EQUALIZING AND VOICING
UNDERSTANDING THE POWER
OF THE
INSPIRE MENUS

RODGERS INSTRUMENTS US LLC
# TABLE OF CONTENTS

INTRODUCTION..........................................................................................................................2

PREPARING THE ORGAN FOR EQUALIZING .............................................................................. 3
  Quick Menu User and Service Menu ....................................................................................3
  Speaker Setup .......................................................................................................................5
  Channel Volumes ................................................................................................................6
  Audio Test ............................................................................................................................7
  Master Volume ...................................................................................................................7
  Matrix Mixer ......................................................................................................................8
  Room Type and Reverb Volume .........................................................................................9
  Default Voices ..................................................................................................................10
  Save Settings ...................................................................................................................12

UNDERSTANDING THE PARAMETRIC GRAPHIC EQUALIZER ........................................ 12

EQUALIZING - THE PROCESS ............................................................................................ 14
  Select a Channel ................................................................................................................ 14
  Identify the Most Problem Frequency ............................................................................ 14
  Address the Problem ....................................................................................................... 15
  Save ................................................................................................................................ 16

VOICING - UNDERSTANDING THE VOICING MENU .................................................... 18
  Note Voicing .....................................................................................................................18
  How to Select Adjustment Keys .......................................................................................18
  The Display .......................................................................................................................19
  Tune ..................................................................................................................................19
  Low Frequency and High Frequency ............................................................................ 20
  Low Gain and High Gain ............................................................................................... 20
  Tremulant Depth .............................................................................................................22
  Wind Supply ....................................................................................................................22
  Advanced Voicing ..........................................................................................................22

VOICING - THE PROCEDURE ............................................................................................22
  Identify and Address Each Problem .............................................................................22
  Save Voicing ....................................................................................................................24

DOCUMENTS TO PRINT ........................................................................................................ 25
  Frequencies of Organ stops in Equal Temperament .......................................................25
  Frequency Chart and Number of Keys and Q ...............................................................26
INTRODUCTION

When an Inspire organ is newly installed, imperfections are heard which can be corrected by equalizing and voicing. The purpose of this document is to provide an in-depth explanation of the Inspire organ’s menus and icons along with directions for navigating and using the menus and their tools. To a person with expertise in the topic, this information might seem more detailed than necessary. However, the focus is especially for those who are inexperienced with equalizing and voicing, and who are new to the Inspire organ’s powerful equalizing and voicing menus.

The left column of the chart below shows the path of the organ sound, starting at the bottom with the organ’s pipe samples for each note of every rank and moving upward to the end of the path: what is heard in the speakers. Along this path the sound is modified by adjustments and parameters that are configured when the organ is installed, and that are explained in this document. The sequence for configuring these powerful parameters is shown in the right column, starting at the top. This document provides the explanations and procedures for accomplishing this process.

<table>
<thead>
<tr>
<th>Audio Path</th>
<th>Organ Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speakers</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Master Volume / Channel Volume</strong></td>
<td>1--Set Master and Channel volume levels</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equalizer</strong></td>
<td>2--Make speaker corrections in the Equalizer</td>
</tr>
<tr>
<td>Audio corrections for specific channels (speakers)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Matrix Mixer</strong></td>
<td>3--Set up channeling in the Matrix Mixer</td>
</tr>
<tr>
<td>How the divisions are channeled to specific speakers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Voicing</strong></td>
<td>4--Make voicing changes as needed after completing steps 1 through 3</td>
</tr>
<tr>
<td>Artistic/stylistic changes to the tonal character of the sample</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sound samples</strong></td>
<td></td>
</tr>
</tbody>
</table>
Equalizing is the process of adjusting the volume of frequencies of the output channels using filters. Voicing is the process of making artistic/stylistic adjustments to change the character of the samples to match the tastes of the users. Both processes assume that the listener has healthy hearing, full audio consciousness, and an understanding of how to use the Inspire organ’s menus and tools.

What is full audio consciousness? People with undeveloped audio consciousness recognize if a sound is loud or not; people with more audio consciousness recognize bass and treble; and people with full audio consciousness recognize the complete audio spectrum including bass, low mid-range, mid-range, high mid-range and high. People who are fully audio conscious will be able to equalize an organ by balancing all parts of the spectrum with the goal of transparency. Transparency means that all parts are clearly heard, without one part being too loud.

PERCEIVED HUMAN HEARING

PREPARING THE ORGAN FOR EQUALIZING

Why equalize an organ before voicing? Equalizing corrects problems caused by the room and the speakers that affect all stops. Voicing addresses user tastes and preferences for individual stops. Equalizing before voicing saves time because a problem caused by the room, affecting all stops, can be addressed at once rather than voicing the same problem multiple times for separate stops.

TERMINOLOGY
The words key, pitch and frequency are used somewhat interchangeably, but for clarity, these words are used as follows: a key is the actual key on the keyboard. When a key is pressed (played) a pitch is heard, but to describe the pitch more precisely we use the word frequency. Frequency is the number of cycles or vibrations per second, measured in Hertz (Hz). Frequency measures the cycle rate and pitch refers to how high or low the sound is heard.

QUICK MENU USER AND SERVICE MENU ITEMS
There are several steps to preparing the organ for equalizing which first require an understanding of how to navigate the Quick Menu which contains User and Service Menu items. When the organ is turned on, the main menu indicates:

The SELECT and VALUE knobs (labeled beneath the knobs) can be “pushed” or “turned”.

USER MENU ITEMS #1-16
User Menu items are accessible to any user. Push SELECT to open the Quick Menu. Turn SELECT to scroll through User items #1-16. Push SELECT to enter a menu item and turn VALUE to make changes within a menu item. Push VALUE (sometimes repeatedly) to exit a menu.
**SERVICE MENU ITEMS #30-69**
While holding SET, briefly push both SELECT and VALUE.

<table>
<thead>
<tr>
<th>USER MENU ITEMS</th>
<th>SERVICE MENU ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demo</td>
<td>30. Pipe Modeling</td>
</tr>
<tr>
<td>2. USB Memory</td>
<td>31. Stop Voicing</td>
</tr>
<tr>
<td>3. Hymn Player</td>
<td>40. Equalizer</td>
</tr>
<tr>
<td>4. Song Recorder</td>
<td>41. Matrix Mixer</td>
</tr>
<tr>
<td>5. Pitch/Tuning</td>
<td>42. Channel Volumes</td>
</tr>
<tr>
<td></td>
<td>43. Speaker setup</td>
</tr>
<tr>
<td></td>
<td>44. System Console</td>
</tr>
<tr>
<td></td>
<td>50. Switch Assign</td>
</tr>
<tr>
<td></td>
<td>51. Calibration</td>
</tr>
<tr>
<td></td>
<td>59. Audio Test</td>
</tr>
<tr>
<td></td>
<td>60. Program</td>
</tr>
<tr>
<td>6. Room Type</td>
<td>13. Audio</td>
</tr>
<tr>
<td>7. Orchestral Stop</td>
<td>14. MIDI</td>
</tr>
<tr>
<td>8. Console</td>
<td>15. Save/Load (USB)</td>
</tr>
<tr>
<td>12. Crescendo (Inspire 233)</td>
<td></td>
</tr>
</tbody>
</table>

---

**Diagram:**
- Service Menu Interface
- User Menu Items
- Service Menu Items

---

**Image:**
- Service Menu Interface
- User Menu Items
- Service Menu Items
PREPARING THE ORGAN

CHOOSE A SPEAKER SETUP

1. Navigate to highlight Service Menu #43 “Speaker Set-up”. Push SELECT to enter the menu. See Figure #1 below for Speaker Set-up choices.

2. Turn VALUE to highlight the desired speaker set-up.

3. Push SET to “Write”. The display indicates “Complete”.

4. Push VALUE to return to the Service Menu.

---

**Figure 1: SPEAKER SETUP OPTIONS**

<table>
<thead>
<tr>
<th>Speaker Setup Number</th>
<th>Speaker Setup Description</th>
<th>Internal 2.1 Speakers</th>
<th>Satellite Speakers (optional)</th>
<th>Ch 1-2</th>
<th>Ch 3-4</th>
<th>Ch 5-6</th>
<th>Ch 7-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Internal 2.1</td>
<td>ON</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Internal 2.1 + Satellite Front</td>
<td>ON</td>
<td>L+R Mix</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Internal 2.1 + Satellite Rear Reverb</td>
<td>ON</td>
<td>Reverb</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>External 2.2</td>
<td>OFF</td>
<td>-</td>
<td>GT, PD &amp; SW</td>
<td>-</td>
<td>-</td>
<td>Subwoofers</td>
</tr>
<tr>
<td>5</td>
<td>External 2.2 + Internal 2.1</td>
<td>ON</td>
<td>-</td>
<td>GT, PD &amp; SW</td>
<td>-</td>
<td>-</td>
<td>Subwoofers</td>
</tr>
<tr>
<td>6</td>
<td>External 4.2</td>
<td>OFF</td>
<td>-</td>
<td>GT, PD &amp; SW</td>
<td>-</td>
<td>-</td>
<td>Subwoofers</td>
</tr>
<tr>
<td>7</td>
<td>External 4.2 + Internal 2.1</td>
<td>ON</td>
<td>-</td>
<td>GT, PD and SW A Stops</td>
<td>GT, PD and SW B Stops</td>
<td>-</td>
<td>Subwoofers</td>
</tr>
<tr>
<td>8</td>
<td>External 4.2 Chambers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SW</td>
<td>GT &amp; PD</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>External 4.2 Chambers + Internal 2.1</td>
<td>ON</td>
<td>-</td>
<td>-</td>
<td>SW</td>
<td>GT &amp; PD</td>
<td>-</td>
</tr>
</tbody>
</table>
Speaker setup # 7 assigns Great, Pedal and Swell A stops to Channels 1/2 (Card 1); Great, Pedal and Swell B stops to Channels 3/4 (Card 2); and Orchestral Voices to Cards 3 as pictured below, affecting each stop’s channel location. When voicing, refer to this illustration to view the output of each stop.

PREPARING THE ORGAN
CHOOSE CHANNEL VOLUMES

The purpose of the Channel Volumes menu is to make sure that all speakers are turned ON for the selected speaker setup. Channel volumes have a range of OFF, negative numbers, and ON, but no positive numbers. Increases in channel volume are achieved through the Matrix Mixer.

1. Navigate to highlight Service Menu #42 “Channel Volumes”. Push SELECT to enter the menu. Each menu item refers to a channel pair of speakers.

2. Turn SELECT to highlight a channel pair and turn VALUE to assign ON or OFF as needed for the speaker setup.

3. Push VALUE to return to the Service Menu
PREPARING THE ORGAN

AUDIO TEST (to ensure all speakers are working properly)

1. Navigate to highlight Service Menu #60 “Audio Test”. Push SELECT to enter the menu.

2. Turn SELECT to highlight “Source” and turn VALUE to choose either SINE or WHITE.

3. Turn SELECT to highlight “Level” and turn VALUE to choose an audible percentage level.

4. Turn SELECT to highlight “Output”. Turn VALUE to scroll through all output choices. If a speaker is used in the Speaker Setup and is properly connected, a sine wave or white noise will be heard.

5. Push VALUE to return to the Service Menu.

PREPARING THE ORGAN

SELECT THE MASTER VOLUME

Generally, set the Master Volume at about 85% to leave head room for increasing the volume later if necessary.

1. Navigate to highlight User Menu #13 “Audio”. Push SELECT to enter the menu.

2. With a full registration, and the shoes open to their loudest, play full chords and turn VALUE to choose the desired Master Volume.

3. Push VALUE to return to the Service Menu.
PREPARING THE ORGAN

ADJUST CHANNEL PAIR VOLUMES IN THE MATRIX MIXER

The Matrix Mixer allows for adjustment of the volume level of each audio source (band) into each output channel.

1. Navigate to highlight Service Menu #41 “Matrix Mixer”. Push SELECT to enter the menu.

2. Turn SELECT to highlight a channel pair. Turn VALUE to the desired volume level (measured in decibels). The range is from OFF, -24dB to +24dB with 0dB corresponding to ON.

Note:
If internal speakers are used, equalizing is not necessary because the organ ships with the internal speakers well equalized. Regardless, this would be a good time to use the Matrix Mixer to either turn off the internal speakers or to balance the volume between the internal and external speakers.

MATRIX MIXER

TSS (True Sound Space) Send determines the volume level of the dry (non-reverb) signal that is sent to the TSS Module. The length of the reverb is determined by the Room Type choice (Menu #6).
PREPARING THE ORGAN
SELECT A ROOM TYPE AND A REVERB VOLUME

Two videos: What is Reverb? (https://www.youtube.com/watch?v=5nGUrADdjpQ

It is important to carefully select the best Room Type for the installation before equalizing because reverb colors the sound in a way that influences equalization. Choose a room type that sounds natural and believable. Consider including the main organist in this decision because tastes in reverb differ.

Room Type determines the length of the reverb’s decay. Reverb Volume (Audio Menu #13) sets the master volume of the reverb. The Matrix Mixer TSS Send allows adjustment of which speakers have reverb as well as the volume level for each channel pair.

1. Navigate to highlight User Menu #6 “Room Type”. Push SELECT to view the Room Types.

2. Rotate VALUE to highlight each Room Type. With the expression shoes fully open, and with a full registration, play a chord with both hands. Release the chord and listen to the length of the decay. Toggle between Room Type Menu #6 and Audio Menu #13 Reverb Volume to experiment with different room types set at master reverb volume levels.

3. After selecting the Room Type and its volume level, push VALUE to return to the Service Menu.
PREPARING THE ORGAN

CHOOSE DEFAULT VOICE PALETTE AND ORCHESTRAL VOICES

Although choosing default voices isn’t necessary for the equalizing process, this would be a good time to include it in the set-up process. Consider including the main organist in choosing the default voices because this is a matter of taste.

VOICE PALETTE VOICES

1. Light an engraved stop and turn SELECT to highlight VP1 (Voice Palette). Turn VALUE to listen to the stop and its voice palette options, highlighting the most suitable voice for the installation. Do this for all engraved stops.
ORCHESTRAL VOICES

Light up each of the 6 Orchestral couplers and choose the desired default voice including its Level, Octave, and Velocity. If the Velocity value is set to KBD, the voice responds to touch on the velocity-sensitive keyboard. Volume ranges from -24dB to +24dB.

SAVE VOICE DEFAULT CHOICES

With all stops and orchestral couplers lighted:
1. While holding the SET piston, push the CANCEL (0) piston. Release both pistons. The confirmation screen will appear.
2. Turn VALUE to choose “DEFAULT STOPS”.
3. Push SET to save the settings. “Executing” and “Completed” will be displayed.
PREPARING THE ORGAN
SAVE ALL OF THE ABOVE SETTINGS
1. While holding the SET piston, push the CANCEL (0) piston. Release both pistons.
2. The confirmation screen will appear.
3. Turn VALUE to choose “SYSTEM”.
4. Push SET to save the settings. “Executing” and “Completed” will be displayed.

UNDERSTANDING THE PARAMETRIC GRAPHIC EQUALIZER

This YouTube video provides a quick, general explanation of a parametric equalizer
How a Parametric EQ Works.
(https://www.youtube.com/watch?v=D5UCIgX8gPc&feature=youtu.be)

Types of filters used in equalizing Inspire organs include:

- Parametric filter
- Shelf Filter
- Low Cut = High pass
- High Cut = Low pass
THE PARAMETRIC EQUALIZER DISPLAY ITEMS

**Equalizer:** Each channel pair can be adjusted using five independent Parametric EQs, one Low Frequency and one High Frequency filter. In Figure 2, all the numbers in the display reflect the adjustments that have been made for EQ1. If VALUE were rotated to EQ2, the other display numbers would be different.

**Channel Pairs:** Although the individual channels can be independently equalized, leave the display set to the channel pairs. (In situations where different settings are needed for individual channels, and settings do not match, no graphic will be displayed). Note: In the most current software L/R has been changed to channel pair numbers.

**Frequency:** This shows the frequency center point of the bandwidth that is affected by the EQ adjustment. In Figure 2, the frequency being adjusted is 44Hz.

**High Pass and Low Pass Filters:** After scrolling through EQ1-EQ5 in the parametric equalizer, the next parameters are the High and Low Pass Filters. High pass filters remove or attenuate all frequencies below a cutoff frequency, leaving high frequencies unaffected. Low pass filters remove or attenuate all frequencies above a cutoff frequency, leaving low frequencies unaffected.
EQUALIZING - THE PROCESS
Before starting, for reference, print the “Frequencies of Organ Stops” and “Number of Keys and Q” located on the last two pages of this document.

EQUALIZING - THE PROCESS
SELECT A CHANNEL PAIR AND TURN OFF OTHER CHANNELS

During the equalizing process, the steps below will be repeated for each channel pair, requiring moving between Channel Volume Menu #42 and Equalizer Menu #40.

1. Equalize the sub-woofer channels (7/8) first to correct issues of excessive low frequencies that create undesired “boominess” in the organ sound. To hear only the channel pair that is being equalized, all other channel pairs need to be muted.

2. Navigate to Service Menu #42 “Channel Volumes”. Push SELECT to enter the menu.

3. Turn SELECT to highlight each channel pair. Turn VALUE to “OFF” for all choices except “Ext. 7/8” which will be ON. You are now ready to enter the Equalizer menu to adjust up to 5 EQs (filters) and the low and high pass filters for channels 7/8.

4. Press VALUE to exit the menu.

EQUALIZING - THE PROCESS
IDENTIFY THE MOST PROBLEM FREQUENCY

1. On the subwoofer channel, start with pedal 16’ Flute or Principal. Adjustments will affect all 16’ stops. On other channels start with an 8’ flute.

2. With the expression pedals fully open, slowly play the keys chromatically, listening for unwanted resonances and for ranges of frequencies that are louder than the surrounding frequencies. Double check with other stops (8’, 4’, one octave lower, etc., or Tutti) to confirm that the problem exists for other stops.
3. Refer to the “Frequencies of Organ Stops” chart, to identify which frequency is the loudest (center frequency) and how many keys above and below it need to be addressed (Q). These are the numbers to enter into the EQ filter for Frequency and Q.

EQUALIZING - THE PROCESS

ADDRESS THE PROBLEM

1. Navigate to Service Menu #40 “Equalizer”. Push SELECT to enter the menu.

2. Turn SELECT to highlight the channel pair that will be equalized. The first pair will be External 7/8.

3. Push SELECT to view EQ1 highlighted. Turn SELECT to highlight Frequency. Turn VALUE to change the number to the value of the problem frequency.

4. Turn SELECT to highlight “Q” and turn VALUE to the number written down for Q. In this example, Q has been set to 2.8 which is the number closest to the number of keys being adjusted, in this case, 6.

5. Turn SELECT to highlight Gain. With the expression pedals fully open, play the problem key and the keys around it, and turn VALUE to change the Gain number until the desired result is heard. A negative value is used to attenuate (reduce) volume and correct unwanted resonances and boominess.
6. Turn SELECT to highlight the EQ and turn VALUE to FRH or FRL. Adjust the HIGH and LOW pass filters as needed. For HIGH, all frequencies below this frequency will be attenuated or removed. For LOW, all frequencies above this frequency will be attenuated/removed.

7. If there are other problem frequencies for channels 7/8, turn SELECT to highlight EQ1. Turn VALUE to EQ2 and repeat the above steps to enter the problem frequency and Q, and then to adjust the GAIN to correct the problem.

8. When satisfied with the equalization of channels 7/8, return to p. 14 and repeat the process for all channel pairs. After equalizing everything, continue with the next step to save.

**EQUALIZING - THE PROCESS**

**SAVE**

1. While holding SET, Push and release CANCEL (0). The SAVE SETUP screen appears.

2. Turn VALUE to highlight “System”.

3. Push and release SET. “COMPLETE” will appear in the display

**Note:** Equalizing and all other menu items are saved to System. Only the voicing menu items are saved to Voicing.
FLAT, ACTUAL, AND CORRECTED
VOICING - UNDERSTANDING
THE VOICING MENU

THE VOICING MENU DISPLAY

**Note Voicing:**
After setting the level of the entire stop, select Note Voicing to voice “Note-by-Note”.

**Advanced Voicing:**
Addresses Rank and Pan settings.

The name of the stop being voiced.

**Level:**
The gain (volume) level of the entire stop, measured in decibels. Turn VALUE to increase or decrease the volume.

**Output:**
The section to which the stop is assigned. In this example, the Principal 16’ is assigned to Pedal 1.

UNDERSTANDING THE VOICING MENU

NOTE VOICING

1. Turn SELECT to highlight “Note Voicing”.
2. Push SELECT to enter the menu.
3. Level is the first parameter when the voicing menu is opened as seen in the Note Voicing Menu below.

HOW TO SELECT ADJUSTMENT KEYS

**Single notes:** To select one key, play the key. Brackets appear above and below that key.
To return to single note selection after using notes by range, hold SET and play the key.

**Notes by range:** To select, while holding SET, first play the desired low anchor key and then the high anchor key. Brackets indicate the low and high ends of the range.
Notes by Range (rubber-band) allows the adjustment of a key within a range of keys. Hold the SET piston and first play the low anchor key, then the adjustment key and then the high anchor key. The outside brackets point outward. The adjustment key has brackets that point inward. This is a very useful tool because the changes made to the keys surrounding the adjustment key are gradual.

UNDERSTANDING THE VOICING MENU
THE DISPLAY

STOP/VOICE PALETTE: To select a stop, double tap a stop or turn VALUE to scroll through the list. The currently selected stop tab will blink, yet the voice can be turned on or off in the normal fashion. The stop will continue to blink as a reminder that it is the selected stop, allowing the voicer to listen to the stop in various combinations without deselecting the stop.

TOOLS: After the adjustment key or keys have been selected, highlighting “Tools” changes to choices of All +1, All -1, All +10, All - 10, All +10%, Randomize, and Reset, and Harmonics.

GRAPH: The graph shows the relative volume level of the Principal 8’ for each of the Great manual’s 61 keys, chromatically from left to right. (To quickly “flatline” or return all levels to zero, turn SELECT to highlight “Tools”, turn VALUE to highlight “Reset”, and push SELECT).

UNDERSTANDING THE VOICING MENU

In addition to “Level” pictured in the Note Voicing Menu above, turning VALUE accesses these parameters.

TUNE
“Tune” adjusts the tuning of one or more frequencies. Tuning is measured in cents. The range can be adjusted ± 50 cents centered on the selected frequency.

LEVEL adjusts the volume level for one key or a range of keys. measured in decibels.
LOW FREQUENCY and HIGH FREQUENCY

The Low Frequency parameter (Lfrq) selects the shelf frequency of a note-by-note, low-shelf filter. The frequency of the first through tenth harmonics can be adjusted using the Tools. Similarly, the High Frequency parameter (Hfrq) selects the shelf frequency of a note-by-note, high-shelf filter. When the keys for adjustment have been selected, the TOOLS menu opens to view the first through tenth harmonics.

![Image 1](image1.png)

![Image 2](image2.png)

LOW GAIN and HIGH GAIN

Low Gain adjusts the volume of all frequencies below the selected low frequency. Similarly, High Gain adjusts the volume of all frequencies below the selected high frequency. After the keys have been selected for adjustment, the TOOLS menu adjustments include decibel increases by increments of All +1, All -1, All +10, All -10, All +10%, Randomize, and Reset.

The Low Frequency and Low Gain parameters are working together, and they are a **Bass filter (Low Shelf)**. The High Frequency and High Gain parameters are also working together, and they are a **Treble filter (High Shelf)**.

- Since every note has its own frequencies, it is necessary to be able to change frequencies for each note separately.
- With the harmonic selector the frequencies for each note can be set to the desired frequency.
• To add more bass to a stop, increase the Low Gain starting on the 2\textsuperscript{nd} harmonic. It will affect the frequencies below the 2\textsuperscript{nd} harmonic, since the Low Shelf filter adjusts the volume of all frequencies \textbf{below} the selected \textit{Low Frequency} (\textit{e.g.} 2\textsuperscript{nd} harmonic).

• To add more brightness to a stop, increase the High Gain starting on the 4\textsuperscript{th} harmonic (or what else is defined by listening). It will also affect all the frequencies above the 4\textsuperscript{th} harmonic, since the High Shelf filter adjusts the volume of all frequencies \textbf{above} the selected \textit{High Frequency} (\textit{e.g.} 4\textsuperscript{th} harmonic).

• To understand how the frequency of a particular harmonic is calculated, determine the fundamental (base) frequency of a note. This is often what is meant when the word ‘pitch’ is used.

An example for \(A = 440\ \text{Hz} \Rightarrow 440\) is the fundamental frequency (which is the 1\textsuperscript{st} harmonic). To calculate the frequency of a specific harmonic, multiply the fundamental frequency with the number of the harmonic.

\begin{itemize}
  \item Harmonic 1: \(440\ \text{Hz} \quad (1 \times 440)\)
  \item Harmonic 2: \(880\ \text{Hz} \quad (2 \times 440)\)
  \item Harmonic 4: \(1760\ \text{Hz} \quad (4 \times 440)\)
  \item …
  \item Harmonic 10: \(4400\ \text{Hz} \quad (10 \times 440)\)
\end{itemize}

These harmonics are the upper tones of the sounding pipe sample. For instance, a Bourdon pipe barely has upper tones, and a Trumpet can have more than 100 upper tones.

Some voices only need adjustments to the frequencies below 200 Hz. (\textit{e.g.} a Subbass 16’, which might sound very “boomy”). Sometimes a Principal 2’ is improved by reducing the frequencies of all keys above 2000 Hz. The upper octaves will be softer, and the lower octaves unchanged. Most often it is best to set the frequencies to the harmonics, so they move along with the different notes.
**TREMULANT DEPTH**  
Tremulant Depth adjusts the amount of tuning and volume modulation that is applied by the tremulant. In previous organs, Tremulant Depth was a global parameter. The Inspire organs’ tremulant depth is adjustable per stop. After the key or keys have been selected for adjustment, the TOOLS menu adjustments include increases by increments of All +1, All -1, All +10, All -10, All +10%, Randomize, and Reset.

**WIND SUPPLY**  
Wind Supply operates within the range set by the global Wind Supply setting found in the Pipe Modeling menu. Generally, this parameter doesn’t need adjusting in the voicing process.

**ADVANCED VOICING**  
Advanced Voicing addresses Rank and Pan Settings. For a detailed explanation, refer to p. 31 through 35 in the Inspire 233 Technical Manual.

---

**VOICING: THE PROCEDURE**

If equalizing has been done well, problems with resonant frequencies will have been addressed, making the primary purpose of voicing to be adjustments to the taste of the user. It is possible that many stops will need little or no adjustment. Successful voicing assumes that the voicer can identify which Voicing menu item(s) are needed to address a given issue.

**IDENTIFY AND ADDRESS EACH PROBLEM**

1. Because voicing is both a matter of taste and the ability hear well, it may be helpful to have two listeners. With the expression shoes fully open, play chords and also play chromatically through each stop, listening for issues to be addressed.
2. Write the stop name, the problem, key(s) that need addressing, and which voicing menu item(s) will be used to address each problem.
3. Use the voicing menus and tools to address each problem.

By changing the Frequencies of the Low and High shelf filters (LFQ/LGN and HFQ/HGN), the sound can be changed in a way that is desirable. Since it is possible to set a different frequency for each key (note-by-note), the following procedure is recommended.

1. Make a global setting for the stop by setting the Low Frequency to the 2\textsuperscript{nd} harmonic, and the High Frequency to the 4\textsuperscript{th} harmonic (or higher, when a stop has more upper tones).
2. Adjust the low gain and the high gain for all the notes (with the +1 / -1 tool) to achieve the desired overall color of the sound.
3. Make note-by-note adjustments, mostly using the Low Gain and High Gain parameters. Sometimes, with very odd sounds, changing the Low or High Frequency parameter only for that particular note can help to get the desired result.

An example of voicing changes made to the Great Principal 8’
An example of voicing changes made to the Open Diapason 8’

SAVE VOICING

1. While holding the SET piston, push the CANCEL (0) piston. Release both pistons.

2. The confirmation screen will appear.

3. Turn VALUE to choose “VOICING”.

4. Push SET to save the settings. “Executing” and “Completed” will be displayed.
FREQUENCIES OF ORGAN STOPS IN EQUAL TEMPERAMENT
EQUALIZING STEPS

1. Identify the problem key.

2. Use the “Frequencies of Organ Stops” illustration to identify the frequency of the problem key(s).

3. Play the keys on either side of the problem key and determine the number of keys that need to be addressed. Use the adjacent illustration to determine the Q factor.

4. Enter the frequency and Q into the Equalizer menu as described on p. 15

5. With the expression pedals fully open, hold a chord and turn VALUE to adjust the gain to address the problem frequency. While turning VALUE you will hear the difference and also see the notch or peak change on the graphical equalizer display.

<table>
<thead>
<tr>
<th>NUMBER OF KEYS</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.31</td>
</tr>
<tr>
<td>2</td>
<td>8.65</td>
</tr>
<tr>
<td>3</td>
<td>5.76</td>
</tr>
<tr>
<td>4</td>
<td>4.32</td>
</tr>
<tr>
<td>5</td>
<td>3.45</td>
</tr>
<tr>
<td>6</td>
<td>2.87</td>
</tr>
<tr>
<td>7</td>
<td>2.46</td>
</tr>
<tr>
<td>8</td>
<td>2.14</td>
</tr>
<tr>
<td>9</td>
<td>1.90</td>
</tr>
<tr>
<td>10</td>
<td>1.71</td>
</tr>
<tr>
<td>11</td>
<td>1.55</td>
</tr>
<tr>
<td>12</td>
<td>1.41</td>
</tr>
<tr>
<td>13</td>
<td>1.30</td>
</tr>
<tr>
<td>14</td>
<td>1.20</td>
</tr>
<tr>
<td>15</td>
<td>1.12</td>
</tr>
<tr>
<td>16</td>
<td>1.04</td>
</tr>
<tr>
<td>17</td>
<td>0.98</td>
</tr>
<tr>
<td>18</td>
<td>0.92</td>
</tr>
<tr>
<td>19</td>
<td>0.87</td>
</tr>
<tr>
<td>20</td>
<td>0.82</td>
</tr>
<tr>
<td>21</td>
<td>0.78</td>
</tr>
<tr>
<td>22</td>
<td>0.74</td>
</tr>
<tr>
<td>23</td>
<td>0.70</td>
</tr>
<tr>
<td>24</td>
<td>0.67</td>
</tr>
<tr>
<td>25</td>
<td>0.61</td>
</tr>
<tr>
<td>26</td>
<td>0.56</td>
</tr>
<tr>
<td>28</td>
<td>0.51</td>
</tr>
<tr>
<td>32</td>
<td>0.47</td>
</tr>
</tbody>
</table>
DEDICATED TO MOVING HEARTS AND SOULS
Since 1958, Rodgers has been committed to heightening the spiritual experience of audiences with the transformational power of music. Rodgers organs not only capture the essence of American pipe organ sound, they have led the way in making organs more accessible to places of worship, universities, music schools, and enthusiasts around the world.