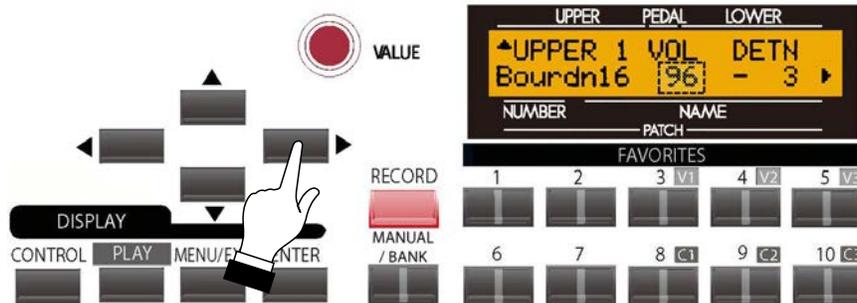
The word “PIPE” should now be blinking.

3. Touch the ENTER Touch Button. The Information Center Display should now look like this:



You are now in the PIPE Edit Menu.

4. Touch the PAGE RIGHT Touch Button once. The Information Center Display should now look like this:



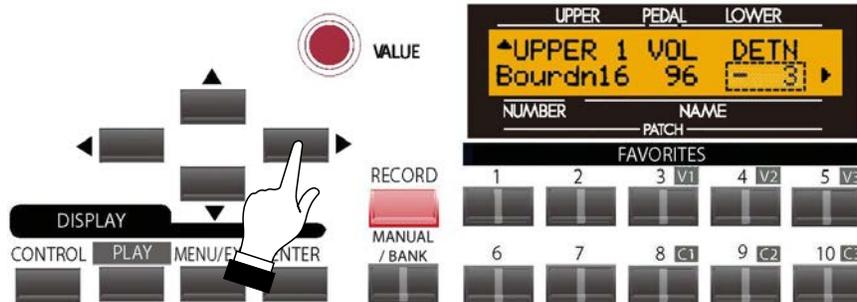
Pipe Voice Volume

Notice that the number underneath “VOL” is blinking. You can now modify the characteristics of each Pipe Voice, starting with Pipe Voice Volume. You can select a Volume setting of from “0” (softest) through “127” (loudest).

Turn the VALUE Rotary Control to the **right** to **increase** the volume of the selected Pipe Voice..

Turn the VALUE Rotary Control to the **left** to **decrease** the volume of the selected Pipe Voice.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend below the word “**DETN**” (Detune) should now be blinking.



Pipe Voice Detune

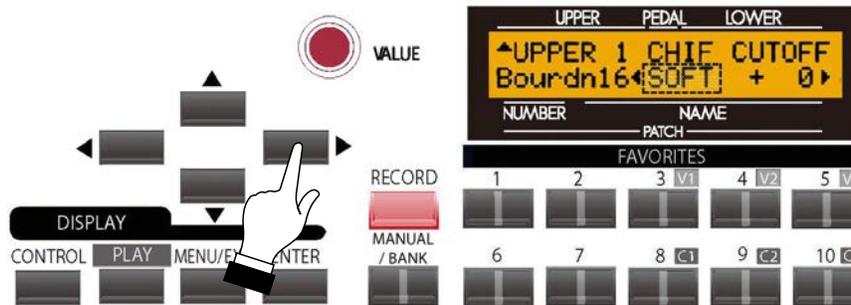
This Advanced Feature allows you to detune each individual Pipe Voice. You can select from “-50” (quarter-step flat) through “+50” (quarter-step sharp).

Turn the VALUE Rotary Control to the **right** to make the pitch of the selected Pipe Voice **flat**.

Turn the VALUE Rotary Control to the **left** to make the pitch of the selected Pipe Voice **sharp**.

PIPE Edit Menu - Page 2

From the previous screen, touch the **PAGE RIGHT Touch Button** once. Page 2 of the PIPE Edit Menu should now display. The legend below the word **“CHIF”** (Chiff) should now be blinking.



Pipe Voice Chiff

This Advanced Feature allows you to set the amount of Chiff or attack for each individual Pipe Voice.

What Is “Chiff?”

There are two classifications of organ pipes based on the method used to produce sound. “Flue” or “labial” pipes produce sound by means of sending a stream of air through the body of the pipe, while “reed” or “lingual” pipes utilize a beating reed in a manner similar to a reed instrument such as a clarinet.

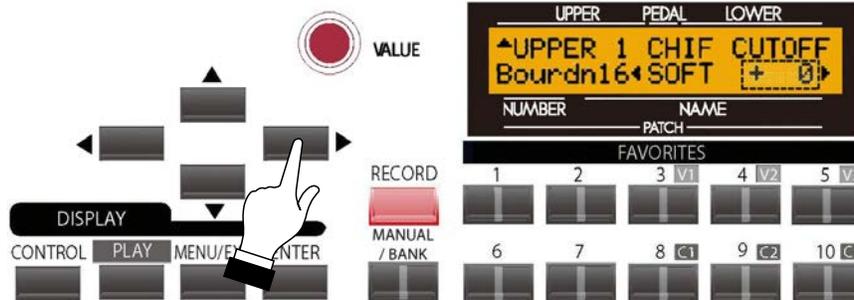
A flue pipe can be voiced in such a way so that a short attack transient is heard at the onset of the tone. The term, “chiff,” was coined by pipe organ makers to describe the sound. The amount of chiff can vary depending on the maker and the effect desired - some organ builders voice the flue pipes with little or no chiff while others, perhaps influenced by the “neo-baroque” school of organ building, deliberately strive to include the chiff effect.

Select the Chiff setting you want by doing the following:

Turn the VALUE Rotary Control to the **right** to add **more** Chiff to the selected Pipe Voice.

Turn the VALUE Rotary Control to the **left** to add **less** Chiff to the selected Pipe Voice.

From the previous screen, touch the **PAGE RIGHT** Touch Button once. The legend below the word **“CUTOFF”** should now be blinking.



Pipe Voice Cutoff

This Advanced Feature allows you to set the brightness of each individual Pipe Voice by setting its Filter Cutoff point.

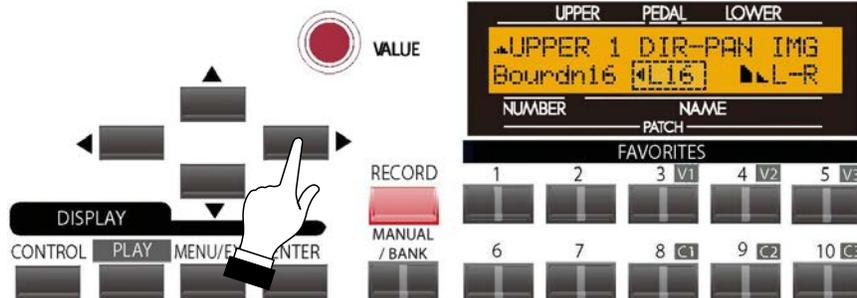
Select the Cutoff setting you want by doing the following:

Turn the VALUE Rotary Control to the **right** to make the selected Pipe Voice **mellower**.

Turn the VALUE Rotary Control to the **left** to make the pitch selected Pipe Voice **brighter**.

PIPE Edit Menu - Page 3

From the previous screen, touch the **PAGE RIGHT Touch Button** once. Page 3 of the PIPE Edit Menu should now display. The legend below the word “DIR” (Direction) should now be blinking.



Pipe Voice Pan

This Advanced Feature allows you to simulate different placements of pipe ranks.

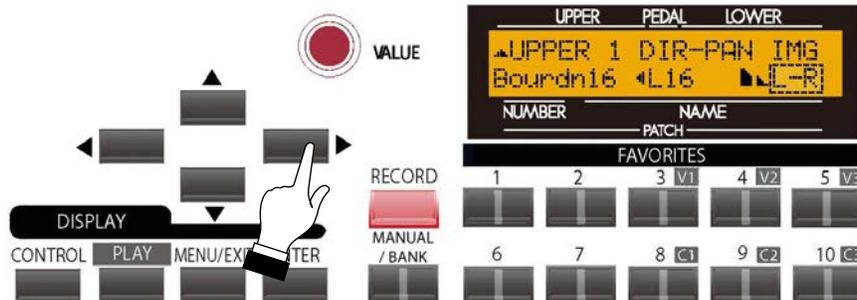
Select the directionality you want by doing the following:

Turn the VALUE Rotary Control to the **right** to move the sound of the selected Pipe Voice **left**.

Turn the VALUE Rotary Control to the **left** to move the sound of the selected Pipe Voice **right**.

NOTE: Setting this parameter to “-C-” will locate the sound in the center.

From the previous screen, touch the **PAGE RIGHT Touch Button** once. The legend below the word “IMG” (Image) should now be blinking.



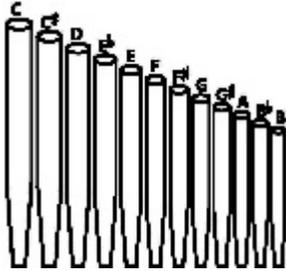
Pipe Voice Imaging

This Advanced Feature allows you to simulate different arrangements of pipes.

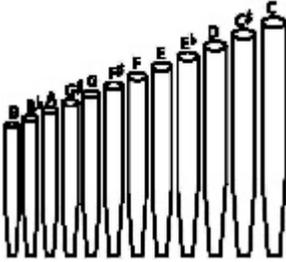
What Is “Pipe Imaging?”

The pipes of a pipe organ are arranged into sets called **ranks**. Each rank consists of pipes representing a specific sound on the organ - Open Diapason, Trompette, etc. (In keeping with the different philosophies of organ sound, many organ stop names are of European origin; hence the use of French, German, Dutch, etc.)

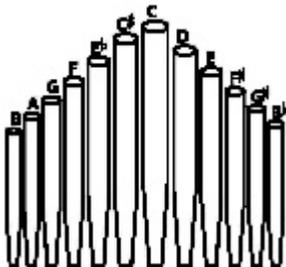
The pipes of each rank are supported by an assembly called a **chest**. The pipes can be arranged in many different ways on the chest. The pipe arrangement chosen by the maker depends on several things - aesthetics, musical, etc. - but the four most common ones are shown on the next page.



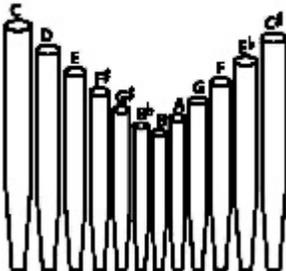
Left to Right - the pipes producing lower pitches are on the left. Playing notes chromatically going up on the keyboard will cause the pipes on the left to sound first.



Right to Left - the pipes producing higher pitches are on the right. Playing notes chromatically going up on the keyboard will cause the pipes on the right to sound first.



Pyramid - when notes are played chromatically going up on the keyboard, the notes start in the center and alternate between left and right.



Inverted Pyramid - when notes are played chromatically going up on the keyboard, the notes start at one end and alternate between left and right until they meet in the center.

NOTE: The above two pipe placement schemes are sometimes referred to as “C-C#” placement due to chromatic notes being separated.

The **SKX** gives you five different Pipe Imaging choices. The data chart below explains them.

Pipe Image Settings	
Description	Function
L-R	Left to Right (see drawing).
R-L	Right to Left (see drawing).
PYR	Pyramid (see drawing).
IVR	Inverted pyramid (see drawing).
- FIX -	No imaging.

Turn the **VALUE** Rotary Control to make your selection.

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