

*What I Know*

for Solo Percussionist and Scripted Looping

by

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# Instructions

**Welcome to the instructions!** There's some important stuff in here, and brevity was never really my thing, so make yourself some tea and get cozy.

*What I Know* is a piece that I wrote for *you* to play. It is also a piece of software, and requires a fair amount of external equipment that you'll need to supply.

To perform the piece, you will need:

- An **Audio Interface** with **at least two 1/4" jack-inputs** (with an "Instrument" / "Hi-Z" switch) and **four audio outputs** (either line-out or XLR will work).

It should be new enough that the round-trip latency to your computer doesn't cause timing issues.

(Anything that stays under ~15 milliseconds at a Vector/Buffer Size of 256 samples should do the trick. Ideally, you'll keep the vector size down to 128 or 64 samples, which will reduce the latency even further. Anything under 6 milliseconds round-trip is basically unnoticeable.)

- **Two Piezos / Contact Microphones** that can be affixed with a strong adhesive. I recommend the "[Imelod Contact Microphone Piezo Pickup](#)", which is available on Amazon in both Europe and the USA, and only costs ~\$10 at the time I'm writing this. Other similar piezo mics for acoustic guitars and ukuleles *should* also do the trick, but I can't guarantee they'll sound right.
- **Two unbalanced 1/4" guitar cables** for plugging the piezos in to your audio interface.
- A piece of **MDF board** 100 cm wide, 60 cm deep, and roughly 18-19mm thick. (This will be referred to here as either the MDF, wood, or table)
- A sturdy **"X-Stand"** (for stage pianos or keyboards). This will hold the MDF. You might also want to find some **thin pieces of foam** roughly the size and shape of the X-Stand beams to place between the MDF and the stand to keep things from rattling.
- A **Mac computer** (sorry, it's a real pain to make softwares for both Mac and Windows, and I happen to be a Mac user). The computer also needs to be somewhat new. A 2018-ish Intel i7 quad-core with a processor speed of 3,2 GHz should be fine, although the newer, the better.

Real-time, low-latency audio processing with lots of loops and effects can be quite hard on the CPU, and you don't want to have any risk of CPU-spikes while performing.

- A **Stereo PA setup** that can produce frequencies between 30-22,000 Hz.
- A pair of **In-Ear Monitors** or earbud headphones that don't draw too much attention. You also might want to get a **headphone extender cable**.

## ABOUT THE PIECE

*What I Know* is performed on an amplified piece of MDF board, and the music is synchronized to a Click-Track that only you can hear. The piece should be a bit like a magic trick, leaving the audience wondering how it all works.

Through the use of a technique I call "scripted looping", certain moments of your playing will be automatically recorded and played back at just the right time. Basically, it's like a looper pedal that's controlled by a musical score.

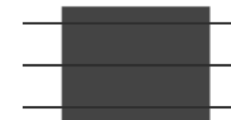
Additionally, various audio effects will be applied to the sound in real time, adding another layer of illusion. In specific moments, the pitch of the audio might be raised or lowered, distorted, or delayed, and when performed successfully, it will create the illusion that you're making these sounds with just your hands and the table.

For this to work, you'll need to use a PA system that is comfortably louder than the acoustic sound of your hands hitting the table. Otherwise, the effect will only partially come through. (Ideally, the entire audience would be wearing headphones to entirely isolate the sound, but that's not very realistic in most situations)

And overall, do your best to hide the fact that you're listening to a click-track. A good magician never reveals their secrets ;)

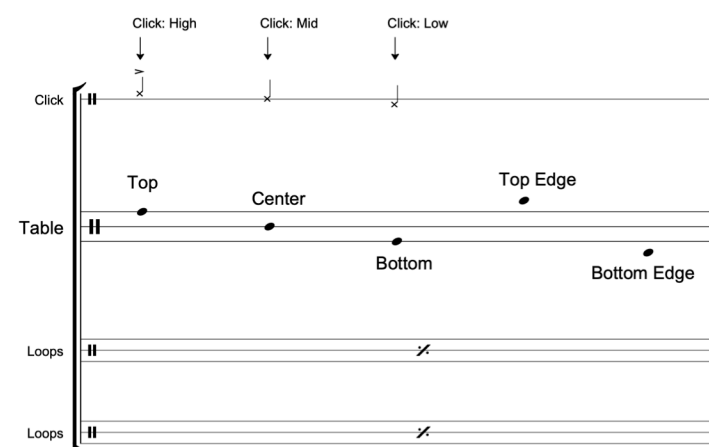
## NOTATION

The sheet music uses a three-line staff to represent the top, middle and bottom of the table from your perspective as you look down on it. The positions on the table can be seen more clearly in this diagram. You'll notice that the top and bottom lines are not quite *all* the way to the edge. The very edge of the table is denoted by notes that lie above and below the staff.



There are multiple staves to represent the click-track, the table (what you're actually playing), and the various loops that will play back at different times in the piece.

The different note-heads and symbols not seen here will be explained in detail on the page "Specific Stuff"



## THE SOFTWARE

When you open the *What I Know* software, you will see a toolbar at the top, and sheet music occupying most of the screen. The arrows at the top left of the page let you flip through the pages (as will the left/right arrow keys on your keyboard). When you play along with the click-track, the pages will turn automatically.

Toolbar Functions:

- **Play/Stop:** Play or Stop the Click-Track
- **Starting Point:** This dropdown menu lets you decide where in the piece you want the Click-Track to start playing from. This is mostly useful for rehearsing.
- **Tempo:** This is just a display of the current tempo. You cannot adjust it.
- **Timer:** This lets you set a timer that delays the start of the Click-Track after you press "Play". This is especially useful at the beginning of the performance to give you enough time to move to your sitting position and take a few deep breaths before the Click-Track starts. I recommend setting this a bit longer than you might think – it's ok to sit in silence for a minute before the piece begins.
- **Count In:** This lets you decide how many beats you want for your Count In when starting the piece somewhere besides "START". This is mostly useful for when you're rehearsing individual sections.
- **Click-Track Volume:** Controls the volume of the Click-Track relative to the music.
- **Performer Output Volume:** Controls the overall volume of your In-Ear Monitors.
- **Audience Output Volume:** Controls the volume of the sound going to the PA system.
- **Channel Routing:** Let's you set which outputs you're using for your In-Ears vs. the Audience Output. By default, your In-Ears are set to channels 1/2, and channels 3/4 will go to the PA.
- **Audio Settings:** This gives you a long list of options to customize the sound. Instructions are given for every parameter.
- **System Settings:** Lets you turn on and off the audio engine, set the Audio Input/Output device (both should be set to your Audio Interface), change the audio sample rate (set it to 44100, or bad things will happen!), and change the audio vector size (64 or 128 are recommended, but 256 might also be ok. The higher you go, the more latency you'll have, but the more time your CPU will have to calculate things)
- **Resize Score:** For screen sizes that are different than the standard MacBook 16:10 aspect ratio, the score may appear weirdly stretched by default. Use these controls to make things look less weird.
- **Save/Load Settings:** Once you're happy with the way you've tuned the settings across the software (such as the various parameters in the Audio Input Settings), you can click "Save" and it will prompt you to save a file. Then, when re-opening the software at a later time, just click "Load" and select the same file to return to those previous settings.

## Table Setup

### SETTING UP THE TABLE

Set the X-Stand to a comfortable sitting height and place the MDF on top. I highly recommend using some strips of foam or thick fabric to cushion the table (depicted by the gray lines in the diagrams).

Feel free to experiment with the height and foam thickness.

### PLACING THE CONTACT MICS

Using the double-sided adhesive that comes with the Piezo / Contact Mic, affix the Piezos to the underside of the table at the front two corners (the side closest to the audience). The edge of each Piezo should be roughly ~2 cm from the edges of the table (in both directions). Press firmly and hold the Piezo for a few seconds to ensure it's properly attached.

This placement *should* offer a sound that works well for the piece, but the placement of Piezos on a resonating wooden body can be very finicky and inconsistent. I recommend starting with this position and going through the sound adjustment process in the "Audio Settings" window in the application. If after doing all of those steps, you believe that something still isn't quite right, you could try minimally adjusting the placement of the Piezos.

**IMPORTANT:** It is essential to affix the cables to the table in some way so to prevent them from swinging around when you hit the table. The cables are highly sensitive, and you'll notice that even barely touching them with your hand causes the Piezos to vibrate and produce unwanted sounds. If the cables are not secured properly, each hit will have an unwanted amount of decay as the cables continue to move and vibrate after the table has stopped vibrating. You can use gaffer tape (depicted by the pink lines in the diagram) to attach the cables to the table, and/or you might find that you can tuck the cables between the foam and the table. Just be sure they're really snug up against the table; you *really* do not want them to come loose in the middle of a performance.

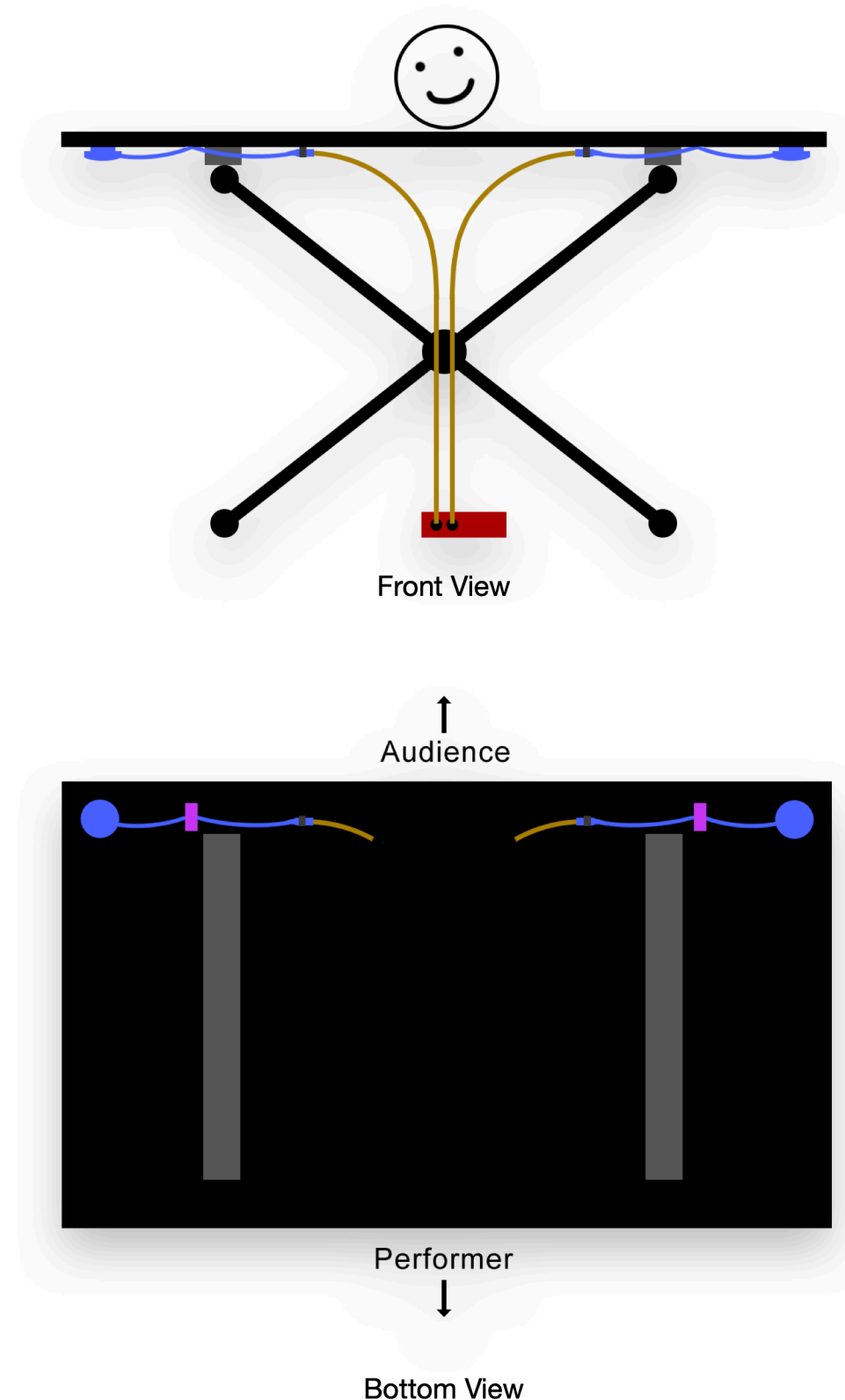
Similarly, the X-Stand might continue to vibrate long after the table stops, producing deeper, slower resonance that will transfer into the cables. Therefore, be careful about wrapping the cables tightly around the stand legs. A bit of contact should be fine, especially to hold up the weight of the 1/4" jack cables, but too much contact might negatively affect the sound.

Trust your ears, and be creative!

### SPEAKER PLACEMENT

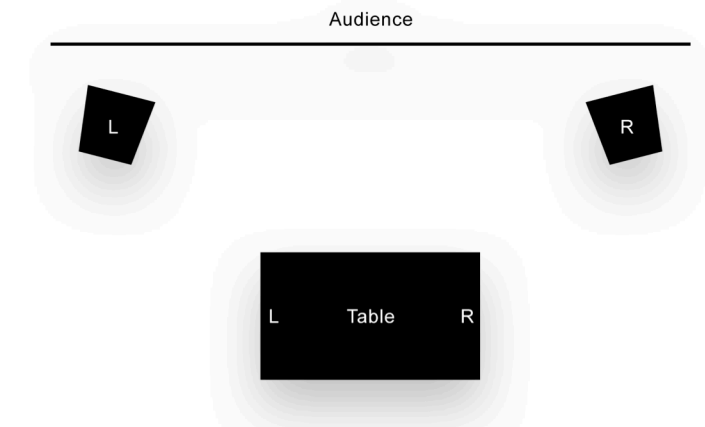
**If you're unsure of how to set up a PA system, find someone to help you or do it for you.**

But in general, the basic idea is that you want to keep the speakers in front of you so that the sound isn't pointing directly at the table. Although this piece uses contact microphones, which are more feedback-resistant than normal microphones, it's not



impossible to have feedback if the speakers are loud enough and pointed right at the mics.

Another potential issue is something called "bleed", which is like a minor version of feedback. Audio bleed is when sound from the speakers makes its way back into the mics during the recording of a loop, and is audible again when the loop is played back. Keeping the speakers far away from the mics will also help prevent this.



**IMPORTANT:** The Left and Right channels should be the same for both your In-Ear Monitors and the Audience – from YOUR perspective! (Refer to the diagram)

If you flip the channels, all of the stereo panning will be backwards to the audience, destroying the illusion of space created by the side-to-side "slides".

Regardless of how you're routing Channels 1/2 or 3/4 for the IEMs or PA, the odd channel numbers will always be left, and the even channels will always be right.

**Recommendation: Hire a sound engineer.** Although I've designed this piece to be relatively stable in loudness, and although there are compressors and limiters built in to the software to help prevent sudden bursts of sound, none of these precautions are as safe as having a trained person behind the mixer. Sound can be dangerous! So again, I *highly recommend* finding a skilled sound person and entrusting them with the faders.

### PERFORMANCE TIPS

One of the goals of the piece is to create the illusion that the table is really producing all the sounds being played through the speakers, and that the loop-playback is a kind of "response" from the table. It's like a magic trick; of course the audience will know it's not real, but if the illusion is good enough, the audience will forget what they know.

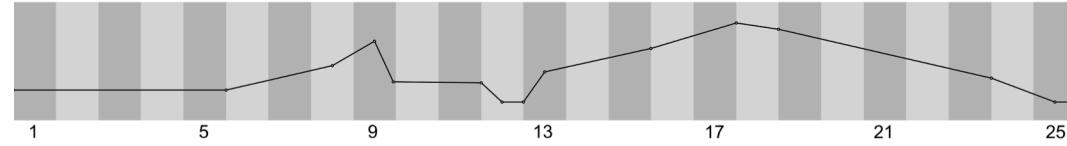
Therefore, it's advisable to try to conceal your In-Ear Monitors. For example, consider putting them on *before* going on stage, and run the cable through the back of your shirt, rather than letting it visibly hang in front of you.

That being said, I don't think it's important to conceal the computer and audio interface. I'll leave that up to you.



## Specific Stuff

❶ During the 25 times playing through measure 4, the tempo will vary according to the graph below. The click-track will guide you. As the tempo increases, play slightly louder and slightly increase the size of the circle, and vice versa as the tempo slows down. Overall, it shouldn't get louder than mezzo-piano.



❷ Slides: Slide your right index finger across the surface of the table, following the path shown in the box above the black line. At both the start and end of the slide, your left index finger will tap the table at the spot directly next to the right index finger. At the end, both fingers lift together simultaneously.

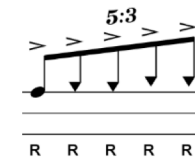


No matter the direction of the slide, the right finger will do the sliding, and the left finger will do the tapping. However, you may flip the hands, so long as you keep it consistent throughout the whole piece – also flipping all of the L and R stickings.

Feel free to use more than one finger, or even the whole hand, to increase the volume of the slide, when appropriate.

- m. 4 and mm. 17-21: Start and end the slide in the very center of the table, making a little circle out to the right. You may vary the size of the circle according to the tempo (covered in point ❶), but don't let it get too big.
- mm. 6-9 (and sim.): Start at the center, and slide straight to the left or right side, according to the path shown in the box above the black line. End a few centimeters from the edge of the table. Same goes for the up and down arrows.
- mm. 177: Start at the left edge (where you just ended the slide in mm. 176) and slide on an oval path clockwise around the entire table, ending only slightly below where you started.
- m. 179: Same as m. 177, starting where you left off, but once again ending slightly below – about halfway down to the bottom left corner.
- m. 180: Starting from the previous point, slide fully into the bottom left corner, then from that corner to the center of the table.
- \*\*\* mm. 175 and 179: In these two measures, the actual length of the slides cannot be represented using standard "dotting" notation. Measure 175 has a slide length of nine 16th notes, and m. 179 has a slide length of nine 8th notes. To make this more clear, there are dotted lines showing where the slides start and stop in relation to the loop playback.

❸ Downward-triangle note-heads / Pointy-Jabby-Thingy: Relax your hand and fingers. Now bring the tips of all four fingers and thumb together, as if trying to hold onto a small object using every finger at once. Your longest fingers should be slightly bent to be the same length as your thumb and pinky.



Using this hand-shape, poke/jab the table forcefully, pressing in with every stroke. This will appear to raise the pitch of the table (it will happen digitally). Like in measure 35, this will often happen in a group of many notes, in which case you should morph your hand from a normal stroke to this pointy-jabby thing over the course of that grouping.

Also take note of the position of these notes on the staff, and move your hand on the table accordingly (usually moving slightly upwards over the course of the note-grouping)

❹ Loop box: This simply shows the portion of the music that will be looped.

❺ Palm hit: Use the palm/heel of your right hand to create a thick, punchy sound. This stroke is like the "kick drum" of the piece.



Ghost notes / Taps (small notes): Play them softly. Feel free to use two fingers for fast double-strokes.



❻ Start these 6-lets normally at the bottom-center of the table, and move your hands away from each other along the bottom edge off the table, getting closer to the outer corners. The sound will seem to get further away, as if the corners of the table would be distant, echoey chambers.

In this section, the vertical dimension of the notes on the staff represents the side-to-side dimension of the table.

❼ In this section, the palm hits are less like kick drums, and more like heel-toe conga strokes ("Marcha"). Also take note that the left hand is alternating between normal strokes and "pointy-jabby" strokes.

❽



Make a fist and strike the table with the first row of knuckles closest to the tips of your fingers, as if you're knocking on a door.



Flick the table with your fingernail. The strike should be quick and staccato, but the hand should move away slowly and delicately, matching the spacious sound.

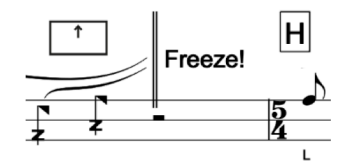


Using your fingernails, quickly swipe from left to right, or right to left (randomly switch directions, and which hand is swiping). The motion should be similar to swiping through pages on a touch-screen tablet – except with your nails, instead of your fingertips.



Again using your fingernails, slide your hands around randomly on the entire surface of the table, trying not to lift your fingers (it may happen now and then, which is fine, but try not to create any audible articulations). It's a bit like using brushes on a snare, but try not to follow any patterns or repeat movements. Be expressive!

At the end of this section, the last two beats should suddenly move towards the top-center of the table. Lift your hands suddenly right on beat 3 and freeze your position for two beats until starting to drum again at H.



❾ Using both hands, swipe quickly and forcefully from the center of the table off to the right, as if to 'fling' the sound to the right side of the room. You might even turn your head to 'watch' the sound fly off into the distance.

❿ On the last note of this 4:3 gesture, freeze your position, keeping your right hand upright and pressed into the table.

On beat 3 of the next measure, suddenly and forcefully flick your fingers outwards to the audience, even using your fingernails a bit to activate more sound from the table. Freeze and hold the position for a few seconds as the sound fades.

(Assuming you're not a German in the early 1940's: as you flick your fingers out, rotate your hand 45-90° to something more like a handshake position)



# What I Know

for Solo Percussionist and Scripted Looping

Commissioned by Justin Lamb, Chris Amick, Trevor Barroero, Justin Bunting, Omar Carmenates, Andrew Eldridge, Chris Harris, Leila Hawana Kaneda, Cameron Leach, YoungKyoung Lee, David Lord, Marco Díaz Pérez, Matthew Sandridge, Rick Schadt, Sam Sherer, James Vilseck, and Jordan Walsh

Connor Shafran

Click-Track

Table

Click

Table

Click

Table

Click

Table

Loops

Tempo markings:  $\text{♩} = 90$ ,  $\text{♩} = 100$ ,  $\text{♩} = 130$ ,  $\text{♩} = 145$ ,  $\text{♩} = 160$ ,  $\text{♩} = 151$ ,  $\text{♩} = 130$ ,  $\text{♩} = 80$ ,  $\text{♩} = 150$ ,  $\text{♩} = 170$ ,  $\text{♩} = 120$ ,  $\text{♩} = 110$ ,  $\text{♩} = 120$ ,  $\text{♩} = 90$ ,  $\text{♩} = 120$

Dynamics: *pp*, *mp*, *mf*, *f*, *sim.*

Articulation: *accel.*, *rit.*

Other markings: 25x, 2, 1, 4, 5, 6, 3, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100









Click 105 *rit.*  $\text{♩} = 110$

Table

Click 123 **G**

Table

Click 138  $\text{♩} = 125$  **H**  $\text{♩} = 132!$

Table

Loops

Click 150

Table

Loops

156  $\text{♩} = 127$  I

Click  $\frac{3}{4}$   $\frac{3}{4}$   $\frac{4}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$

Table  $\frac{3}{4}$   $\frac{3}{4}$   $\frac{4}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$

Loops  $\frac{3}{4}$   $\frac{4}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$

*f* *mf*

RLRL LRRRL LRRRL

5:3 5:3 6 6 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3

163

Click  $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{2}{4}$   $\frac{3}{4}$   $\frac{3}{4}$

Table  $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{2}{4}$   $\frac{3}{4}$   $\frac{3}{4}$

Loops  $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{6}{4}$   $\frac{2}{4}$   $\frac{3}{4}$   $\frac{3}{4}$

3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3

168 J

Click  $\frac{7}{8}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$

Table  $\frac{7}{8}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$

Loops  $\frac{7}{8}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$   $\frac{5}{4}$

3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3



173 *accel.*  $\text{♩} = 135$

Click

Table

Loops

Loops

*fff*

179

Click

Table

Loops

Loops

184  $\text{♩} = 110$

Click

Table

Loops

9

10

10

4:3

L R R R R