



## **Beamz® Studio Tutorial**

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## Course Overview



### BEAMZ® STUDIO TUTORIAL

This tutorial will teach you how to use Beamz Studio to compose and edit interactive Beamz songs using samples, MP3's or midi files for content. It's not like a Users' Manual; it has been structured to provide a progressive learning process. While it is possible to gradually learn to use Beamz Studio through experimentation, composing interactive music requires you to understand some foundations and fundamentals that may not have been exposed to before.

Composing interactive music can be challenging at first, even for someone experienced with electronically producing traditional music. New things must be learned and a new perspective on composing music must be gained. Reading this tutorial from start to finish before you start using the software *really* is the best way to understand the editing screens and how they all work together when you start looking at them and trying to use them productively. It really won't take much time to do this - just the discipline. You'll get to the fun part of experimentation a lot quicker this way, and you'll be glad you did.

Here's a suggested way to read the tutorial for the first time.

1. In the help browser, click the button that hides the table of contents.
2. Expand the remaining topic window to full screen.
3. Read through each topic and click the next link on each page to proceed to the next topic. If you click a related topic link use the browser's *Back* button to return to where you were. Later on, when you need to look something up again, you can easily find it with the table of contents.

**IMPORTANT NOTE:**

Before getting started with Beamz Studio, visit [www.thebeamz.com/support/studio-updates/](http://www.thebeamz.com/support/studio-updates/) to check for product and documentation updates. This web page will also provide useful information from our composers regarding composing interactive music and creating Beamz songs.

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# How composing interactive music differs from composing traditional music.

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The Beamz Music System overall is an *Interactive Music* instrument and player that allows a performer to play songs that were composed to be played *interactively*.

Beamz Studio is a software tool that can be used to compose *interactive* music, so being able to compose music in the traditional sense is a good beginning to composing it interactively, but is not required.

Beamz Studio allows you to edit and add your own sound files to a Beamz song, or to make a completely new song based on your own sounds. As a prerequisite to using Beamz Studio, you should already have the software and skills necessary to work with your own sounds in midi, mp3, or .wav file format.

## Traditional vs. Interactive Music

*Interactive Music* was not possible until recently when computers gained the ability to produce it. Up until then, all other forms of music were *traditional*. Before software based *Interactive* musical instruments became possible, music composition typically occurred in a linear form, where songs are played from start to finish as a pre-determined sequence of notes. Each note is written by the composer to play at a specific time and place within the composition - always. The tempo/key/chord of the song provides the composer with absolute control over how the song will sound when it is played in real-time - moment by moment.

## Traditional Music Composition

In a way, *traditional* music composition can be described as *pre-composed script* (pre programming) which will be performed in real time by the pre-determined instruments, each playing pre-composed parts. The underlying theory of *traditional music* composition is the **elimination of randomness** as a way to avoid producing musical sounds that are unsympathetic to the ear. If each instrument played notes randomly, it would sound terrible, so traditional music strictly controls **when** each note will play. All notes are composed to play at a precise moment during the performance, and they must agree musically with all other notes that will be played by other instruments **at that moment**.

## Interactive Music Composition

Whereas traditional music compositions consist only of pre-composed notes that will be played, interactive music compositions consist of a pre-composed **selection** of notes that **could possibly** be played **at any moment** during the performance. Like *traditional* songs, *interactive* songs must be composed in advance and the musical parts must all agree in musical terms (key, chords, etc.).

Composing interactive music can be challenging at first, even for someone experienced with electronically producing traditional music. New things must be learned and a new perspective on composing music must be gained.

This tutorial will cover how interactive Beamz songs are structured and how they work when they are being played. We will cover how Beamz instruments are put together and how they produce their sounds when a laser beam is triggered. Then we will get into detail on how to use the editing screens in Beamz Studio to work with your own songs. When you have completed this tutorial, you will have the knowledge necessary to begin using Beamz Studio to produce your own Beamz songs.

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# How interactive Beamz songs are mapped and how they they are played.

Traditional musical songs are mapped out or arranged by sections.

A basic song arrangement could be: 1-Intro, 2-Verse, 3-Chorus, 4-Break, 5-Verse, 6-Chorus, and 7-Ending.

Each section of the song is played for a specific length (bars of music), then the song moves on to the next section. Since the chords & rhythms (music parts) often change from section to section, each one has its own related instrumental parts.

The sample song illustrated below is 39 bars long, has 7 sections. Each section of the song has its own music part that will be played. When it is played, this song starts with the Intro then plays all sections thru the Ending, then stops.

Song Sections:	<b>1. Intro</b>	<b>2. Verse</b>	<b>3. Chorus</b>	<b>4. Break</b>	<b>5. Verse</b>	<b>6. Chorus</b>	<b>7. Ending</b>
Length:	1 bar	8 bars	8 bars	4 bars	8 bars	8 bars	2 bars
Music Parts:	Riff-I	Riff-V	Riff-C	Riff-B	Riff-V	Riff-C	Riff-E

Start ← Song is 39 bars long and has 7 sections. → Stop

When more than one instrument plays a song, the music parts are shared by all of the instruments that play during each section of the song, and each instrument has its own part.

Song Section :	<b>1. Intro</b>	<b>2. Verse</b>	<b>3. Chorus</b>	<b>4. Break</b>	<b>5. Verse</b>	<b>6. Chorus</b>	<b>7. Ending</b>
Length:	1 bar	8 bars	8 bars	4 bars	8 bars	8 bars	2 bars
Music Part:	Riff-I	Riff-V	Riff-C	Riff-B	Riff-V	Riff-C	Riff-E
PIANO part:	Piano-I	Piano-V	Piano-C	Piano-B	Piano-V	Piano-C	Piano-E
GUITAR part:	Guitar-I	Guitar-V	Guitar-C	Guitar-B	Guitar-V	Guitar-C	Guitar-E
BASS part:	Bass-I	Bass-V	Bass-C	Bass-B	Bass-V	Bass-C	Bass-E
DRUMS part:	Drums-I	Drums-V	Drums-C	Drums-B	Drums-V	Drums-C	Drums-E

music clips

## MUSIC CLIPS

The individual instrument parts that are played for each section of a song are called *music clips*. *Music Clip* is the term for the pool of notes that each instrument will play during one section of the song. All music clips for an instrument constitute the part it will play during the entire song.

In traditional music, this means the notes that will be played and when they will be

played during the song. Every note to be played by each instrument has been composed in advance to be played at a specific point in time during the performance. Whenever the song is performed, it is always played the same way.

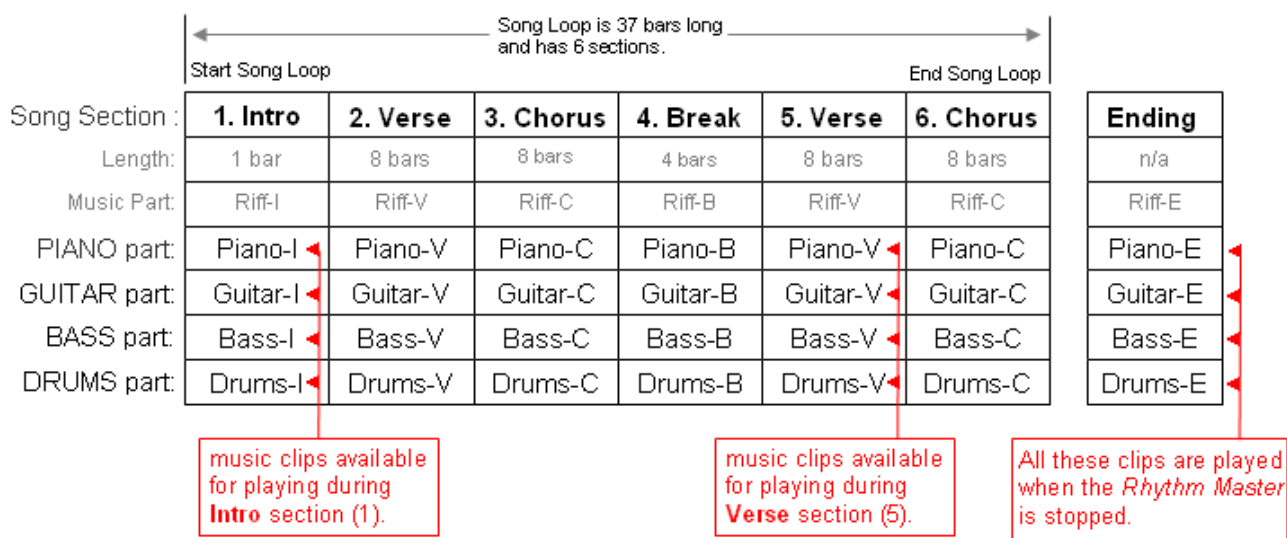
In Beamz songs, *music clip* means the notes that are **available** to be played during the current section of the song. When the notes are actually played is determined by the musician who triggers a Beamz *Instrument* to play its **active** music clip.

Music clips are part of a Beamz Instrument's definition, and *how* they actually play their sounds is determined by the way the Instrument has been defined. More on this later.

### HOW BEAMZ SONGS PLAY

A Beamz song is *played* by starting and stopping the *Rhythm* instrument. When a Beamz song is played, it plays all sections of the song from the first thru the last section. Instead of stopping, a Beamz song will continue by playing all of the song sections again. It will continue to repeat the song until the performer decides it is time to stop the song. When a Beamz song is stopped, it will *then* play the Ending.

Here is an illustration of how the sample song would look as a Beamz song.



A *Rhythm Master* is a special looped part that supplies the "built-in" background music for a song.

A typical example would be a combination of Bass and Drum parts.

The *Rhythm Master* controls the playing of a Beamz song. Beamz songs will start to play when the *Rhythm Master* is started and stop playing when it is stopped. While the *Master* is playing, the song continues to loop thru its sections until it is stopped by the performer. As the song progresses from one section to another, different music clips become *available* for each instrument - should the performer choose to play them by

triggering a *Beam Trigger* that has been assigned to the instrument.

The Rhythm Master has a special property that makes it the **Master** controller for the song. Not only does it start and stop the song, but it also serves as the master metronome for the song as well. As the Rhythm Master plays thru each song section, it becomes the official *active* section in the song's progress - controlling which music clips are available on the other Instruments that are **Slaved** to it. When a Rhythm Master is stopped, all of the Ending music clips play, and the song stops.

### **In Summary:**

So far we have covered how each instrument has music clips for each song section, and how they become available for playing while the *Rhythm Master* plays thru each section of the song. We know that while it is running, the Master will repeat the song until it is stopped. We also know that all of the *Ending* music clips will be played when the Master is stopped.

But what about when the Rhythm Master is not actively playing?

### **FREE RUNNING SECTION**

When a Beamz song is first loaded and the *Rhythm Master* has not yet been started, the Beamz will still play notes for each instrument, even though the song hasn't been started.

All Beamz songs have a special section that is called the **Free Running** section.

The *Free Running* section is just what its name implies: a Free-Running set of music clips available for each instrument whenever the song is not under the control of a running Rhythm Master. The Free Running section is active when a song is loaded and remains active indefinitely until the Rhythm Master is started and takes control of the song. Once the Master is stopped the Free Running section becomes active again.

The Free Running section is actually a section that is a part of every Beamz song.

It is intended to play indefinitely when it is active, and has no specified length.

Volume is the only property that may be edited for the Free Running section.

It is active whenever there isn't a Rhythm Master playing.

It provides default Music Clips for each Instrument that can be played without the Rhythm background.

No other song section may be named *Free Running*.

### **ENDING SECTION**

When a Rhythm Master is stopped, an ending automatically plays

The **Ending** section is another section that is a part of every Beamz song.

It contains the music clips that will be played when the song ends.

No other song section may be named *Ending*.



When a Rhythm Master is stopped, the Free Running section becomes active and ALL the music clips in the Ending section are **automatically triggered** to play without any input from the performer.

Section:	<b>Free Run</b>	<b>1. Intro</b>	<b>2. Verse</b>	<b>3. Chorus</b>	<b>4. Break</b>	<b>5. Verse</b>	<b>6. Chorus</b>	<b>-Ending-</b>
Length	n/a	1 bar	8 bars	8 bars	4 bars	8 bars	8 bars	n/a
Music:	Riff-F	Riff-I	Riff-V	Riff-C	Riff-B	Riff-V	Riff-C	Riff-E
PIANO:	Piano-F	Piano-I	Piano-V	Piano-C	Piano-B	Piano-V	Piano-C	Piano-E
GUITAR	Guitar-F	Guitar-I	Guitar-V	Guitar-C	Guitar-B	Guitar-V	Guitar-C	Guitar-E
BASS:	Bass-F	Bass-I	Bass-V	Bass-C	Bass-B	Bass-V	Bass-C	Bass-E
DRUMS	Drums-F	Drums-I	Drums-V	Drums-C	Drums-B	Drums-V	Drums-C	Drums-E

Free Running section is active when no Rhythm Master is playing

Song sections are played and controlled by the Rhythm Master. As the Master plays thru each section, the *music clips* for the current section become active and available for the performer to play on each instrument. This is done by triggering a *Beam* that has been assigned to a beamz *Instrument*.

When the Master is STOPPED the Free Running section becomes active and ALL Ending section's music clips automatically play.

### In Summary:

So far, we have covered how Beamz songs are mapped out and played by starting and stopping the Rhythm Master. We understand that, when triggered, the sound being produced by each Instrument is contained in its music clip for the current (active) section of the song. We also know that the Free Running section is active when no Master is playing and, when a Master is stopped, all the music clips for the Ending section are automatically played.

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## BEAM TRIGGERS

In Beamz terminology, the lasers on the consoles are called *Beams* and they work as *triggers* - where breaking a beam of light turns a *Trigger* on. The trigger stays on as long as the light beam remains broken. Pressing (and holding) the Right two large buttons on the console has the same effect as breaking the light beam, so they are considered to be *Beam Triggers* as well.

The Beamz System supports 3 Beamz units, each with 4 beams and 2 buttons that can be used to trigger Beamz instruments.

More than one Instrument can be assigned to a single trigger enabling them all to be triggered at once by the same Beam Trigger, so there are often more than 16 instruments in a song.

## BEAMZ INSTRUMENTS

All Beamz songs have their own collections of Beamz Instruments.

Beamz Instruments are setup as part of a song, and the Music Clips they play during the song are setup as part of the Instrument.

A Beamz Instrument must be assigned to a *Beam Trigger* so it can be triggered by the performer.

How an Instrument responds to a Beam Trigger is determined by which *Trigger Type* it uses.

In essence, a Beamz Instrument is an interactive sound file player.

When an Instrument is triggered by its assigned beam, it plays a sound file from its active music clip.

We've covered this pretty well so far, but now it's time to take this further.

What *really* happens is the Instrument plays an existing sound file that is assigned to its active music clip.

The kinds of sound files in a music clip can vary, so the way an Instrument plays them can vary as well.

For example, a sound could be played as a single note, or multiple notes that will be streamed, or a complete musical phrase that will be repeated (looped). How each sound will be played is determined by the Trigger Type that has been selected for the Instrument.

We have already discussed how the Instrument "*plays an existing sound file that is assigned in its active music clip*", and we have also defined an active music clip as being a collection or pool of sounds that an Instrument dips into when it needs something to play.

Now it is time to get into Music Clips further.

## MUSIC CLIPS

Each Beamz instrument has a Music Clip for every section of the song, (including Free Running & Ending). When a new instrument is created, an empty Music Clip is created for each song section. If a new section is added to a song, empty music clips for it will be added to all instruments in the song. When a song section is removed, all of its associated Music Clips are also removed.

A Music Clip is a pool of sound files that the instrument may play during the current song section. More specifically, it is a *list* of sound files in the song folder that will be played each time an instrument plays one.

The list is numbered from top to bottom and each sound file is played in the order indicated by its number.

If there is only one file on the list, it will be played each time the instrument plays a sound. When there are many sound files on the list, it steps thru them when it needs something to play - each time playing the next one on the list. Then the list is repeated.

If the instrument is to be silent during a certain section, this list will be empty, and the Music Clip will produce no sound if the instrument is triggered.

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# How Triggers, Instruments, Music Clips, and Sound Files are used together.

As we have previously said, there is a close relationship between the types of sound files and the Trigger Type that will be used to play them back.

Music Clip Samples
1. Sample-1.wav
2. Sample-2.wav
3. Sample-3.wav
4. Sample-4.wav
5. Sample-5.wav

This active Music Clip for an Instrument has 5 .wav samples in its list.

These 5 samples will be played in this order each time the *Instrument* plays one from this music clip. After the last one plays, the list is repeated.

Changing the play order involves moving a sound file up or down the list.

All Trigger Types play their sound files this way.

## Trigger Types:

### **One Shot**

Each time the Beam is triggered, it steps thru the list and plays one sound file from beginning to end.

### **Pulsed**

Each time the Beam is triggered, it plays the next sound file on the list from beginning to end.

If the Beam trigger is held on, it will cycle thru the list playing each sound file in succession.

The Sounds are streamed at a rate that corresponds to musical notes which is specified as a *Pulse Rate*.

### **Start/Stop**

When triggered, it will loop a single sound file on the list repeatedly until it is stopped by another trigger.

Each time it starts, it plays the loop from the beginning.

### **Start/Pause**

This works the same way as Start/Stop except when stopped, it stops in place (paused). The next time it starts, it will loop from the place where it was last stopped.

### **Momentary/Stop**

This works the same way as Start/Stop except it loops only while the Beam Trigger is held on.

**Momentary/Pause**

This works the same way as Start/Pause except it loops only while the Beam Trigger is held on.

**Song Advance**

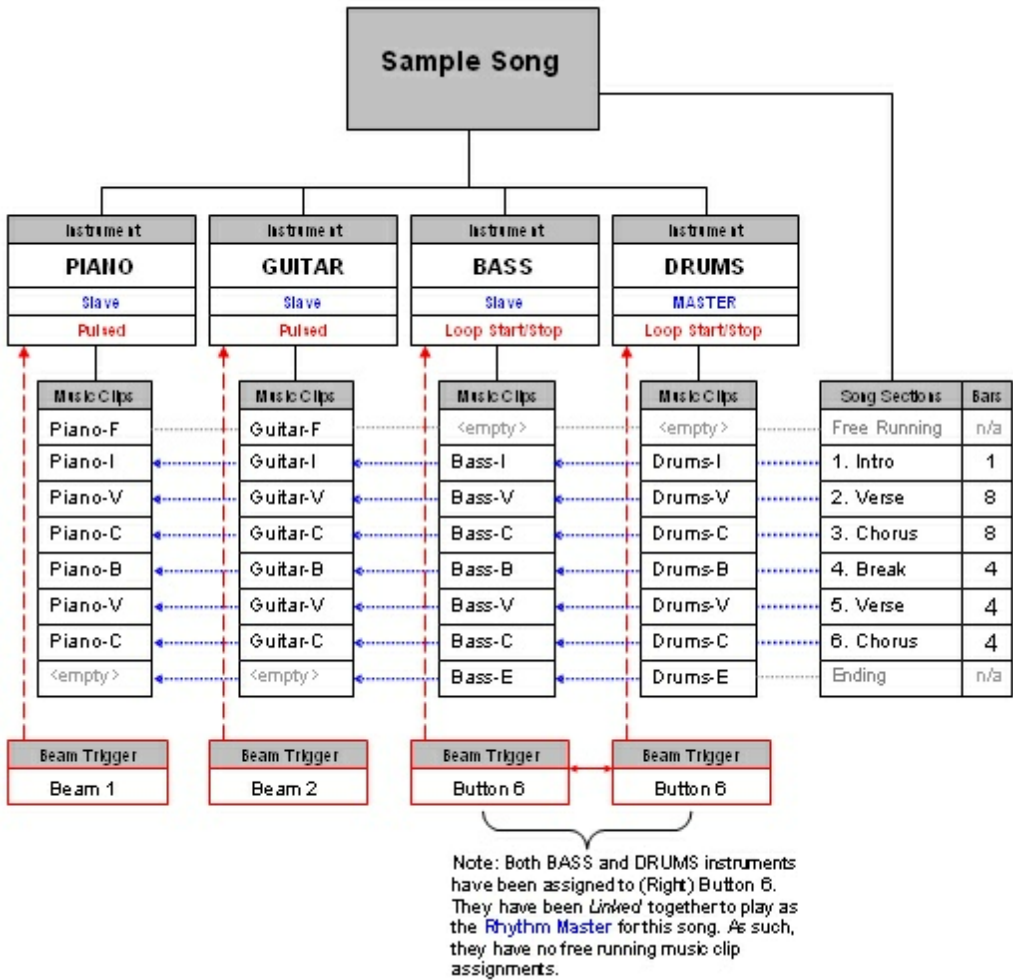
Each time the Beam is triggered, it advances the song to the next Section.

**Swap Sounds**

Swaps the Beamz controller and the screen display to the alternate set of Beam Triggers.

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Before we get into the details of how to work with a song using Beamz Studio, we need to take a different look at our sample song. This time from Beamz Studio's point of view.



## Building a new song in Beamz Studio would follow these basic steps:

1. Create and define the Song itself by using the Song editor.
2. Create the song Sections using the Section editor.
3. Create and configure the Instruments using the Instruments editor.
4. Assign sound files to the Music Clips for each Instrument/Section using the Music Clips editor.
5. Link Beam Triggers to the Instruments using the Beam Assignment screen.
6. Mix all the volume levels for the song using the Beam Assignment screen.

## Song Folders.

Before we get into how to use the editing screens, there is one more aspect of Beamz Studio you should understand. When the Beamz System is installed, a master songs folder is created on the hard disk.

(You can see the path to this folder in the Beamz Options screen in the Beamz Library box.)

Within this folder, every Beamz song has its own individual folder which is used to store the song's configuration files and all the sound files that are used by the song. When a new song is created, a new folder is created for the song inside of the Beamz music folder. Standard Beamz files needed by all Beamz songs are also copied into it at this time.

It is important to know that in order for a sound file (or video) to be used by a Beamz Song, it must reside in the song's folder before it can be imported into the song. If the same sound file or video is used by several different songs, each song must have its own personal copy of it within its own song folder.

Importing a new sound file in the music clips editor first offers a list of the files that are already in the song's folder. Selecting a one from this list will immediately include it in the music clip's list. If the desired sound file is not in the song folder, you can navigate to it and select it where it resides. However, when you select one outside of the song folder, a **copy** of it is placed into the song folder and it is included in the music clip's list. The same thing applies when a video file is used by a song - a copy is made in the song folder.

Before we move on to using the Song Editing screens, we need to cover a couple more things.

## Main Playing screen - Song Position display.

As an aid to composers, Beamz studio displays current song position information beneath the song's name.

4:3	Breakdown	13:3
-----	-----------	------

Bars:Beats since Section started    Name of the currently active Section    Bars:Beats since Rhythm started

## The difference between Preset songs and User songs.

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### Preset songs and User songs.

The songs that came with the Beamz system are called Preset songs, and they cannot be directly edited. A User copy of a Preset song is automatically created when the Song Editor is opened for one of them. All User copies of a song are always placed in the same song folder as the original song.

## How to make a new song.

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Open the Tools menu and click on *Create New Song*. A new song will be created and the Song Editor will open for it.

### Building a new song in Beamz Studio would follow these basic steps:

1. Create and define the Song itself by using the Song editor.
2. Create the song Sections using the Section editor.
3. Create and configure the Instruments using the Instruments editor.
4. Assign sound files to the Music Clips for each Instrument/Section using the Music Clips editor.
5. Link Beam Triggers to the Instruments using the Beam Assignment screen.
6. Mix all the volume levels for the song using the Beam Assignment screen.

## How make copies of a song and edit it.

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There are two ways to begin editing a current song:

1. Click on the name of the song in Player's main view or click on any Beam - this enters song edit with the Instrument selected.
2. Open the Tools menu and click on *Edit Current Song* - only available for User songs.

## How to delete a user song.

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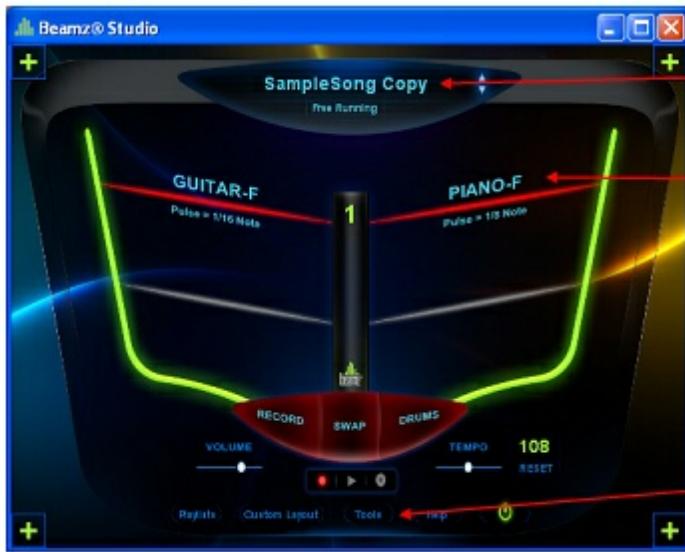
Open the Tools menu and click on *Delete Current Song*.

**Note:** This option is not available for preset songs.



# How to open the Song Editor.

There are 3 ways to open the Song Editor.

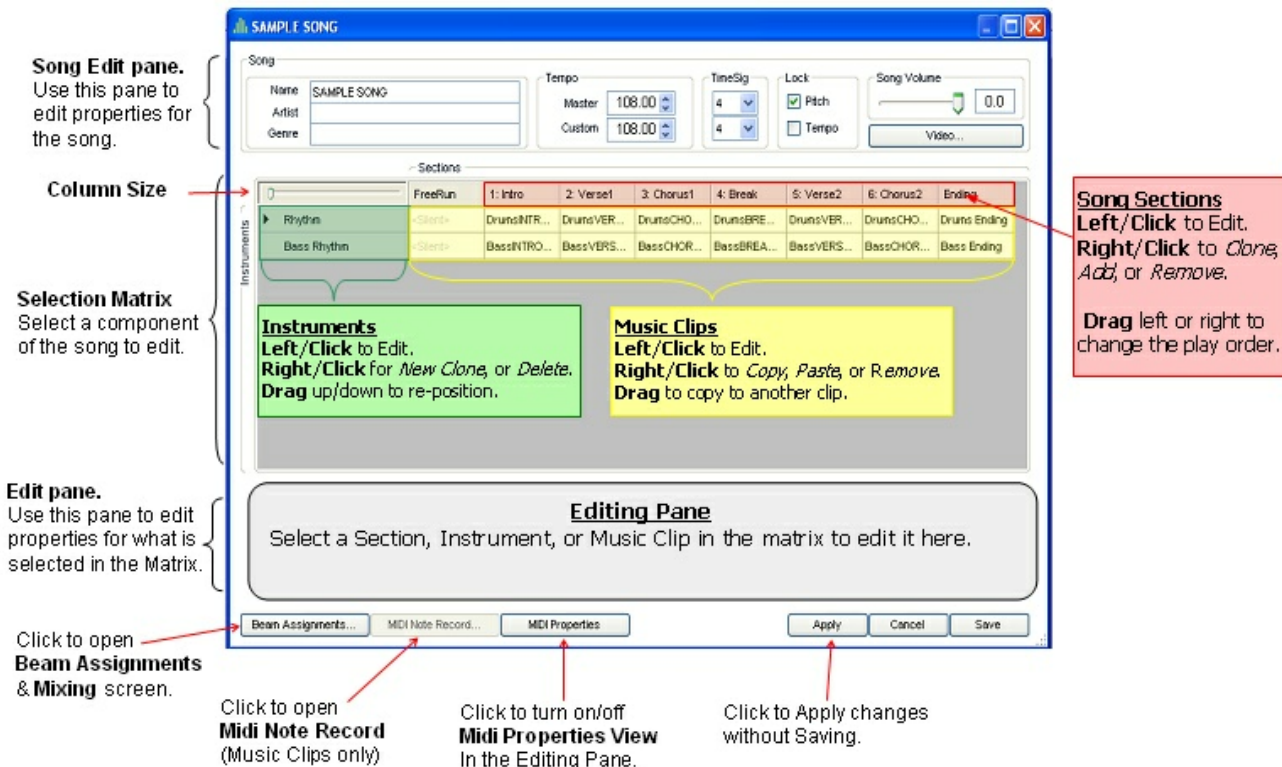


Click on the *Song Name* to Open the **Song Edit** screen.

Click on an *Instrument Name* to Open the **Song Edit** screen With the Instrument selected for editing.

Click the *Tools Button* and select *Create New Song* or *Copy Current Song and edit*.

SONG EDIT Screen - see How to open the Song Editor.



The song editor allow you to easily edit any component of a song with a single mouse click.

The Edit pane at the bottom changes depending on which component is selected in the matrix, and each component has its own unique set of properties that can be edited.

Midi properties for the selection have their own View which can be seen via the midi properties button.

For more information see [Midi Properties view](#).

The Selection Matrix displays a view of the song similar to the sample song in previous illustrations.

It shows all of the song components that can be edited individually.

- Sections of the song are listed along the top as columns from left to right in the order they will play.
- Instruments are listed down the left as rows. They may be dragged up or down to any order you choose.
- Music Clips are shown across the Instrument's row under the appropriate Section column.

The display width of the section columns may be resized using the zoom slider which is located above the Instruments side of the Matrix. Any column in the matrix may be resized individually by clicking on its column boundary and dragging it.

### **How to Select a song component for editing.**

Left Clicking on a Section, Instrument, or Music Clip will show its properties in the Edit pane.

### **How to Add, Copy or Remove sections from the song.**

Right Click on any Section name opens a menu with these selections.

### **How to Move a Section up or down the play order sequence.**

Click on a Section name and drag it left or right on the Matrix.

Other sections will be shifted to accommodate the change.

### **How to Add, Copy or Remove Instruments from the song.**

Right Click on any Instrument name opens a menu with these selections.

### **How to Copy a Music Clip.**

Click on a Music Clip and Drag it to where you want the copy to be placed.

### **How to Remove a Music Clip from the Matrix.**

Right Click on any Music Clip and select Remove to empty the selected Music Clip.

The **Beam Assignments** Button at the bottom opens the Beam Assignments screen where Instruments are assigned to Beam Triggers and the final mix for the song is prepared.

The **Midi Properties** button toggles Midi Properties view on or off which displays the midi controls for the current selection.

The **Midi Note Record** button opens a window where midi notes may be recorded into the selected Music Clip.

For more information see [How to record your own midi notes into a music clip.](#)

The **Apply** button immediately applies edits without saving the song. It's helpful when using the hardware controller during editing. **Note:** This does not save the song.

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## Song properties.

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These properties for the song may be edited whenever the song edit screen is open.

**Song Name** - this text entry is displayed in the Master Song List and on the main Playing screen.

**Genre** - this text entry is displayed in the Master Song List.

**Artist** - this text entry is not used anywhere else.

**Time Signature** - sets the music time signature for the song. Common value is 4/4.

**Master Tempo** - sets the default (reset) Tempo for the song in Beats Per Minute.

**Custom Tempo** - this control is linked to the Tempo setting on the Playing screen and determines the play speed of the song.

- see Beamz Tempo settings.

**Pitch Lock** - Locks the pitch of all sounds to the tempo. see Notes on using Pitch Locking.

**Tempo Lock** - Locks the tempo and prevents it from being changed in the Playing or Custom Layout screens.

**Master Volume** - sets the playing Volume for the song. - can also be set in Beam Assignments screen.

**Video files** - clicking this allows a video file to be assigned to the song. see How to add video to a song.

**Song Midi properties:** see Midi Properties view.

**Prog Out** Auto-send midi program number.

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## HOW TO EDIT A SONG SECTION.

Left click on any Section name in the matrix and an edit pane will open for it at the bottom of the screen.

This Edit pane shows the 3 properties than can be edited for a song section:

The screenshot shows an edit pane for a song section. It is titled "Section" and contains three main components: a "Name" field with the text "Intro", a "Length" field with the text "1:0", and a "Volume" control. The volume control consists of a horizontal slider bar with a green arrow pointing to the right, and a numerical input field to its right containing the value "0.0".

1. **Section Name** - this text entry is displayed on the main Playing screen.

### Notes:

- Matching Music Clips in Sections with the same name are linked together as one when they are edited.
- Song sections cannot be named *Free Running* or *Ending* which are reserved names.
- Free Running* and *Ending* section names cannot be edited.

2. **Section Length** - (Bars:Beats), defines how long this section will be played by the Rhythm Master.

**Note:** Free Running and Ending section lengths cannot be edited.

3. **Volume** - alters the master volume while the section is being played.

## HOW TO MOVE A SONG SECTION TO A DIFFERENT SPOT IN THE PLAYING ORDER.

Working with the *arrangement* of a song involves mapping out the order that the song's sections will be played. To the left of each song section's name is a number that indicates its spot on the sequential play list of the sections that a Rhythm Master will follow when the song is played. You can move a section up or down this list by dragging it left or right to a different spot on the matrix, which will shift to accommodate the change.

### Notes:

- When you move a section to a new spot in the play list, its Music Clips are moved along with it.
- Free Running* and *Ending* sections cannot be moved because they are not part of the Rhythm Master's loop.

## HOW TO CREATE A NEW SONG SECTION.

- Right/Click on the name of any song section. Select *New Section* on the menu. A new song section will be created and inserted in the matrix.

2. Edit the new section to name it and set its length in Bars: Beats. (4 Bars = 4:0)

- All Music Clips for the new section will be empty.

### HOW TO CLONE (COPY) A SONG SECTION.

1. Select the Section you want to copy (clone).

2. Right/Click on its name in the matrix and select *Clone Section* from the menu. Cloning a Section inserts an identical copy of it into the matrix including all Music Clip assignments.

- All Music Clips for the new section are the same as the original (cloned) section, and are linked together for editing as long as the section has the same name as the original (see the next topic: Notes on duplicate Section names).

### HOW TO DELETE A SONG SECTION FROM THE SONG.

1. Right/Click on the name of any song section.

2. Select *Delete Section* on the menu. The selected song section will be removed from the matrix.

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## Notes on duplicate Section names

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When Song sections have the same name, their Music Clips are linked together and are edited as one.

Edits made to Music Clips in any one of the sections sharing a name will affect the corresponding Music Clip in the other linked sections. When you select a section that is linked to others, the other sections having the same name will be highlighted to show the link between them.

**It is important to remember this when cloning a section.**

If you want the clones to be linked, allow them to continue having the same name, otherwise rename the section you want to be able to work on individually.

**Composing tip** about using linked sections to save time & work.

Songs often repeat sections throughout their course. This is illustrated by our sample song which plays the verse and chorus sections twice in the overall song loop. Each time the verse plays during the song loop, it plays the exact same notes. The same for both times the chorus section plays. The song in the illustrations was composed by cloning the verse & chorus sections in spots 2 & 3 and then dragging the clones to spots 5 & 6 on the list. Since the copied sections play the same as the originals, they have kept the original section names to make editing Music Clip assignments for them easier.

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## Beamz Tempo settings

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In the song edit screen, there are two tempo settings:

**Master Tempo** - sets the default Tempo for the song.

**Custom Tempo** - sets the speed that the song will actually play.

It is also displayed on the main Playing screen where clicking *Reset* sets the Custom Tempo value to the Master Tempo.

**Note:** Checking **Tempo Lock** will disable the custom tempo controls in the Playing and Custom Layout screens, preventing the performer from changing the tempo.

**Using tempo controllers embedded in midi files.**

If you are playing a midi file as your *Master* instrument, you also have the option of using the tempo settings contained within the midi file instead of the tempo settings for the song.

The option to do this is available in midi properties view for instruments that are defined as master (sync) instruments.



The normal default for this is **off**, but in some cases you may want the song to follow the tempo settings in the midi file being played.

### **Something you should know if you choose to use this feature.**

As tempo changes are encountered in the midi file during playback, they are used to update (replace) the Master tempo setting for the song. Within the Beamz Studio software, Custom Tempo is seen as an offset - or a deviation from - what has been set as the Master tempo for the song. This is why you see the Custom tempo change as you change the Master tempo is changed.

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## **Notes on using Pitch Locking.**

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If **Pitch Lock** is selected, the pitch of all sounds being played by the instrument will be locked to the playing tempo. Using the Custom Tempo setting - which is represented on the main playing screen, the playback speed of a song may be sped up or slowed down. Since some samples used in a song may be dependent on the original tempo to play properly, the song may fall apart when the tempo is adjusted. Using Pitch Lock adjusts the playback speed to accommodate the tempo change, which can be heard as a rise or fall in pitch. Midi files can easily accommodate a tempo change without locking the pitch, so it shouldn't be used with them. Pitch Lock is used mostly for sample based loops.

## **Notes on working with Beamz Preset songs**

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Prior to the commercial release of the Beamz Studio software application, Beamz composers used a proprietary composition application to create its interactive Beamz songs; the special notes below are not applicable to songs that Beamz composers created with Beamz Studio software.

The best way to determine if the Beamz preset song you desire to edit was created “pre-Studio” is to look at the ending section of the song structure. If all the instruments are *silent* in the ending section, you are working with a preset song composed “pre-Beamz



Studio” and the special notes below are applicable for making a copy of and editing that preset song.

### **Endings**

Preset songs handle endings by using a TAG instrument. A TAG instrument is a One-Shot instrument that is also assigned to the same beam used to start & stop the Rhythm master. Each time it is triggered, it steps thru a list of 2 Music Clip assignments to coincide with the 2 triggers to start & stop the Master.

The first on the assignments list is silent and is only there as a place holder to accommodate the "start" trigger.

The second assignment on the list contains the sound files that will be played as an ending, which would be played the second time the TAG instrument is triggered - the one that stops the Rhythm master from playing.

### **Autoplay Instruments In Preset Songs**

AutoPlay Instruments are used by some Preset songs to establish a playing environment needed by some of the sound files used by the song. When editing a copy of a preset song, you might see an AutoPlay Instrument in the matrix.

**Do not edit or remove the Autoplay instrument otherwise the song may not play properly.**

### **Silent AutoPlay Masters with their own DirectMusic DLS assignments**

Some of the preset songs use a silent version of the Rhythm master that runs whenever the FreeRun section is active (no Rhythm master is running). Its purpose is to provide a song-pattern to the beams during FreeRun without the Rhythm background. You can spot one of these songs if the song position display on the main screen advances thru the sections before the Rhythm is started. **Note:** The AutoPlay instrument in this type of song typically uses a DirectMusic authored .sgt file which has its own, internal DLS assignments. They are used by all midi files within the song - even though the DLS collections have not been "imported" into the song and cannot be seen in the Midi Properties / DLS assignments for a midi based Music Clip. In Midi Properties, a GS Piano is shown as the assigned instrument and the Play Bar in Music Clips editor also plays a piano sound - even though the instrument plays the correct sound on the main screen and the Beam Assignments screen as well. If you want to work with one of these Music Clips and hear the right sound with the Play-Bar, import the appropriate DLS and assign its instrument/patch in the Midi Properties for the Music Clip.

### **Looping Pulsed and One-Shot Instruments.**

Some of the preset songs bring back a cool thing old drum boxes could do that has disappeared in electronic music.

Looping instruments will record what you play for a number of bars, then play it back as an on-going loop you can add to with other similar instruments - layering each loop on top of the ones you have already built.

Songs that use this type of instrument are *Loop de Jour*, and all the songs whose names mention loops.

If you decide to work on one of these songs, here is something to remember.

If you change anything at all in one of the looping instruments, you have to use the looping properties for the instrument to setup the loop again. Otherwise looping capability will stop working for the instrument. If your work does not involve changing any of these instruments, they will continue to work without going through this step. For more information read the chapter on Using Midi Looping.

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## How to add video to a song.

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Clicking the **Add Video** button in the Song Edit pane and open the video file controls window.



Click the **Browse** button navigate to the video you want to Open.

If you Open a video outside of the song's folder, a copy of it will be made there.

If there is a video opened for the song, it's name will be displayed.

Clicking **Remove** will remove the video from the song, but not delete the copy in the song folder.

Videos are played along with the Rhythm Runner, and will begin playing at the moment the Rhythm is started.

If it doesn't *quite* synchronize with the Rhythm, the **Start** value allows you to offset the start time of the video by entering the offset in milliseconds.

Left click on an Instrument Name in the matrix.

The Edit pane below will show the properties for it:

The screenshot shows the 'Instrument Editor' interface with the following fields and controls:

- Name:** 'Guitar' (text input) with a 'Copy to All Clips' button.
- Sync:** 'Slave' (dropdown menu).
- Start:** '1/ 0' (text input) with a 'Triplet' checkbox.
- Volume:** A slider set to '-6.6'.
- Description:** 'Pulse = 1/16 note' (text input) with a 'Copy to All Clips' button.
- Trigger:** 'Pulsed' (dropdown menu).
- Pulse:** '1/ 16' (text input) with 'Triplet' and 'Freewheel' checkboxes.
- Polyphony:** '1' (text input).

Instruments are listed by their name and can be moved to any order by dragging them up/down in the matrix.

## Instrument properties:

**Name** - this text entry is displayed on the main Playing screen above the assigned beam when the instrument is not being controlled by a Rhythm Master.

**Copy to All Clips** - sets the *Name* in all the music clips for this instrument to this Name.

**Description** - this text entry is displayed on the main Playing screen below the assigned beam when the instrument is not being controlled by a Rhythm Master.

**Copy to All Clips** - sets the *Description* in all the music clips for this instrument to this Description.

**Note:** If left blank, *Trigger Type* properties will be filled in.

## Trigger (Type)

1. **One-Shot** - plays one sound per trigger no matter how long trigger is held.
2. **Pulsed** - will stream sounds one at a time as long as the trigger is held on. Sounds will be streamed at the rate specified in the *Pulse Rate* property.
3. **Start / Stop** - will start looping a single sound file for its specified length until another trigger stops it.
4. **Swap Sounds** - swaps the Beam Trigger assignments between the 2 possible Beamz Units.
5. **Start/Pause** - works the same way as Start/Stop except when stopped, it stops in place (paused). The next time it starts, it will loop from the place where it was last stopped.
6. **Momentary/Stop** - works the same way as Start/Stop except it loops only while the Beam Trigger is held on.
7. **Momentary/Pause** - works the same way as Start/Pause except it loops only while the Beam Trigger is held on.
8. **Song Advance** - each time the Beam is triggered, it advances the song to the next Section.

**Pulse (Rate)** - sets the rate at which sounds are streamed when they are pulsed. This only applies to trigger type *Pulsed*. This entry is specified as musical note values. A setting of 1/1 would be one whole note. The illustration above is set for 1/16 notes.

**FreeWheel** - locks or unlocks pulsed notes to the Master Metronome. This only applies to trigger type *Pulsed*. see Using the FreeWheel property

**Start** - sets a musical grid used to align or *quantize* triggers received by this instrument. This entry is specified as musical note values. (same as Pulse Rate)  
This property can be used for all trigger types. see Using the Start property

**Sync** - a pull down list with 3 choices:

1. **Master** - this instrument is the Rhythm Master - used only with Loop Start / Stop.
2. **Slave** - this instrument will follow the Rhythm Master thru the song sections.
3. **None** - this instrument is not affected by the Master.

It always plays its Free Running music clips. see Using the Sync property

**Polyphony** - specifies how many sounds can play at once when their playing overlaps.  
see Using the Polyphony property

**Volume** - can be used to adjust the overall volume for the Instrument.

**Instrument Midi properties:** see Midi Properties view.

**External Port** -

Selects the output midi port to be used for sending midi to an external midi device.

**Step Play Interval** - Allows midi files to be stepped thru incrementally.

For more information please see How to use the Step Play Interval with midi files.

**Embedded tempo** - Tempo information in a midi file will be used instead of the tempo setting for the song.

For more information please see Beamz Tempo settings.

**Looping** - Everything played is repeated back as a loop a specific number of times.

For more information please see Using Midi Looping.

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The *Sync* property sets the relationship between this Instrument and the Rhythm Master.

### Instruments with *Sync* designated as None.

Some instruments are meant to play the same part throughout the entire song with no regard to which section of the song is being played by the Rhythm Master. These Instruments pay no attention to the Master at all. They always only play the Music Clips in their Free Running section - even when the Rhythm Master is running. Since they will never play the Music Clips in the song sections played by the rhythm master, those clips should be empty.

### Instruments with *Sync* designated as Master.

1. Since it will serve as a running metronome, an Instrument that has a *Master Sync* property must be a loop that is started and stopped with the trigger type *Start / Stop* - otherwise, it wouldn't play thru the sections.
2. Since most Rhythm Masters provide the rhythm background (such as Bass & Drums) the sound files for these parts must be prepared to loop precisely at the same *Master Tempo* and time signature as the song.
3. It is common in Beamz songs to have a Rhythm Master that is made up of more than one Instrument. Our sample song has the bass and drums as a background Master. Each is a separate Loop Start/Stop Instrument that plays a looping sample that matches the other. Both Instruments are linked together by assigning them to the same Beam Trigger which can be used to start and stop them both simultaneously. Since all Beamz songs use the right console button for running masters, both of these instruments are usually assigned to Beam Trigger 8.  
**NOTE:** Only one of Instrument can be a *Master* instrument. All other Instruments linked to a Rhythm Master should be *Slaved* to it.

### Instruments with *Sync* designated as Slave.

Multiple Instruments can be Slaved to the Rhythm Master.

They will play the Music Clips in their Free Running section while no Master is running and controlling the song. Once the Master is running, they will only play the Music Clips that are made Active as the Master plays thru the song.

*Polyphony* specifies how many notes can overlap or play at one time.

When a note is played on an acoustic instrument, it takes a while for it to decay or quiet down. Depending on the instrument, some notes can take a long time to end. Samples of these notes are typically long enough to accommodate the entire note - including its decay. Given the interactive nature of Beamz Instruments, it is possible to trigger several notes on top of each other as they each decay.

The default setting for *Polyphony* is 1 - which is best for most uses.

In this case, if one note is still playing when another note is played on this Instrument, the first one will be cut off and only the second note will play. If another note plays before the second note finishes, it will be cut off and only the third note will be heard. For example, lead guitar notes are very long and playing more than one of them at the same time usually produces a musical train wreck. With a *Polyphony* setting of 1, these notes can be streamed or pulsed. When the pulsing is stopped, the last note triggered will play out to its long, long ending.

More experienced composers can use Polyphony to take advantage of the overlap by composing notes that are complimentary with each other and can play well overlapped. Polyphony allows you to choose how many of them will be playing together. An example would be long sustained notes composed provide a chord texture to the song.

The *Start* property aligns the timing of triggers received by this Instrument to the metronome count.

All Trigger Types can use the Start Property.

Normally, an Instrument responds at the precise moment a Trigger is received from its assigned Beam.

The sound produced by the instrument will be in time with the music as much or as little as the performer wants it to be - *expressive* timing. Most of the time, this is the way you want it to be.

However, for some instruments, you may want them to play perfectly in time with the Rhythm Master, which can be difficult without some practice, so the *Start* property was provided to offer an easy way to do this.

The normal default *Start* value is *None* which provides immediate response when a Beam is triggered.

If you choose to use them, the *Start* options are specified as musical note values. The note value selected here becomes the start boundary for the instrument. When an Instrument receives a Trigger from a Beam, it will wait until it is the next "right time" to play a note of this kind as the Master metronome counts thru the song. Then, it will respond to the trigger. This assures that all triggers align with the music as was specified by the *Start* value that was selected. The best way to play a Beam with a specified *Start* value is to either trigger the Beam at the proper time musically, which produces immediate sound, or by triggering the Beam slightly ahead of time, in which case the Instrument will wait until the correct time to play a note of the selected value.

The *Start* property only regulates the timing of the first note when a Beam is triggered. If a trigger is held on for Pulsed Instruments, the timing of the pulsed notes is regulated by the *FreeWheel* property, which is covered as the next topic.

### **Other ways to use the *Start* property.**

For example, if the instrument is set up to play a part that is meant to be played on the downbeat of a measure, a *Start* value of a *Whole Note* (1/1) could be used. The performer can either play these parts directly at the proper moment, or pre-trigger them by playing slightly ahead of the downbeat and they will play on the next downbeat the metronome reaches. Common uses for this would be a *One-Shot* trigger type that plays an orchestra hit, or a *Start / Stop* trigger that starts a loop that plays along with the Rhythm Master.

*FreeWheel* allows pulsed notes to be pulsed "free" without locking them into the metronome count.

Only *Pulse Trigger Types* can use the *FreeWheel* property.

If *FreeWheel* IS NOT selected, a pulsed Instrument will stream notes in perfect timing with the Master metronome according to the note value selected as the *Pulse Rate*. The moment the Instrument first responds to the trigger is not affected by this but all subsequent pulsed notes are locked to the Master metronome on the Pulse Rate boundaries.

For Example: A *Start* value of *None* with a *Pulse Rate* of *1/8*.

Without *FreeWheel*, the instrument may be triggered out of time, but all subsequent pulsed notes will be 1/8 notes that are in their proper note boundaries according to the Master metronome.

If *FreeWheel* IS selected, a Pulsed Instrument will stream the notes at the intervals for the note value selected as the Pulse Rate according to the Tempo of the song. In this case the pulsed notes can freewheel from the Master metronome count and base their timing against the moment an Instrument first responds to the Beam being triggered.

Freewheeled notes are all pulsed with the same timing imperfection (artistic expression) as the first note produced by the trigger - which can be regulated by the *Start* property.

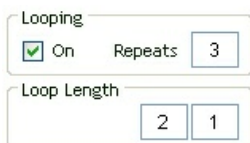


Midi Looping brings back a cool feature that was once popular in early drum machines. They worked by recording a loop over and over again. Anything played into the loop was added to it and you could hear what you played the next time the loop repeated. With a little skill you could build an impressive percussion line by layering in different drum parts at the right moment during the loop. The loop would continue to repeat until you turn it off.

Midi Looping in Beams Studio works the same way except you can specify how many times something will repeat before drops out of the loop.

As the name would imply Midi Looping only works when midi files are being played. It will not work with samples -- even if it has been selected for the instrument.

Midi Looping is only available for **pulsed** and **one-shot** instruments. If you open midi properties for one of these instruments you'll see these options.



Looping  
 On Repeats   
Loop Length

To use it, turn it on, then set the loop length and the number of repeats.

**Loop Length** sets the length of the loop.

In this illustration the loop length is two bars long. (two whole notes)

**Repeats** sets the number of times something played will *repeat*.

In this illustration you would hear something a total of four times, once when it was first played, and then repeated three times.

### Tips for working with looping:

The shorter you make a loop, the more quickly it becomes cluttered.

The longer you make a loop, the longer it takes to layer in all the parts, and the longer it takes for it to become cluttered.

Setting the repeats value lower causes the loop to start decaying quicker, which requires more involvement to keep it going.

Setting the repeats value higher can give you time to improvise against the loop once you've got it going.

If you're trying this for the first time use the settings in the illustration.

**Note:** Midi Looping will not work when the *Step Play* option is used.

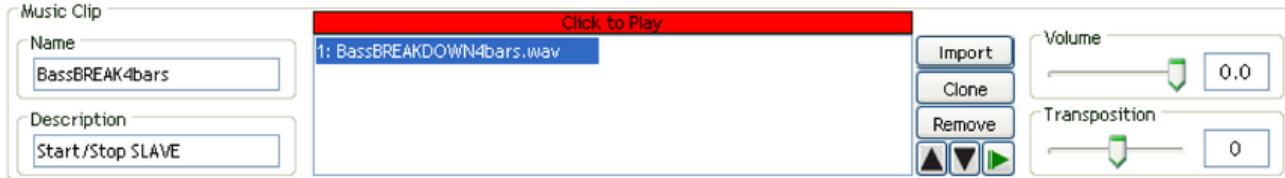
Enabling Stepping will disable Looping for the instrument.

For more information on stepping see: [How to use the Step Play Interval with midi files.](#)

## How to use the Music Clips Editor.

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Left clicking on the name of any Music Clip will open this pane at the bottom of the screen.



The *Name* and *Description* properties are both text entry fields that serve as labels for this clip.

The Name is displayed on the matrix. Both labels are displayed on the main Playing screen above and below the assigned Beam display while this clip is Active.

The *Sound File Assignments* Box in the center of the pane is a play-List of all the sounds that have been assigned to this Music Clip. They are numbered in the order in which they will be play as the Music Clip steps thru its Assignments. This list can be organized by moving Assignments up or down the list.

### HOW TO ADD A SOUND FILE ASSIGNMENT TO A MUSIC CLIP.

Sound file Assignments are added by clicking the *Import* button and opening the file to be added.

### HOW TO COPY AN ASSIGNMENT.

Clicking the *Clone* button will insert an exact clone of the selected Assignment into the list below the original. This includes all of its properties. *Volume*, *Transpose*.

### HOW TO REMOVE AN ASSIGNMENT FROM THE LIST.

Clicking the *Remove* button takes the selected Assignment off of the list.

### HOW TO MOVE AN ASSIGNMENT UP OR DOWN THE LIST.

Clicking the *Move Up* or *Down* buttons moves the selected sound file Assignment up or down the step-thru list.

To learn how to use the Midi Properties for a music clip see [Midi Properties view](#).

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If in Midi Properties View, click the Midi Properties button to turn it off.

Select the Music Clip you want to work with.

Select the name of a sound file in the Assignments Box to edit its properties.

*Volume* Slider will adjust the playback volume for the selected sound file.

*Transpose* Slider will transpose the playback for the selected sound file musically.

Use the slider to transpose the selected Assignment up or down in musical steps called semi-tones.

There are 12 semi-tones in one octave. When this slider is set to anything other than zero, playback for the selected sound file assignment will be transposed by the amount specified.

**Composing Tip:** Use this volume control and the Play All Bar to get an even volume across all the assignments. This will save a lot of time later.

### HOW TO EDIT MIDI PROPERTIES FOR A MUSIC CLIP.

Select the Music Clip you want to work with.

If not in Midi Properties View, click the Midi Properties button to turn it on.

For more information see [Midi Properties view](#).

## How to audition sound files.

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### Hearing how a single sound file will play.

Select a single assignment and click the Play button to hear it.

### Hearing how the Instrument will play all of the sounds in the Music Clip.

The red button along the top of the Assignments box works like a beam on the main screen.

It can be used to hear how the Instrument will play the assignments in the box when it is triggered.

It usually operates with a mouse-over like the beams on the main screen, however, if the Instrument you are working with is a Start/Stop type, clicking on the bar will start the loop, clicking it again will stop it.

## Notes on importing MP3 files.

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The Microsoft Direct Music synthesizer can only use samples in .wav file format.

When a MP3 file is imported into a Music Clip, it is converted into a .wav file which is then imported and placed into the song's folder.

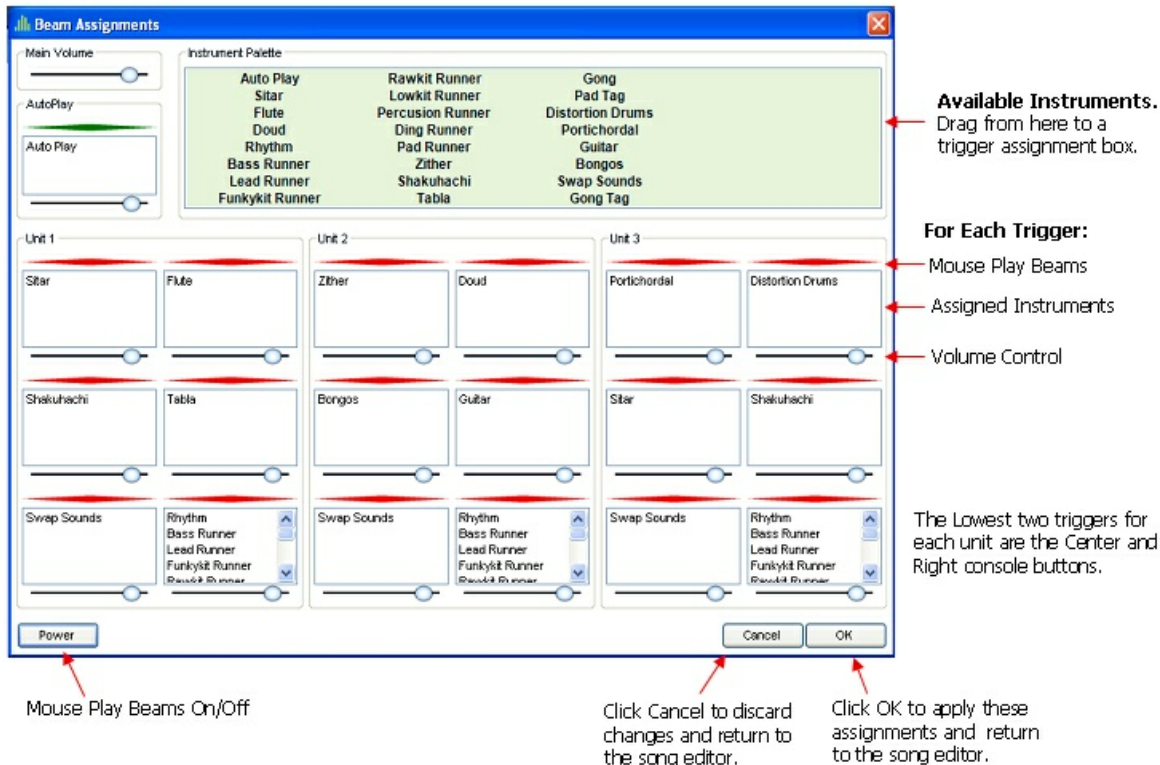
## Sound Card Notes.

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Beamz Studio relies on the Microsoft GS Synthesizer, which is a part of Windows. It works only with the Microsoft WDM audio stream protocol, which is the Windows standard. Practically all factory installed sound cards for Windows computers use the protocol. However, some advanced add-on sound cards offer a selection of other protocols that used. If you're someone who uses one of these cards, be aware that the card used for Beamz playback must be using the WDM protocol.

## ASSIGNING INSTRUMENTS TO BEAM TRIGGERS AND MIXING THE SONG.

Click on the *Beam Assignments* button on the main Song Edit screen to open this screen.



This screen is used to assign instruments to beam triggers and to do a final mix for the song.

Each of the possible Beam Triggers has its own Instrument Assignments box that contains the names of the Instruments that are assigned to it. You assign an instrument by dragging it into the box. Dragging an instrument out of the box will remove it's assignment there. The Volume slider and Mouse Play Beam can be used to mix the volume to match the song.

## How to assign Instruments to Beam Triggers.

Open the Beam Assignments screen.

An Instrument is assigned to a Beam Trigger by clicking on it inside the Palette of Available Instruments and dragging it into the Assignments box for the Beam. Multiple Instruments can be assigned to the same Beam Trigger. The Instrument at the top of the stack will have its name and description displayed on the main screen.

### HOW TO REMOVE A BEAM TRIGGER ASSIGNMENT.

Instrument Assignments made to a Beam Trigger are removed by dragging them back into the Palette of Available Instruments.

Open the Beam Assignments screen.

Each Beam Trigger has a *Trigger Volume* Slider that will adjust its volume. Mouse Play beams are provided for all triggers so you can test the mix while you're working on it.

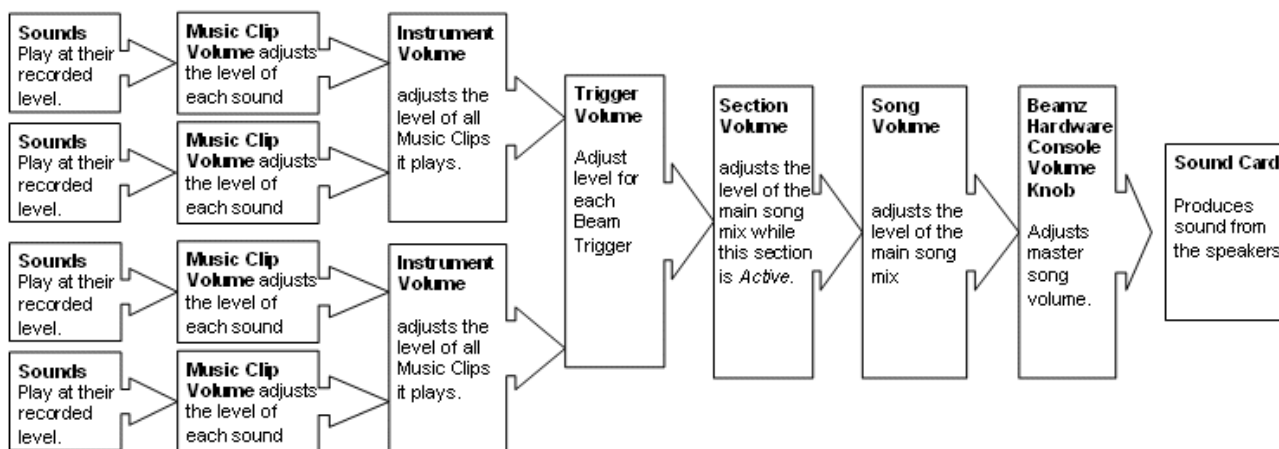
The *Master Volume* Slider will adjust the volume of the song as a whole. (This Volume Slider is also available in the Song Edit pane). See the the next topic on Using a structured approach to mixing.

## Using a structured approach to mixing.

A Beamz song is a multitude of sounds that can possibly play together randomly as the performer chooses. Getting them all to play at a consistent volume throughout an entire song can be challenging.

When a sound file plays, the sound it produces begins along a *path* thru the Beamz software and ultimately ends up at the final destination: the computer's sound card, where it can be heard. As the sound travels along its *path* thru the Beamz software, there are several places where its volume can be adjusted along the way.

The sound is adjusted at several places along its path to the sound card.



### HOW BEAMZ VOLUME CONTROLS WORK.

All Volume sliders in Beamz Studio can only lower the volume, not boost it on its path to the sound card.

This amount is displayed as a decibel value. (-3.0 would be reducing the volume by 3 decibels.)

## HOW TO MIX A SONG.

1. Use the Volume Slider in the Music Clip edit pane to fine tune each sound's volume across all sounds for each Instrument. They should all play at the same level.
  - 1a. For Music Clips with midi properties, the volume and panning can also be adjusted there.
2. Use Volume Slider in the Instrument edit pane to set a similar level for all Instruments in the song.
3. Use the individual Volume Sliders in the Beam Assignments screen to tune the overall mix for the song.
4. If certain song sections are to be quieter than others, use the Volume Slider in the Section edit pane to adjust the master mix lower while the section is being played.
5. Use the Volume Slider in the Beam Assignments screen or the Song Edit pane to adjust the Master volume to match other songs.

### **Composer's Tip for getting a good mix in a Beamz song:**

You can avoid ending up with a song that cannot play as loudly as other songs. A good mixing target would be to end up with a Master Volume that needs to be lowered to match other songs. If the volume needs to be boosted, there should be enough "head room" to raise it easily. At each stage of the mixing process, try to avoid having the volume controls maxed out. Always try for a mix that has a little room to be boosted at each step in the path if this becomes necessary later.

### **Composer's Tip for getting a good volume for samples you record yourself:**

Ending up with a good overall mix for a song begins with the samples themselves. Since Beamz Studio can only lower the volume, the overall volume of the samples should be high enough to clearly be heard in the main mix. - if they're too high for the song, they can be easily cut down. Much time and effort can be saved during the mixing process if all the samples played by an instrument are at a consistent volume for the entire song, and at strong volume levels.

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## AutoPlay Trigger explained.

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Beamz software has a special internal trigger called *Autoplay* that is automatically triggered one time whenever the Free Run section becomes active. Instruments used with the Autoplay trigger are either Start/Stop or One-Shot trigger types. Typically, an Autoplay instrument is a silent loop that runs in the background to establish a metronome for instruments set up to trigger on a specific Start value. Sound files can also be assigned to an Autoplay instrument. An example would be an Autoplay instrument that plays Nature sounds in the background for a Relaxation song.

## How Beam Assignments are different from a Custom Layout.

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The *Custom Layout* screen in the *Tools* menu is available to permit any user to rearrange the beam assignments and make their own custom mix for a Preset song.

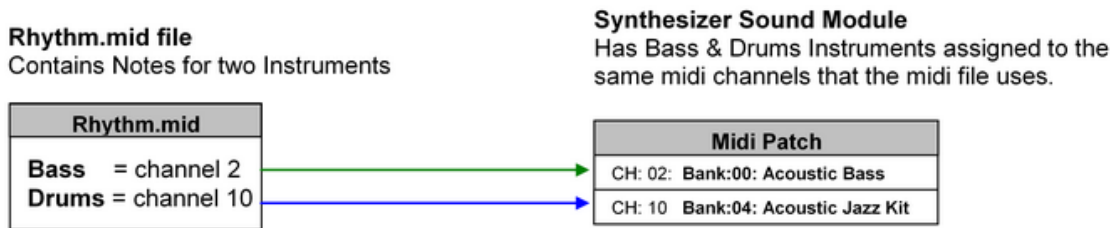
Custom Layout settings are saved as a separate file in the song folder and work as temporary overrides for the permanent settings in the song's definition file. A Custom Layout does not affect the song's definition file in any way.

**NOTE:** A song's Custom Layout is based on what is contained in its permanent song-definition file.

It re-assigns or overrides the song's defined settings. Making changes to a song's definition file can have an adverse effect on its Custom Layout, so it is suggested that you "Reset" or remove a Custom Layout before editing the definitions for a song.



A midi file is a collection on *Notes* that will be produced by a synthesizer when the midi *sequence* is played. Each Instrument being "played" by the midi file will have its own unique midi channel used for its notes, and the sound device intended to produce the sound must have the appropriate (matching) Instrument assigned to the same midi channel. Each instrument must have its own unique midi channel, and its up to the composer to map the midi channels that are used in a song.



When **Rhythm.mid** is played, it sends notes to the synthesizer on 2 midi channels.

Midi synthesizers keep their internal collection of Instruments organized in Banks. Each Bank contains the programming and samples to play a selection of different Instruments. Most synthesizers have a special General Midi Bank which is a standardized collection of all major Instruments.

**Note:** Channel 10 is recognized by General Midi Standards as being used for drums & percussion sounds, which are treated differently by most synthesizers. Some synthesizers display only a list of drum kits as Instrument choices for midi channel 10.

Beamz software uses the Microsoft DirectMusic synthesizer to play its midi files. Instead of being contained in memory banks, the Instrument (patches) used by this synthesizer are contained in DLS Collections which are files on the hard disk of your computer.

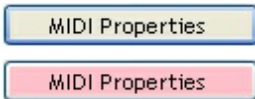
The same midi sequence played in Beamz Studio would look like this:



Just as it is with any midi sound module, each midi channel used in the file being played must be assigned to an Instrument or Patch within a DLS collection in order to produce sound. The Microsoft DirectMusic synthesizer has its own DLS version of the General Midi collection, which is used as a default until something else is assigned.

There are two views available in the editing pane within the Song Editor.  
*Normal View* and *Midi Properties View*.

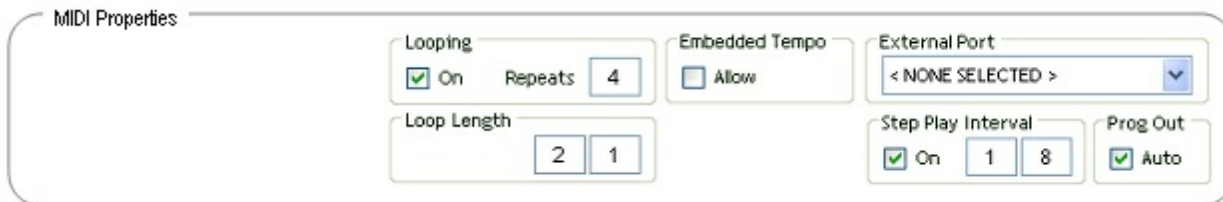
Clicking on the Midi Properties button at the bottom of the screen toggles between them.



While you're in midi properties view, the button turns red.

Depending on what is selected in the song edit matrix, the midi properties available for that selection are displayed in the editing pane.

Selecting an **instrument** in the matrix will display these controls depending on how the instrument was set up.



**Note.** Even though Midi Properties are available for all instruments in a song, they are only used when and if the instrument plays a **midi** sound file. They are ignored for other types of sound files.

### SONG AND INSTRUMENT MIDI PROPERTIES.

#### Prog Out

Indicates whether or not you want to automatically send Program, Volume, and Panning controllers to an external device when each Music Clip becomes active. This is a song level property and it applies to all instruments in the song.

**External Port** - Selects the output midi port to be used for sending all midi that is played by this Instrument to an external midi device. This is an instrument level property and it applies to all music clips in the instrument.

**Step Play Interval** - available only for pulsed and one-shot instruments.

Allows midi files for this Instrument to be stepped thru for a specified duration each time they are played. This is an instrument level property and it applies to all music clips in the instrument.

For more information please see [How to use the Step Play Interval with midi files.](#)

**Embedded tempo** - available only for Master start/stop instruments.

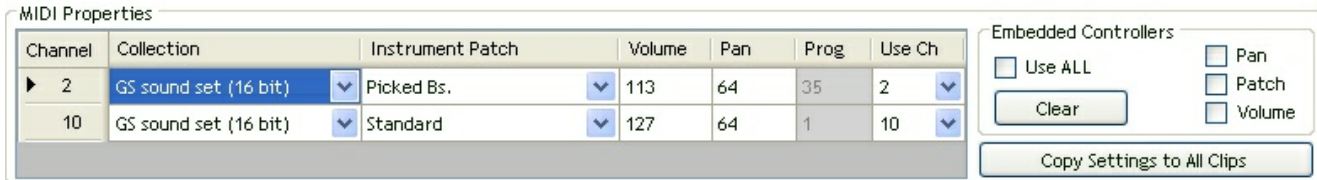
If this option is checked, tempo information contained in the midi file being played will be used instead of the tempo setting for the song. For more information please see Beamz Tempo settings.

**Looping** - available only for pulsed and one-shot instruments.

When midi looping is turned on, everything played by the instrument is repeated back as a loop a specific number of times. For more information please see Using Midi Looping.

## MUSIC CLIP MIDI PROPERTIES

Clicking on a **Music Clip** containing midi files will display these properties.



Each midi channel present in music clip is listed on the grid in the left column.

If the Music Clip contains multiple midi files, all of the channels they use will be listed in the grid.

If there are no midi files in the selected Music Clip, midi channels grid will not be displayed.

**Note.** The **Embedded Controllers** being displayed are specific to the midi channel that is currently selected.

In this case the controllers values would be for midi channel 2, which is the current selection.

Each midi channel can have its own embedded controllers settings.

Clicking on the **Copy Settings to All Clips** button will copy all the midi settings for the selected channel into all other music clips in the instrument that contain midi files using this channel. see How to copy midi settings to other music clips.

## MUSIC CLIP MIDI PROPERTIES.

**Channel** - is a display of the channel embedded in a midi file used by the Music Clip.

**DLS Collection** - Use the pull down arrow to open a list of selections.

It will contain a list of the DLS Collections that have already been imported into the song. The normal default is the General Midi collection that comes with the Microsoft DirectMusic synthesizer. If the one you want to use is not listed, you must Import it by selecting *Import DLS Collection*. This opens a browser window where you can select the .dls file you want to Import. See How midi files play sounds in Beamz Studio

**DLS Instrument** - Use the pull down arrow to open a list of selections.

It will contain a list of all the Instruments contained in the selected DLS Collection.

**Midi Volume** - sets the midi volume control for this midi channel.

**Midi Panning** - sets the midi panning control for this midi channel.

**Prog** (number) - Sets a midi Program Change controller value to be sent to an external midi device each time the Music Clip becomes active. This is only available if a Midi Output Port has been selected and the Auto-Send option is used.

**Use ch** - Sets an over-ride midi channel to be used instead of what's in the midi file itself. The Channels listed at the left of the grid represent what's being used within the midi (.mid media) for the selected Music Clip. This applies to not only the internal DLS assignment, but it also applies to midi output being sent to external midi devices. If this conflicts with another midi Instrument you have setup somewhere else in the song, it can be changed by using the pull down to select a different channel. - See **Special Note** below.

### **Embedded Midi Controllers**

Each channel can have its own midi controllers settings.

For more information please see Using embedded controllers contained in a midi file.

### **SPECIAL NOTE: Midi channel assignments within a song.**

When you Import a midi file into a Music Clip, you must assign a dls instrument for each midi channel it uses. Even though midi channels are assigned to DLS Instruments within a single Music Clip, they apply to the song as a whole. Therefore, caution must be used when assigning a midi channel to a DLS Instrument. If the same channel is used for a different instrument somewhere else in the song, the proper sound may not play. Each midi channel / DLS instrument assignment must be unique.

When importing midi files, use the **Use ch** over-ride to insure this is the case.

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## How to play midi files with the Beamz internal synthesizer.

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1. Import the MIDI file into a Music Clip and Select it. see [How to use the Music Clips Editor](#).
2. If needed, assign a Step Interval for the Instrument. see [How to use the Step Play Interval with midi files](#).
3. Select the Music Clip again. Open the MIDI properties view. see [Midi Properties view](#).
4. Select the DLS collection and Patch (Instrument) for each channel listed in the grid.
5. Close the MIDI properties view and use the play-bar in the Music Clips editor to hear how it sounds. see [How to audition sound files](#).

## How to use the Step Play Interval with midi files.

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You already understand how the list of sound file assignments in a Music Clip is stepped thru each time the Instrument plays a sound from the list. When *Step Play* is enabled for an Instrument, it steps thru a midi file each time the Music Clip needs a sound to play. (Instead of stepping thru the list of sound file assignments)

Assume you want to make a pattern of eight notes - each of them is sustained as a whole note. If you prepared these notes as separate midi files for each note, the Sound File Assignments box in the Music Clips pane might look like this:

Click to Play	
1: E5.mid	5: G5.mid
2: B5.mid	6: D6.mid
3: F5.mid	7: F5.mid
4: C6.mid	8: C6.mid

The Instrument steps thru this list playing one midi file each time it plays a note.

After Step 8 has been played, it begins with step 1 again.

Preparing a separate midi file for each of these notes would be a lot of work.

The Step Interval provides an easier way to prepare these midi notes.

If you prepare a midi file of the eight whole notes in the above illustration, here's what the midi sequence would look like: This file was prepared to be played with a *Step Play Interval* = 1 Bar. (1/1)



The Instrument steps thru the midi file playing one Bar of it each time, then stops in place (pauses).

After Step 8 has been played, it begins with Step 1 again.

The *Step Play Interval* indicates how far it should "play" into the midi file each time it

advances.



The number on the left (3) is the multiplier.

The number on the right (1) is the note value (1 = whole; 16 = 16th note, etc.)

In this illustration the Step Play Interval would be 3 Bars.

### Notes on using the Step Play feature:

The *Step Play* option is only available for Pulsed and One-Shot instrument types.

It only works with midi files - it is ignored for all other media types.

When this is selected, it applies to all midi files played by the Instrument.

If Stepping is used for an instrument, it cannot be used as a Looping instrument as well.

When Looping is enabled, the stepping option is turned off.

For more information on Looping see [Using Midi Looping](#).

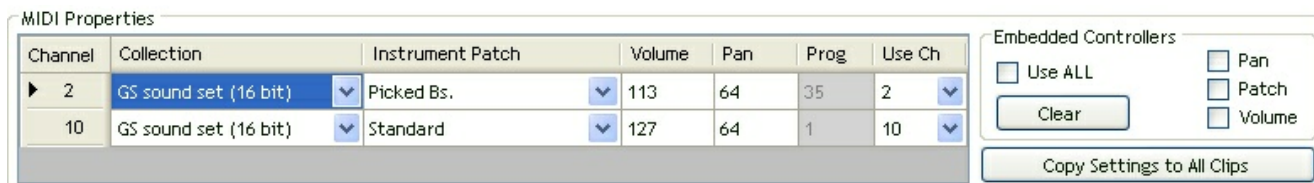
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In addition to the notes to be played, midi files also contain other "events" that allow control of other aspects of a musical performance. They can range from controls set the tempo, to controls that alter how a note is being played, to those intended to be used with midi capable lighting systems. The most common are controls for Volume, Panning, and Patch (synthesizer program).

Beamz Studio allows the option to decide whether or not a Music Clip uses them when playing midi files.

### How to Use Embedded Midi Controllers.

Select the Music Clip containing the midi file and open Midi Properties View for it.



The **Embedded Controllers** being displayed are specific to the midi channel that is currently selected.

Each midi channel can have its own embedded controllers settings.

Select the desired channel and then use the check-boxes to enable the the kind of controllers you want to use from it.

Clicking on the *Clear* button clears all the check-boxes.

Beamz Studio breaks up all the possible midi controllers into four categories.

**Pan** controls, **Patch** changes, **Volume** controls, and **ALL** others.

In order to use all of the possible midi controllers, all of the boxes must be checked.

For convenience, when you check the *Use ALL* box, the Pan, Patch, and Volume boxes are also checked.

It's important to remember that when you check the Use ALL box, you are selecting the category "all controllers *other* than Pan, Patch, and Volume". These controllers are enabled or disabled individually.

To use *all* controllers *except* Pan, Patch, and Volume.





To use *only* Pan, Patch, and Volume controllers.

Embedded Controllers

<input type="checkbox"/> Use ALL	<input checked="" type="checkbox"/> Pan
<input type="button" value="Clear"/>	<input checked="" type="checkbox"/> Patch
	<input checked="" type="checkbox"/> Volume

### Embedded Tempo Controls.

Beamz Studio also permits the use of embedded midi tempo controllers.

To learn more about how to do this, read the topic on Beamz Tempo settings.

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## How to copy midi settings to other music clips.

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Typically a midi part for an instrument is broken up into several different sections that span across the song. In most cases each music clip contains different notes to be played on the same midi instrument. Beamz Studio allows you to set up an instrument in one music clip and then copy the settings into all other music clips that use the same instrument.

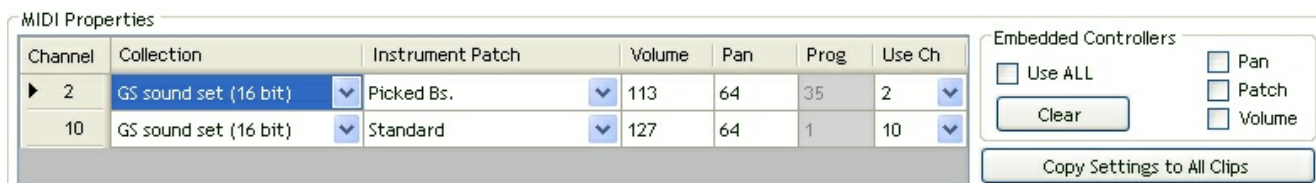
Here are some important things to remember when copying midi settings into other music clips:

- a. The settings will be copied only into music clips that *already* have midi content that uses the same midi channel.
- b. Only the settings for the currently selected midi channel will be copied into the other music clips.

1. Import all of the associated midi files into their respective music clips across all sections for the instrument.

2. Select any of these music clips and setup a midi channel the way you want it to be for all music clips in the instrument.

3. Select the midi channel whose properties you want to copy.



Channel	Collection	Instrument Patch	Volume	Pan	Prog	Use Ch
2	GS sound set (16 bit)	Picked Bs.	113	64	35	2
10	GS sound set (16 bit)	Standard	127	64	1	10

Embedded Controllers

Use ALL

Pan

Patch

Volume

Clear

Copy Settings to All Clips

4. Click the *Copy Settings to All Clips* button to copy all midi settings for the selected channel to all other music clips in the instrument that use the same midi channel.

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**Midi Note Record** offers a convenient way to play simple midi notes directly into the selected Music Clip from your midi keyboard without having to use sequencing software to put them into a midi file first, then Import them.

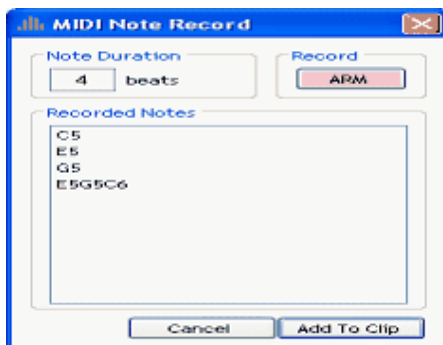
**Note:** It **does not** work like *Step Recording* in midi sequencing software.

Every note on the list will have the selected note duration - no matter how quickly they are played or how long they are sustained on the keyboard. When multiple notes are played on the keyboard, they are all quantized together as a chord, and they are all listed as one entry on the list.

When you click *Add to Clip*, each entry on the list becomes a separate midi file in the Music Clip where they can easily be cloned, removed, or moved to a new spot on the assignments list.

### HOW TO RECORD YOUR OWN MIDI NOTES INTO A MUSIC CLIP.

1. Select the Music Clip where you want the notes to be placed.
2. Click the **Midi Note Record** button to open up this window and to begin a recording session.



When this window opens the recording feature is Armed as indicated by the red color of the Arm button. While the Arm button is red, all notes received from the keyboard are recorded and placed onto the list.

If you want to hear something before committing to actually recording it, you can turn off the Armed feature by clicking the Arm button. While the Arm button is Grey you can hear notes from the keyboard but they are not recorded.

3. Set the **Note Duration** for the notes you intend to play into the Music Clip.
4. Play the notes individually on your midi keyboard (each note you play is added to the box.)
5. When you are finished adding all your notes to the list, click **Add To Clip**

**Composer's Tip:** Assigning a dls instrument to an empty Music Clip for Midi Note Record.

Assigning a dls to a Music Clip cannot be done until the Music Clip contains midi content,

which is not the case for empty music clips. Until you have a midi file in the Music Clip, the only sound you can hear while using Midi Note Record is the GS Piano - which is the default for the synthesizer. An easy way around this is to record one note (that will be discarded later), add it to the clip and assign the appropriate dls instrument to it. Then you can hear it while you record the notes you want to keep. When they've been added to the Music Clip, remove the note that was used as a place-holder.

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1. Import the MIDI file into a Music Clip.  
see [How to use the Music Clips Editor](#).
2. Select the Instrument.  
If needed, assign a Step Interval for the Instrument.  
see [How to use the Step Play Interval with midi files](#).
3. Select the midi port that has the external sound device connected to it.
4. Select the Music Clip and audition the sounds.  
see [How to audition sound files](#).

**Note:** If you do not want to use the midi channels that are listed, you can override them and use a different midi channel by selecting it in the *Use ch* pull down selection.

**Note:** If you know the Patch/Program number of the Instrument you want to use on the external device, enter it in the *Prog* box, and check the *Prog Out* box to auto-send it. If you prefer to manually setup your synthesizer, leave this box unchecked.

**Note:** If you want to hear only the sounds produced by the external device, select <none selected> for the internal dls collection.

# How to trigger Beamz instruments with an external midi keyboard.

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If you have a midi keyboard connected to a Midi Input port on your computer, you can map Beamz Instruments to be triggered by selected keys (midi notes) on your keyboard. When the selected note is played on the keyboard, the designated beam will be triggered.

Open the *Tools* Menu and select *Map MIDI Input to Beams*. This window will open:



Use the pull-downs to select different notes of your choosing.

**Note:** Button 5 is the Center console button; Button 6 is the Right console button.  
The Left console button cannot be mapped.

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