The Introductory Guide to Creating Pad Charts for StepMania

June Goal: Fix todo's

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Link to Terminology Guide - From a step artists POV

Steppers Anonymous Discord to assist new step artists!

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Overview

Creating a step-chart is a multi-part process. In this guide, **you'll learn all the steps involved to create a 4-panel step chart**, with a lot of information regarding what to do, what you can do, and what you probably shouldn't do. Note that most of the basic conventions regarding stepping are somewhat universal to other games that Stepmania simulates. Below is a summed up list of the steps:

- Finding and downloading a song
- Converting a music file to the proper format
- Adding a song into StepMania
- Syncing a song in StepMania using Audacity
- Stepping a song with basic-patterns
- Setting preview music
- Creating graphics (background, banner and/or jacket)

Stepping a song is the longest and most difficult part of the listed steps. There is a lot of focus needed and the need to double, triple, quadruple check your work to make sure your chart is consistent, flows how you want and is overall what you (or others) can enjoy playing. You can never polish [look over and fix] a chart too much.

Take your time.

Getting Started

Keep in mind that this guide is here to assist all who will appreciate some guidance to becoming a good step artist. Admittedly, this guide has some personal bias and will only cover the basics of creating a step-chart, without any focus on any current meta's. Stepping can be considered a form of art, and how every person perceives a song is different and that's what makes step-charts unique.

Download StepMania

Before you begin, **make sure to download StepMania**. This guide's point of view will be from **StepMania 5.3 "Outfox"**, which is the current build of StepMania as of this guide.

It's also recommended that you download Audacity (don't worry, it's free), as it'll be referenced to make sure your song is correctly synced in Stepmania. In the future, Audacity is also useful for more advanced methods of creating simfiles, such as cutting music [shortening audio files], adding fade outs/ins, and amplifying audio files in rare cases. There are other music programs you can use, but for now examples will be in Audacity.

Lastly, any unknown terminology referenced in this guide can be found here. Note that the words *chart* and *file* are used interchangeably, but a chart typically refers to a specific song and difficulty, while a file could refer to a specific song OR the entire folder related to that song, which includes the audio file, background, banner and any other misc. files.

"I believe that mathematical reality lies outside us, that our function is to discover or observe it, and that the theorems which we prove, and which we describe grandiloquently as our "creations," are simply our notes of our observations." — G.H. Hardy, A Mathematician's Apology

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Finding a Song for StepMania

While it may feel natural to try and step a song you personally like on the radio, chances are that it may not make a great step-chart. For first-time steppers, **I recommend a song that may fall into the dance/electronic genre until you understand the basic concepts of stepping**. If you still wish to continue with a popular song, be warned that you may not be able to apply many of the stepping conventions mentioned in this guide.

Some tips when searching for a *steppable* song:

- Shorter songs are usually better, and easier to step
- Avoid LIVE music as it's extremely difficult to sync and beyond this guide
- *Other tips I forgot to mention that I'll add over time etc…*

Song Lengths

Song Lengths in Stepmania are broken down into three categories:

- ***Normal***: Anything less than 2 minutes and 30 seconds
- ***Long Version***: Less than 4 minutes but longer than *Normal*
- ***Marathon***: Anything above 4 minutes

In the ye' olde days of playing rhythm games, players were limited to the amount of songs they could play per one credit, which was usually three songs. Songs that were considered *Long Versions* (common in another dance-game, Pump It Up) would take up two songs, although you only played one song that was long. And in theory, *Marathons* would take up all three songs. This was notable while playing long, custom songs on In The Groove.

A good song length is arguably between 1 minute and 40 seconds, and 2 minutes (between 100 seconds and 120 seconds). Most DDR songs fall within this range which is arguable as to why this range works; whether it's licensing issues or to keep the average play-time between players at a specific average. Songs that are above 2 minutes also tend to become exponentially more tiring for average players. *Note: StepManiaX (5-panel dance-game similar to DDR) uses 1 minute and 45 seconds (strictly for licensing reasons).*

Song Speeds

A song's speed is determined by the amount of beats that happen per minute (BPM). For example, *Break My Heart by Dua Lipa* has 113 beats per minute. If you manually tapped to every beat evenly, you'd tap exactly 113 times each minute. There are programs and websites that attempt to calculate a song's speed by "finding" the beats and counting them. Songs can realistically be really slow like Bag (65 BPM) or can also be really fast like Endymion (220 to 880 BPM).

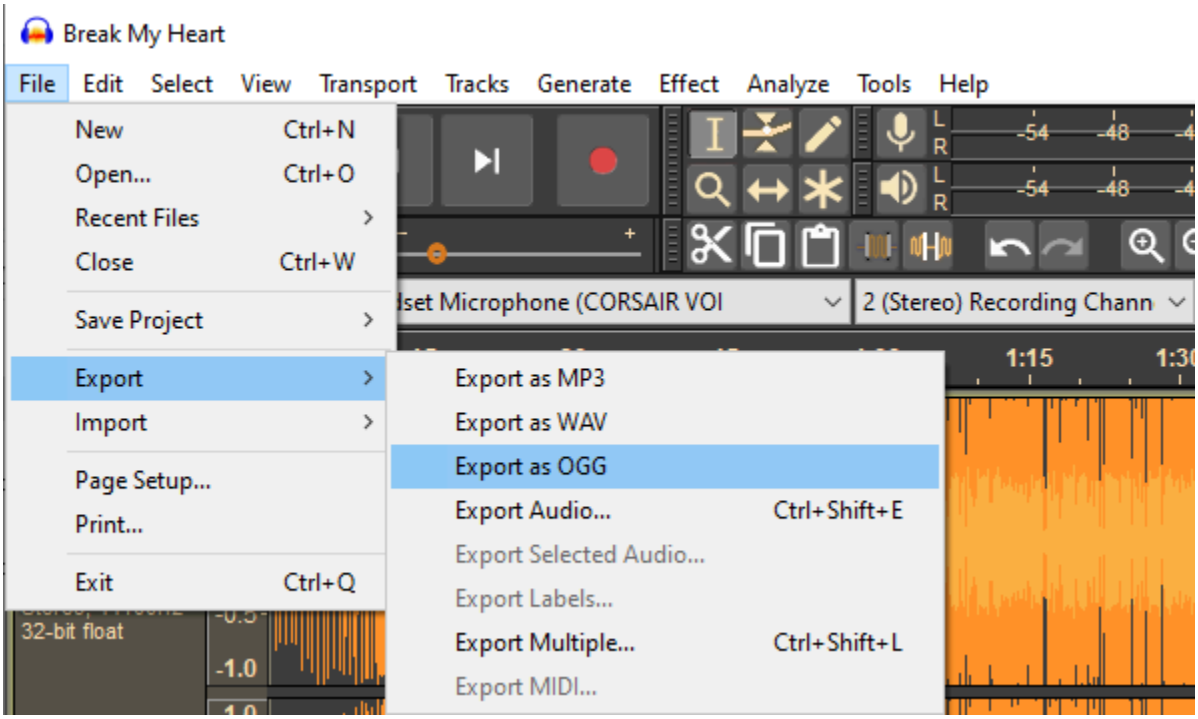
A good range for song speeds is anywhere between ~120-180 BPM. Slower songs tend to not be as steppable, so they can easily feel boring and stepping slower songs don't follow the average stepping conventions. Faster songs limit the amount of complex-patterns a step artist can use without making a song too difficult. The limited flexibility is dangerous for beginner step artists who don't currently understand how hard they're making a chart.

Downloading a Song

Once you've found a song to step, you need to acquire the music file for that song. Audiophiles will criticize this, but if you can find your song on YouTube or other video streaming site and have no other means of acquiring the song, you can download the song by using a converter such as YouTube to MP3 Converter.

Converting File Format (.ogg)

Once you have the music file, it is **highly recommended to convert your music file to the file format known as .ogg**. It only takes a moment. There is/was an issue in StepMania about using other types of music file's due to variable bitrates (which caused the music in the Editor to not always be on-sync). Using the aforementioned program Audacity makes converting a quick and easy process. Just open your file in Audacity, and go to *File -> Export -> Export as OGG*. Once you have your music file in the correct format, it's time to add it to StepMania.



Example of Exporting a file as .ogg in Audacity

Adding a Song into StepMania

Every simfile in StepMania consists of at least two files: a music file and StepMania file. The next step is to navigate your StepMania folder and place your music file where it belongs. Don't worry about the StepMania file, it will be created automatically later on, as it will hold useful information about your song such as your steps and a plethora of other song information.

Create Pack and/or Song Folder

Follow these steps to add your music file into StepMania:

- Open your StepMania folder and look for a folder named *Songs*. This folder contains all the song groups (packs) for your StepMania.
- Open your *Songs* folder and create a new folder. Name it anything you'd like, such as *Customs*. This folder will contain your own files.
- Open your newly created folder, *Customs* or whatever you named it, and create another new folder. This time the name of the folder is going to be the name of the song you're going to step. If you were going to step a song called *Break My Heart,* then that should also be the name of this new folder.
- Open your newly created song folder, *Break My Heart* or whatever song you're going to step, and place your music file inside.

Example: *StepMania 5.3 Outfox\Songs\Customs\Break My Heart*

That's it! Your song is now in StepMania. You can now load StepMania, select Edit Mode, and using the arrow keys, scroll until you see your pack and you should see your new song ready to be stepped by you.

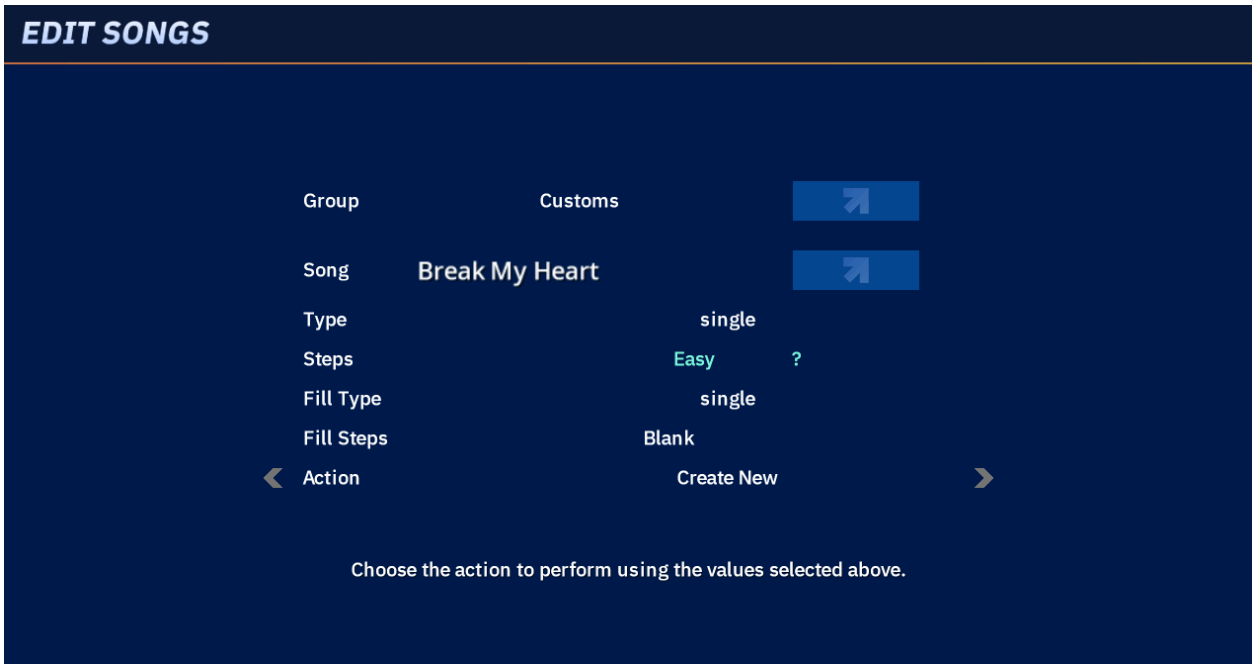
StepMania Editor

The StepMania Editor is where you will edit your chart. There are extra functions and an overwhelming amount of information at your disposal.

When you select Edit Mode on newer StepMania's, you're greeted with a screen that has different options. The first option labeled *Edit Songs/Steps* is what you want to select for editing songs. Most older StepMania's won't have this screen.

Selecting a Song

Before you officially enter the editor, you'll need to select the song you're editing. For the sake of simplicity, you don't need to understand everything on this screen. The editor organizes songs by *Group*, commonly referred to as a *Pack*. Under each group you can select the songs available in that group to edit. There should only be one in your folder if this is your first time. Lastly, you can change the difficulty you're going to edit. Scroll to the bottom and press the Enter key when ready. Example of what you should see below:



Example of the screen before officially entering the StepMania Editor

Common Keys

Below are some of the most commonly used keys in the editor so you can comfortably edit your song. I suggest you press each of these if you're following along step-by-step:

- Pressing the **1**, **2**, **3**, or **4** key will add/remove a step.
- Pressing **Up** or **Down** on the arrow keys will move the chart up or down by the selected step-type.
- Preferably, you can also use the **Page Up** and **Page Down** key to move the chart up or down by an entire measure. **Home** or **End** will bring you to the beginning or last-most step of your chart.
- Pressing **Right** on the arrow key will change the selected step-type, which is denoted by the color on the sides of the step panel (and in the top-right corner of the editor next to the words, *Snap To:*).
- Pressing **ESC** (escape), will bring up your main menu. Pressing this button while the song is playing will immediately stop the song.
- In the main menu, you can access the **Save** button. StepMania does auto-save, but it's good practice to manually save periodically.
- Pressing the **P** key will play the song about half a measure above the currently selected position, or its current position if no position is selected.
- Pressing the **Space Bar** will select/deselect your current position. Pressing the **Space Bar** in two different positions will highlight (in red) everything between those positions. *Note: Inclusive on the first position but exclusive on the second position.*
- Pressing **F11** or **F12** increases and decreases the offset of the song.
- Pressing **F8** while your song is playing toggles *Autoplay*, a mode where the steps are always hit flawlessly.
- Pressing **F7** while your song is playing toggles *Assist Tick*, a noise similar to a tap every time a step is supposed to be hit.

Stepping

As a step artist, it's important to know what you're doing (duh). Understanding patterns is the most important part of creating a chart. Knowing when and where to use certain patterns can greatly improve the quality of a chart. For starters, it's best to learn how to apply basic-patterns before attempting to apply complex-patterns to your chart.

Do not worry about trying to impress the world with your first few charts. Like any hobby, it takes time to become better. Every chart you create is a step towards an even better chart in the future. As long as you're following good practices, stepping will become easier and the quality of your charts will become better.

Context and Style (brief)

Sometimes charts are created to serve a purpose, further than just being stepped because someone enjoys a song. Most notable in packs, there are sometimes a wide range of different step-styles. Some charts are straight forward, using only basic-patterns. Others may use an extreme amount of crosses or other complex-patterns. Some charts may be watered down [made easier] purposely to fit a specific difficulty, while others may use a lot of syncopation to create artificial difficulty. Either way, remember that charts may be created for a purpose before.

The amount of work needed to complete a simfile is also dependent on the context in which it was created. A simfile for yourself might not need graphics, multiple difficulties or good preview music (the clip you hear during song selection), but a pack for public release will appreciate all those extra things that make your simfile look and feel as complete as possible.

Always remember that you're stepping because you want to, not because you have to and at the end of the day, guides like this are here to assist you, not control you.

Step-Types: 4th, 8th, 16ths etc.

As you begin stepping, you should strongly understand the three step-types (numbers) in the title, the 4th, 8th and 16ths. These numbers represent the most common step-types you'll use in stepping. For first-time step artists, you should at least understand the first two.

A 4th note, also referred to as a quarter note, is any red arrow you see in a chart. 8th notes, are any blue arrows and 16ths are any yellow arrows. Each of these represent a **step-type, which defines where an arrow is placed relative to a beat**. For example, 4th notes are placed on beat bars signifying the arrow is placed on beat, while 8th notes are placed exactly in between beat bars signifying the arrow is placed in between a beat. You'll notice many of the examples used below later in this guide commonly use 4th and 8th notes.

A good example to try and understand the concept of 4th and 8th notes is to try counting out loud. Listen to the song of your choice and try to count out loud, "1, 2, 3, 4" as every beat passes. After you've done that a few times, try saying the word *'and'* in between your counting. Each number represents a 4th note and each time you say *'and'* represents an 8th note. This is what 4th and 8th notes signify in music. It's now safe to mention that there are only four 4th notes in a measure, and eight 8th notes in a measure. Can you guess how many 16th notes can fit in a measure?

A step artist will typically choose to focus on matching with different sounds at different times. It's up to you to place steps where they belong. Sometimes, you'll forgo adding steps if there's a specific sound that you're matching with that suddenly goes absent, until it can be heard again. Sometimes you'll match with every sound, leading to a string of red and blue arrows which is very common.

16th notes are a bit tricky, because a 16th note can appear both before and after an 8th note. There are slightly different reasons to utilize 16th notes but most commonly it's the same reason as 4th and 8th notes, which is to match steps with specific sounds. *TODO: Create own page on 16ths*

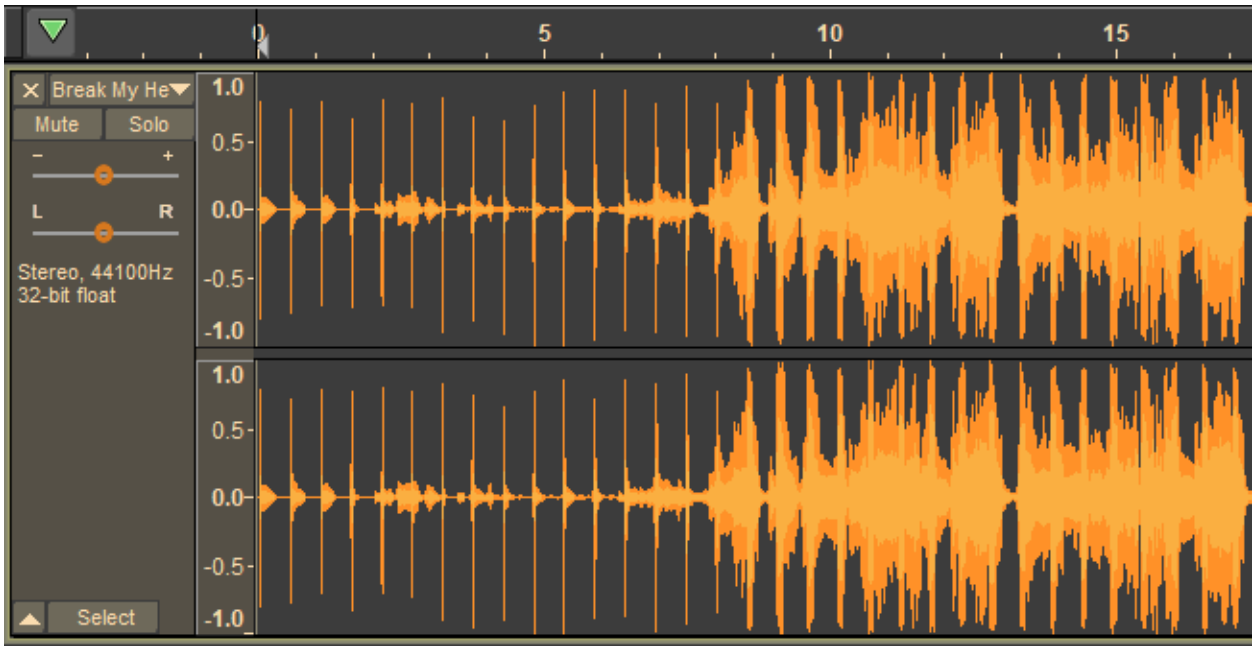
Preparing a Chart for Stepping

Before adding steps, you need to prepare your chart for stepping. This requires two things: set the correct song speed and correctly sync the song. **Setting the correct song speed is important as it can affect your songs sync negatively if it's incorrect; syncing your song lines up the beat of the song with your chart properly in StepMania.**

Adjust Speed and Sync

From the very top of your chart, press the ESC key and scroll down to the option *Edit Timing Data* and press Enter. Select *Edit BPM Change* and enter the current songs speed and press Enter. If you do not know the current songs speed, **TODO: Link BPM analyzer and sites**

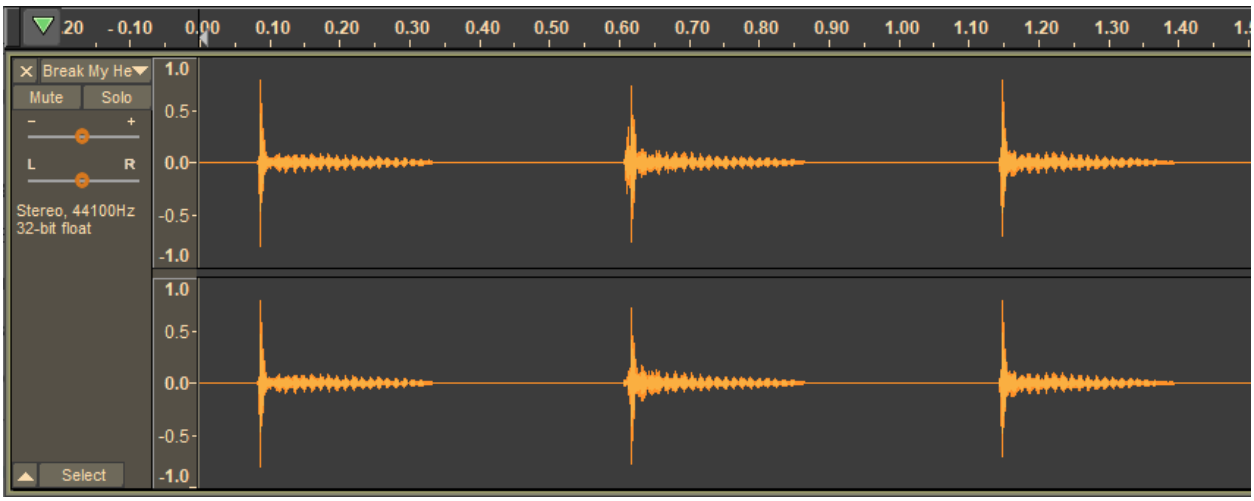
One way to sync a song is by using Audacity. Open your song in Audacity and take a close look at the beginning. Below is an example of *Break My Heart*, opened in Audacity:



A song in Audacity (not zoomed in).

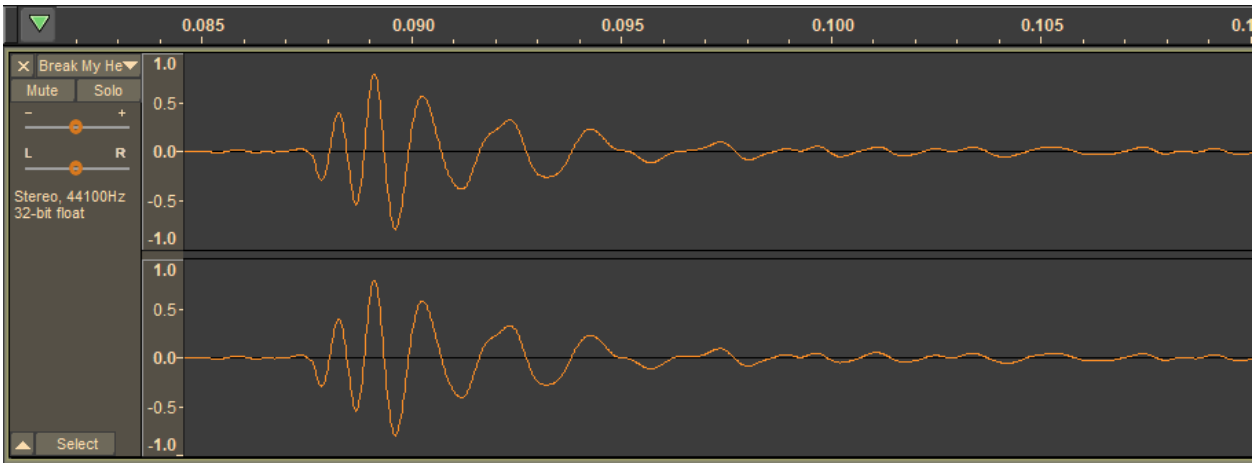
Your song will look very different, but that's normal. Every song is broken down into a waveform and since every song is different, expect different waveforms. What you are looking for is **any distinct peak in the waveform of your song**. In this example, I lucked out and can see plenty of peaks early on in the song, so I will focus on the one furthest to the left. These peaks usually indicate a strong 4th beat, so finding one that is very distinct is useful to making sure your song is synced.

Once you find one, you should zoom-in towards the peak. To do so, press your CTRL key and use your mouse-wheel to zoom-in, or click the magnifying glass at the top of Audacity and you can left-click to zoom-in or right-click to zoom-out. Make sure to hover over your peak as you zoom-in. The peak should now be more noticeable.



A song in Audacity (zoomed in).

As you can see, we now have a more clear view of the left-most peak. Note the numbers above the peak as that is the time in which the peaks happen. What we want is to see the exact time the first peak happens. We can guess that it's before 0.10 in the image, but we can be more precise than that, so let's zoom-in further.



A song in Audacity (zoomed in further).

This is as zoomed in as you need to be to find near-perfect sync. Notice that the largest and left-most peak peaks at the time 0.089. It's safe to say that this beat happens around that time. Once you find the time of the beat you zoomed-in on, next is to apply it in StepMania.

Memorize or write down the time of your beat from Audacity, and in StepMania, scroll down until you're at the closest position to your time. Keep an eye at the top-right of your screen to view the *Current Second:* tab. Also make sure the *Snap to:* tab is still on *4th notes.*

Once you're as close as possible, use the F11 and/or F12 key to change the offset of your song. You'll notice that the *Current Second:* tab changes every time you press these keys. You are effectively changing the songs positions compared to the beat bars on your chart. You should also notice that the *Current Second:* tab is only changing by 0.020 seconds each time. If needed, hold down the ALT key while pressing F11/F12 to change the offset by 0.001. Keep doing this until the beat your is on the time you memorized or wrote down from Audacity.

Begin Stepping

Now that you're ready, it's time to begin adding steps. You'll notice that the editor has four arrows at the top; the *step panel*. You'll also notice a bunch of white lines in the center, which represents the beats where you will add steps. The white lines are referred to as *beat bars*. For most songs, every four beats is a *measure*. Measures are noted by the number on the left-side of that specific bar and it's also a slightly thicker white bar. Measures are useful for noting sections, as most sections are a certain amount of measures long (2, 4, 6, or 8 etc.).

As a last precaution, I recommend you **scroll down to the end of your song and place a step**. For example, if you know your song is about 2 minutes long, then you'll scroll down to where StepMania shows 120 seconds on the *Current Second:* tab. StepMania only plays until the last note is reached but if you haven't added notes, StepMania will keep playing the same part over and over, so adding a step avoids that headache and stops when you hit ESC instead.

Next is to play the song (P key to start), **listen closely to the music**, **stop the song** (ESC key to stop), **and add steps**. You'll be doing this over and over again: **Play, listen, stop, add step(s), repeat**. Like any hobby, this becomes easier over time as you do it more often and creating charts won't always feel so tedious. StepMania autosaves every few minutes, but **you can also manually save your work (recommended) by pressing ESC and selecting *Save*.**

There are usually only two good reasons to add steps anywhere in a song: where a sound is present and/or wherever you *feel* like it. **Arguably, the best way to step a song is to add steps only when a sound is present**, but the reality is that it's your chart and maybe you want to express parts of the song by adding steps even if there's a lack of sounds; this is called syncopation. For starters, it's wise to try and do the former (add steps to sound).

For most easier charts, you'll likely be adding only 4th notes and 8th notes (red and blue arrows) which will keep stepping simple. **If there are too many sounds and you feel overwhelmed, you could selectively choose which sounds you're going to add steps to**. For example, if you choose to add steps to vocals (a singer's voice), you can skip adding steps where vocals are absent, even if there is a clear sound every beat. If you're unsure what sound(s) to match with, try matching with the more prominent sounds you hear.

Listening for Sections

Every song can usually be broken down into parts or sections, most noticeably when the beat changes in some way. Keep in mind most songs also repeat sections every few measures, usually in fours (every four, or eight, twelve, etc). As you add steps, **it's best to try and remain consistent through each section of your chart**. For example, a song might have the following sections:

1. Intro
2. Verse 1
3. Chorus 1
4. Verse 2
5. Chorus 2
6. Outro

If during Verse 1 you decided to add steps to match a singer's vocals, you should also do the same for Verse 2. This creates consistency in your chart, familiarity for the player(s) playing your chart and will help you save time stepping repetitive sections.

Fortunately, **StepMania allows you to copy/paste steps** by selecting two different positions (using the Space Bar) and then by entering the Alter Menu (A key) and selecting *copy*. You can then select a position to *paste* the copied section by selecting the new position (Space Bar) and by pressing the Enter key and selecting *Paste at current beat*.

You don't need to be a musician to understand that songs are divided into sections. Once you listen to a song enough, you should be able to pick out where each section is or at least have a general idea. If it's not obvious at first, don't worry, it'll get easier with time (just like stepping) and can vary between different genres of music.

Again, try and remain consistent. For example, **if you added jumps or freeze arrows in your chart in one section and the exact same section repeats, you should add jumps and freeze arrows in the same relative spots in the following section too.**

Understanding Patterns

Patterns **are the arrangement of steps that players can specifically identify, either by the amount of steps grouped together or a specific arrangement of steps.** Some common patterns have names that make discussing and stepping charts easier which can be found here: StepMania Terminology.

As stated at the beginning of this section, patterns can be separated into two categories: **basic-patterns** and **complex-patterns**. Basic-patterns are intuitive for the player to hit without much thought or the need to turn too much. Complex-patterns are less intuitive and require some learning before the patterns feel natural.

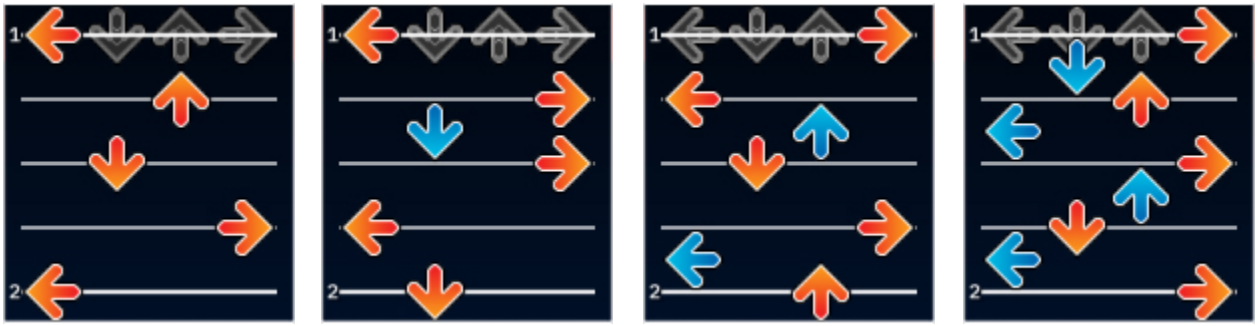
The bulk of your chart, if not your entire chart should consist of basic-patterns: **patterns in which a player can hit every step using both of their feet intuitively, one after another without crossing.** These patterns are without a doubt the most fun to play for everyone and anyone, and easiest to recognize. These are the patterns first-time and non-veteran step artists should be utilizing in their charts until they have a better understanding of basic-patterns.

To add difficulty or to emphasize the music more, you might add complex-patterns: **patterns that require the player to cross, turn their body abruptly, double-step or require prior know-how to hit properly.** These types of patterns can be very difficult to add correctly into a chart without ruining the flow and overall quality of your chart. First-time steppers should try avoiding complex-patterns and focus on using basic-patterns. This is not to discourage anyone but to emphasize that using complex-patterns takes time to learn.

Lastly, it's important for step artist's to follow the flow of their own chart. Trying to avoid double-steps is important (unless utilized for special reasons), but it's common for step artists to mistakenly add them. Creating ambiguity is usually frowned upon and a step artist should look over their chart carefully to make sure every step flows the way they expect.

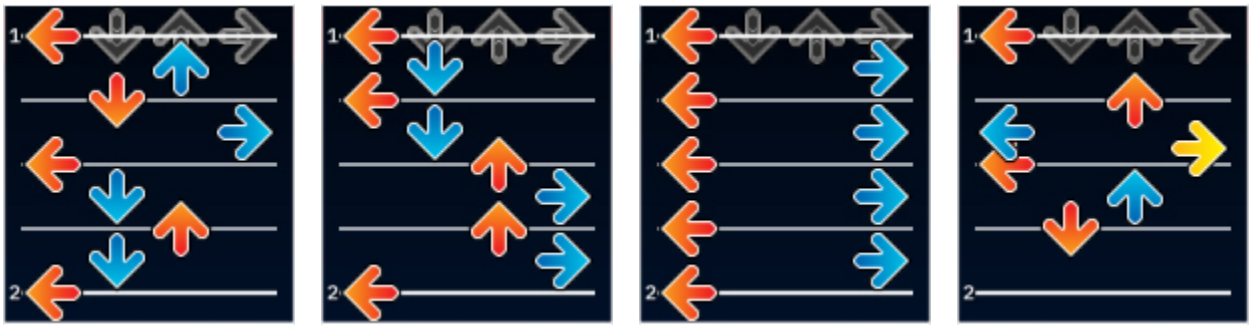
What are Basic-Patterns

As stated above, basic-patterns are **patterns in which a player can hit every step using both of their feet intuitively, one after another without crossing.** Below are some random examples of patterns that are intuitive. I recommend standing up and moving on an imaginary pad to help understand why these patterns <u>feel</u> intuitive if it doesn't look obvious.



Examples of basic-patterns

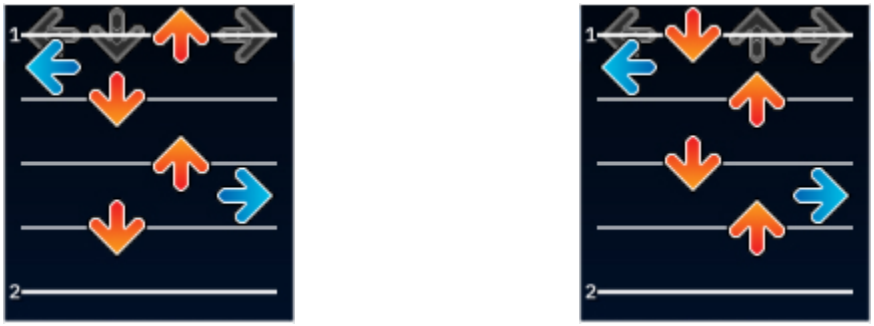
As you're stepping, these types of patterns should be used. The spacing between them is irrelevant and the idea is that the player can just move their feet, one after another, without the need to do any complicated movements. As you step more often, these types of patterns will come naturally.



More examples of basic-patterns

Candles

There is one basic-pattern that is naturally a tad more difficult than others; *candles*:

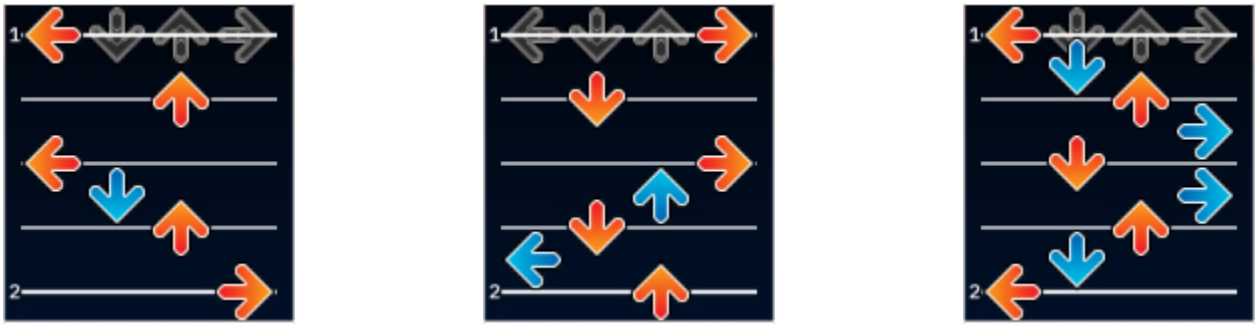


Examples of Candles

Although the pattern(s) above fits the definition of a basic-pattern, it is more tiresome to do consistently than other basic-patterns because **you are moving your foot across the center of the pad**. Do not worry too much about patterns that incorporate candles.

On the left-image above, you start with your right-foot stepping on the up-arrow, then your left-foot steps on the left-arrow and finally your right-foot crosses the center of the pad to step on the down-arrow. **This is tiring to do over and over**. Unlike most other basic-patterns, this can easily increase a song's difficulty and greatly reduce quality on more difficult and faster charts.

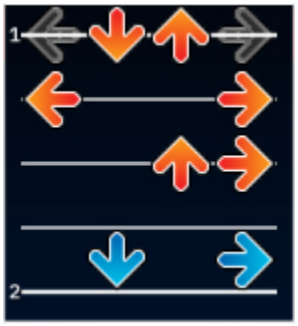
Candles are not always apparent at first and may take some time to recognize. Look at the patterns below and see if you can spot the candles.



More examples of Candles

Jumps

Jumps are **when two steps appear on the same beat**, forcing the player to jump on both steps at the same time. There are only six ways a player can jump on a pad (for 4-panel at least). The two most common jumps are with the left-right arrows, and up-down arrows (the first two jumps in the image below).

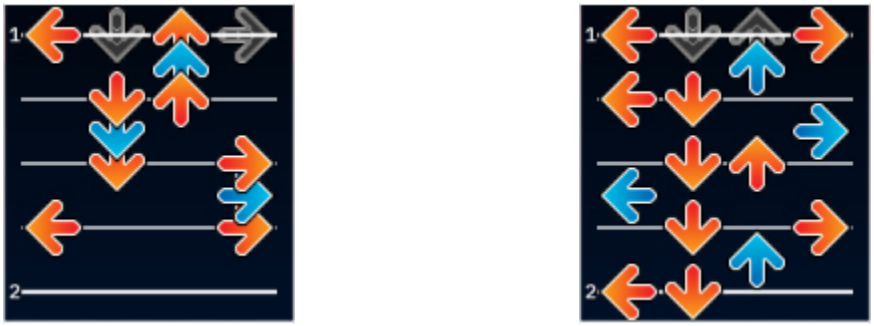


Example of assorted jumps

Placing jumps on louder, more distinct beats, that standout is usually a good idea. Jumps can easily disrupt a song's flow or momentum, and an excessive amount of jumps can ruin the quality of the chart, but that doesn't mean it can't be done right.

Chain and Step-Jumps

Sometimes you'll sacrifice some flow (or attempt to keep it) by adding jumps and keeping steps between them. Below are two different examples, chain-jumps and step-jumps:



Example of chain-jumps and step-jumps, consecutively

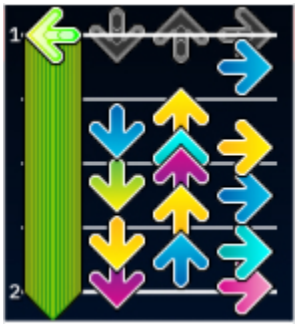
Arguably, **chain-jumps are easier for a player to hit** because at least one of their feet is on the proper step before each successive jump.

Freeze Arrows/Holds

Freeze arrows/holds are **a stretched, or long step that requires a player to keep the step pressed down for the duration of the freeze arrow**. A step artist can use freeze arrows to emphasize sounds in music that are constant, and/or to control the players movements.

Examples of Freeze Arrows/Holds

Since freeze arrows force a player to keep one foot on one of the steps, adding any steps during a freeze arrow forces the player to hit those other steps with only the other foot. First-time step artists should try and avoid adding too many steps during long freeze arrows. Steps during freeze arrows can also force the player to cross (shown above), which can be difficult and should be used sparingly, if at all.

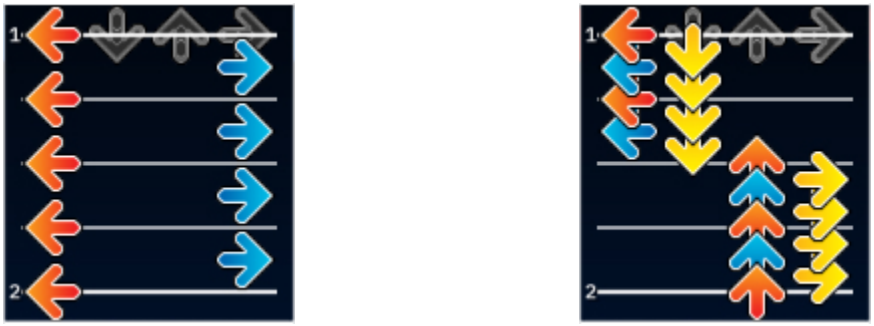


Example(s) of what NOT to do!

(TODO: Add Image of 16th end above note per Gradi)

Drills

Drills are **any two, consistently alternating steps**. Although drills are easier to read than streams, drills can be more difficult when they are long, but are preferable in shorter sections.



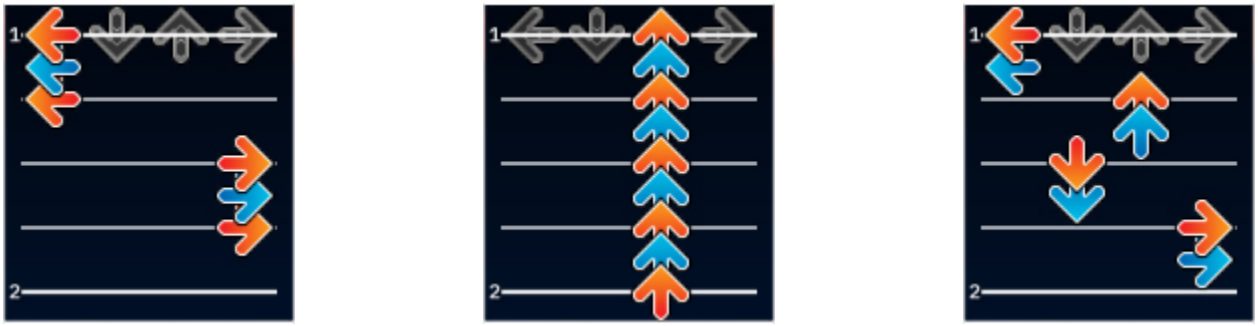
Examples of Drills

Drills can be used anywhere to make a chart easier, as it is the most intuitive pattern to hit. Drills are also useful for matching with repeating sounds that are alternating, similar to how jacks are useful for matching a single, repeating sound.

Mini-drills, or short repeating patterns are very useful for making easy patterns. Most easier difficulties should utilize this pattern greatly. *Todo: mini drill image*

Jacks

Jacks are **any step repeated three times or more in-a-row in quick succession**. Two steps in-a-row is usually referred to as a *mini-jack,* or *double-tap* in other communities. Depending on a song's speed, jacks can become exponentially more difficult with each added step. Regardless, really long jacks are tiring and usually uncalled for such as this or this.



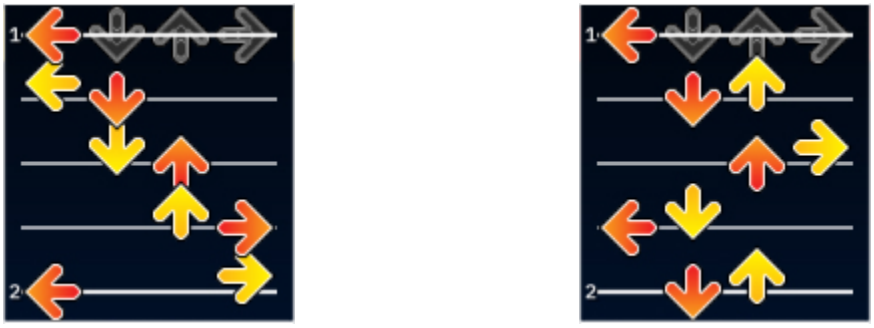
Examples of Jacks and mini-jacks

Jacks **should be used when a sound repeats itself.** If you're using syncopation, it's unlikely you'd add many jacks, but if you do, make sure they are consistent and not just randomly placed. Jacks slightly disrupt the flow of a chart, depending on the length of a jack. Therefore haphazard placement is frowned upon.

If a single sound repeats too many times, **a step artist can forgo using jacks in place of back-to-back mini-jacks, drills or just normal patterns**.

Gallops

Gallops are **created when only two different steps are close to one another**, typically as 16ths or 12th notes.



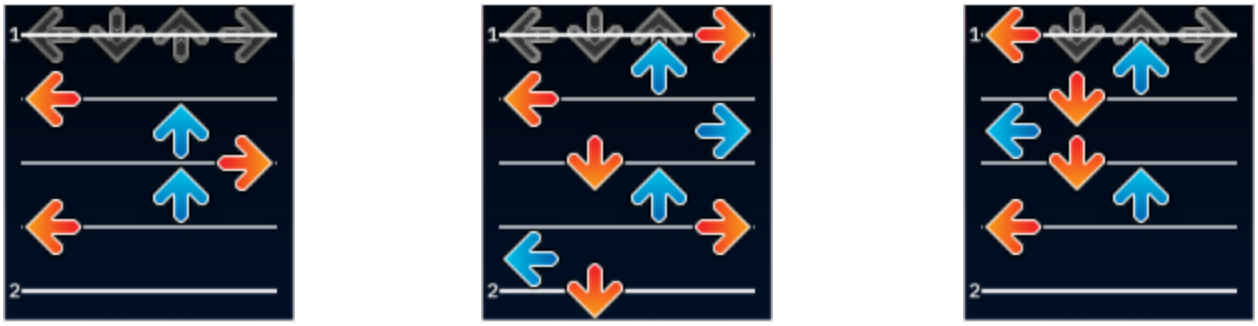
Examples of Gallops (two variations)

It is uncommon to see gallops when matching with sounds, as they can usually be triples if a step artist is over layering [adding steps to multiple sounds rather than a specific sound]. The first variation is slightly more readable than the second, but using either or in any case is acceptable.

Todo: add closer gallops and swing gallops? Maybe (Checked 5/18/21)

What are Complex-Patterns

As stated earlier, complex-patterns are **patterns that require the player to cross, turn their body abruptly, double-step or require prior know-how to hit properly.** These types of patterns can be used in ways to make your song more challenging and also emphasize different sections or sounds in your file even more. As stated elsewhere, some complex-patterns are difficult to utilize properly and most should be avoided for first-time steppers.

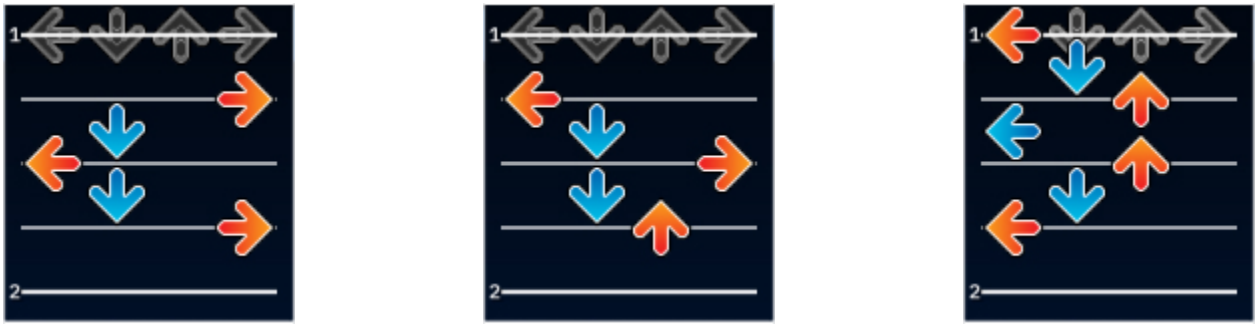


Examples of Complex-Patterns

Try standing up and feeling how non-intuitive these patterns are compared to the basic-pattern examples. You'll notice these patterns force you to turn uncomfortably and require some practice to hit quickly. The faster a song, the more brutal these patterns are for the player.

Crosses

Crosses, also referred to as crossovers, are patterns that force the player to use their feet to step on the opposite side of the pad; left-foot to right-arrow or right-foot to left-arrow. Similar to some basic-patterns, some cross-patterns are easier than other cross-patterns, usually based on the player's preference, overall readability of the patterns used, or amount of steps in the cross-pattern. Crosses should always resolve properly, as in, the player should not need to double-step after the cross completes.

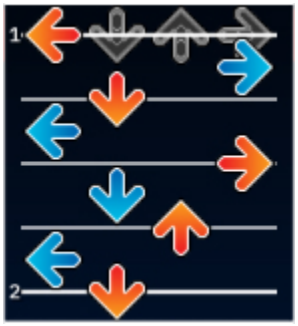


Examples of crosses

Crosses can be made-up of a different amount of steps and can be chained together (a cross can lead into another cross). A cross is usually defined by the first three steps in a pattern (see the first two images above), but to know if a cross resolves properly it takes a few more steps. Again, it's always best to make sure crosses resolve properly so the player doesn't have to guess if they should be crossing or treating the cross like a double-step; the less guess work for the player the better.

Double-Steps

A double-step **is the act of using the same foot twice in-a-row to hit two different steps, usually in quick succession.** Although this is technically a pattern, it's also **a strategy**. Other patterns such as crosses and spins can be hit as a *double-step*, depending on how the player chooses to hit those steps (imagine trying to hit a cross without actually crossing). Double-steps also appear when patterns, such as crosses, don't resolve themselves naturally.

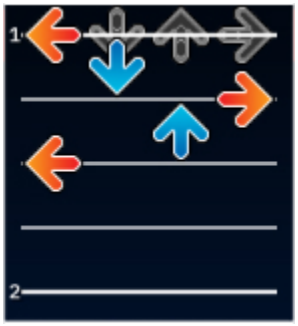


Example of a Double-Step (the first blue left-arrow)
A player's left-foot would need to hit the first down-arrow AND the left-arrow to execute the remaining steps intuitively.

Forced double-steps should be avoided in almost all cases and should never be used by non-veteran step artists. Veteran step artists may use double-steps to emphasize sounds in music, similar to crosses and other complex-patterns. Double-steps add a layer of difficulty to songs but **in a way most player's do NOT find fun**. Despite being intuitive after some practice, the act of double-stepping interrupts a player's flow and can require more energy (compared to a cross) depending on a song's speed and the frequency of double-steps. **This is something DDR uses haphazardly and why many of their charts are not as enjoyable as they could be.**

Spins

A spin is a pattern that if hit correctly (using one foot after another), the player will execute a full 360 degree spin. It's unlikely that a player actually performs a spin and will instead double-step, but because the pattern is recognizable, it is arguably an excusable pattern to use sparingly.

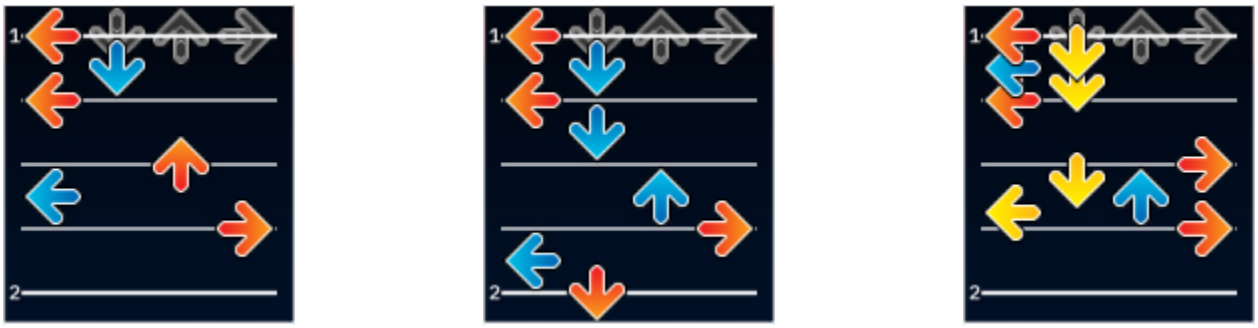


Example of a spin

In theory, if a player crosses the first step of a spin (right-foot to the first left arrow), then the pattern just becomes two crosses. This is not a recommended fifthlet to utilize, but it is notable in Max.(period).

Sub-Patterns

A sub-pattern is **a grouping of arrows that aren't based on the arrangement, but by the amount of arrows grouped together**. For example, triplets, also known as triples, are when three arrows are grouped together relative to the arrows around it. Take a look at the images below and notice (from left-to-right), triplets, fourthlets, and fifthlets.



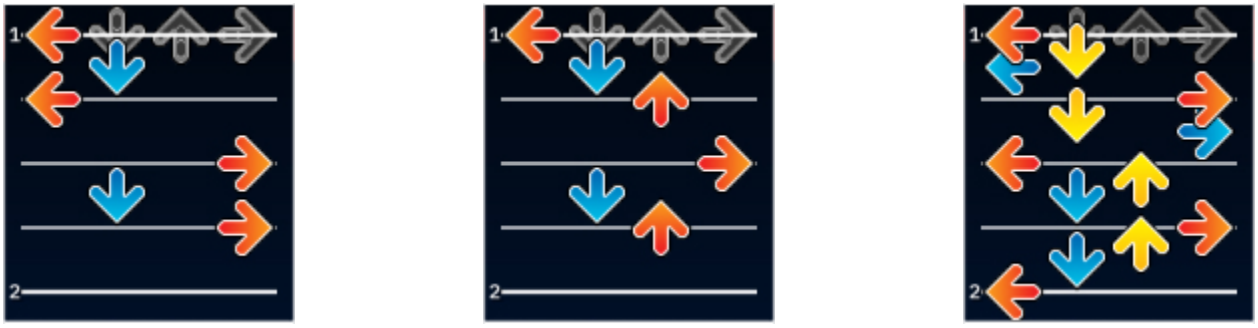
Example of sub-patterns; triplet, fourthlet, fifthlet

Note how there is a space between each sub-pattern.

Sub-patterns can serve an extra purpose beyond matching directly with each sound, especially when creating charts for easier difficulties. For example, there's *quantization* [the method of placing arrows further apart than what a song dictates (using 8th notes instead of 16th notes)]. If there are sounds in a song that are extremely close together, such as a string of 16th notes, but matching with them would make your chart less fun or inconsistent, you can supplement that section with notes that aren't as close together, such as a string of 8th notes instead. You could also use *16th triples* [triples grouped together by a 16th note], instead of a string of 16th notes.

Triples/Triplets

Triples are a group of three steps and are the most common sub-pattern as they are easy to recognize and work well in most instances compared to other sub-patterns.

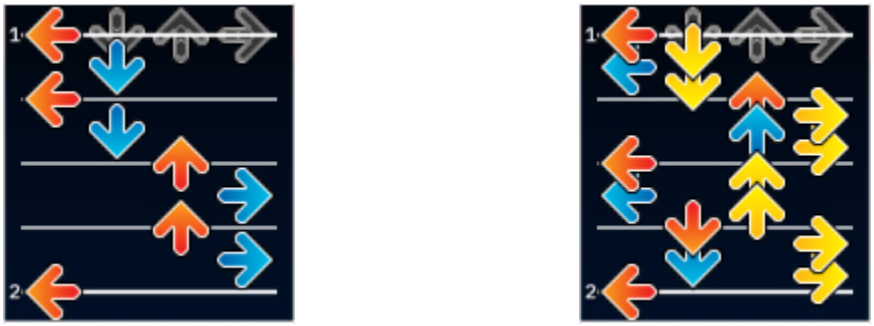


Examples of triples/triplets

When using syncopation, triples can be utilized to either increase or decrease difficulty. As stated above, if a section could use a string of 16th notes, you can make the section easier by using 16th triples. On the contrary, you can use triples on single, abnormal sounds. A light-hearted way to add artificial difficulty would be to add triples every measure, or every other measure. This is not something that should be practiced too often, but is a usual occurrence when making watered-down versions of harder charts.

Fourthlets

Fourthlets are a group of four steps, but unlike triples, fourthlets aren't used to increase difficulty and are commonly used to create easy, friendly, repetitive patterns by being chained together.



Examples of fourthlets

When creating a stream of arrows, it can be wise to use simple patterns. Fourthlets are a good way to do just that; easy patterns that can be used almost anywhere you'd put a stream of arrows.

Tips

In the next section are some basic tips for creating files; a basic guideline on what a step artist should aim for on average. With that said, this section is very biased. **The methods described below are very practical and reflect the initial simplicity of the majority of charts from both Dance Dance Revolution and original (1 and 2) In The Groove**. Following these methods listed below allow for songs' difficulties to be produced similarly to one another and encourages songs to be consistent between their difficulties (assuming there are more than one) and also respective of other songs created by the same step artist.

In other words, there is an expectation when creating charts for certain difficulties and the methods below state what you would find in your average official chart. For example, most medium/difficult files will usually limit themselves to only 8th notes, with very few using 16th notes except for special purposes (really slow songs, minor use of gallops etc.).

Tips for Easier Charts

Easier charts are inherently quicker (and easier) to make than challenging charts, but can also be an issue for step artists who are not aware of what patterns or ideas are too difficult for players who have not acquired the skills of a more seasoned player. Below are some basic tips you can loosely follow to make fair easier charts:

For **Beginner/Novice** charts:

- Only use 4th notes.
- Prioritize using left and right steps.
- Only place 2 notes per measure. Both notes should be the same note in most cases.
- For increasing difficulty:
    - Place 3 or 4 notes in a single measure. Should be the same note, or the same 2 notes in-a-row. Use sparingly.
    - Placing different notes per measure is acceptable, but double-steps should be avoided.
- Use jumps sparingly, typically spaced apart. Avoid corner jumps.

For **Easy** charts:

- Only using 4th notes.
- For increasing difficulty:
    - Introduce 8th notes sparingly.
    - Use complex patterns with 4th notes.
- Avoid corner jumps.

For **Medium** charts:

- Only use 4th and 8th notes.
- For increasing difficulty:
    - Introduce 16th notes sparingly and cautiously.
    - Use complex-patterns with 4th and 8th notes.
- Use corner jumps sparingly.

Tips for Harder Charts

Harder charts need a lot more attention than easier charts, as your freedom to add more notes and complex-patterns is practically unlimited. A Hard chart can be as difficult as you want, unless you're adding a Challenge chart; in which the step artist should make the Challenge chart as difficult as you want and the Hard chart should feel like a watered down version of the Challenge, or at least a different and/or easier variation of the Challenge.

For **Hard** charts (when there is a Challenge chart):

- Use 4th, 8th and 16th notes
- Use easier patterns than the Challenge in parts that are similarly dense.
- For increasing difficulty:
    - Use any other note type to match sounds precisely.
    - Use complex-patterns.
- Try to avoid, or sparingly use overly complex patterns; half-turns, odd crosses and step-jumps.

For **Challenge** charts:

- Use anything.

For **Edit** charts:

- Edits have one of two purposes.
    - Used to create unique variations of Challenge charts that would normally not be found acceptable as a "good quality" chart, such as *dump files.*
    - Harder versions of Challenge charts.
- Realistically there are zero rules in edits. It can lack any sense of pattern and rhythm.

Step Methodology/Theory

Step Methodology, also referred to as Step Theory, is a set of loose rules a step artist uses to assist with stepping. This may include matching exclusively with loud, distinct sounds, or matching with vocals only, or even a mix of both. Which methodology a step artist chooses is not always clear at first, but depending on how hard or easy a step artist may want their file to be can strongly influence which methodologies are applied.

Step Theory

TODO: Keep basics here, intermediate and advanced move to different guide with Gradi

Three categories for the theory of stepping: basic, intermediate, advanced.
Basic: Every step artist should understand
Intermediate: Difficult to understand, but should be observed by everyone
Advanced: Beyond this guide naturally, but can make the quality of a chart much greater

-
- Freezes (basic)
    - Mini-freezes (not for everything)
- Jumps (basic)
- Drills and Jacks (basic)
- Syncopation (basic/intermediate)
- Difficulty Consistency (basic)
- Rating Theory
- Rolls (uncommon/basic/intermediate) (see you stamina nation)
- Hand Theory (uncommon/Intermediate)
- Cross Theory (intermediate) *(ref. Max 360 Challenge - DDR A20)*
    - Accenting sounds
    - Artificial difficulty
    - Half-Turns
- Accenting with double-steps (advanced)
    - Repeating patterns
    - Extreme pitch shifts (super uncommon; here for referencing)
    - NEVER for artificial difficulty (looking at you DDR)
- Pitch Relevancy (advanced) (*ref. Duckgroove - GG Nebulous*)
- Layering (intermediate/advanced)
- Mention of Tech Patterns (advanced)
    - Not in-depth, just a mention
- Mine theory
    - *Mine art (ref. Blitz - GG Nebulous)*
    - *Mine accents (ref. Bounce - GG Nebulous)*
    - *Mines to add artificial difficulty (ref. Hammer - GG Nebulous)*
    - *Mine References (ref. Into The Zone - GG Nebulous)*