

# **Creating Chiptune Music**

Little Sound DJ Tutorial  
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# Table of Content

LSDJ structure .....	3
Hexadecimal system .....	5
Screen structure .....	6
Copy & paste .....	7
Exercise .....	8
Project Screen .....	9
Instrument Screen .....	10
Table Screen .....	12
Groove Screen .....	13
Commands .....	15
Helpful site .....	18
Emulator key press .....	19

## **What is Little Sound DJ?**

Little Sound DJ is a tracker -based music-making tool designed for Nintendo Game Boy hardware. There are 4 channels of audio available to be played simultaneously. Music is created by navigating through different screens with combinations of buttons similar to playing a video game.

## **Game Boy Sound**

The Little Sound DJ has 4 bit resolution, four channels sounds.

Chan1 (pulse): Square wave with envelop and sweep functions.

Chan2 (pulse): Square wave with envelop function.

Chan3 (wave): Soft synthesizer, sample playback and speech synthesis.

Chan4 (Noise): Noise with envelope and shape functions.

## **Hexadecimal Number System**

Little Sound DJ represents parameter values with hexadecimal system,' base 16' number system.

## **Little Sound DJ Screen Structure**

LSDJ consists of multiple screens. Each screen has different functions. Song, Chain, and Phrase are used to compose and arrange a song, and instrument, table and groove screens are used for sound programming.

Song Screen - the highest level of the screens where you construct a song by stringing chains together.

Chain Screen – chains series of phrases.

Phrase Screen - where the patterns are created. However, you cannot hear unless an instrument is assigned.

Instrument Screen - allows you to create and modify an instrument by selecting different waveforms and changing parameters.

Table Screen - where you can alter and automate the sounds of pattern or a chain.

Project Screen - manages songs you have written.

Groove Screen – controls how fast a pattern runs.

## Hexadecimal System

Hexadecimal is based on 16 instead of 10. This means it consists of 16 unique symbols: the digits 0 to 9, followed by the letters A to F.

The value range is 0 to 255 - that is, 00 to FF.

decimal	1	2	3	4	5	6	7	8	9	10
hexadecimal	\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	\$9	\$A

decimal	11	12	13	14	15	16	17	18	19	20
hexadecimal	\$B	\$C	\$D	\$E	\$F	\$10	\$11	\$12	\$13	\$14

decimal	21	22	23	24	25	26	27	28	29	30
hexadecimal	\$15	\$16	\$17	\$18	\$19	\$1A	\$1B	\$1C	\$1D	\$1E

decimal	31	32
hexadecimal	\$1F	\$20

## **Song Screen**

This is where you arrange your songs. The columns contain lists of chains, which will be played from top to down.

Insert a chain - move the cursor to an empty step and press A.

Add a new chain - press A twice.

Remove a chain - press B + A.

## **Chain Screen**

Chains are used for stringing phrases together. The chain screen contains two columns.

The first column contains a list of phrases.

The second column allows for transposing.

## **Phrase Screen**

The phrase screen is where you enter the actual note data.

Note column - where you add note values. A + left/right will change semi tones and A + up/down will change octaves.

Instrument column :used for selecting instruments. You won't hear any sound unless an instrument is assigned.

Command columns - used to add effects to a phrase.

## Copy and Paste

B + A = Cut

SELECT + A = Paste

SELECT + B = mark up blocks

SELECT + A = Paste clipboard.

SELECT + (B, B) = quick-mark a column.

SELECT + (B, B, B) = quick-mark an entire screen.

A + CURSOR = When having marked a block, you can change all data inside that block

### **Exercise1. Creating a drum sound**

<KIT>

1. Go to the song screen, move cursor to the wave column, and insert a new chain by tapping A twice.
2. Edit the chain by pressing SELECT + RIGHT.
3. Insert a new phrase by tapping A twice.
4. Edit the phrase by pressing SELECT + RIGHT.
5. Create a new instrument by moving the cursor to the instrument column and tapping A twice.
6. Press SELECT + RIGHT to edit the instrument.
7. Change the instrument type to KIT.
8. Go back to the phrase screen and make your own drum pattern.

<Pulse>

1. Go to the song screen, and move cursor to the channel 1 column and insert a new chain by tapping A twice.
2. Edit the chain by pressing SELECT + RIGHT
3. Insert a new phrase by tapping A twice.
4. Edit the phrase by pressing SELECT + RIGHT
5. Set the note in step 0 to C6
6. Create a new instrument by moving the cursor to the instrument column and tapping twice.
7. In the instrument page, set the envelop to A1.
8. Set the sweep to E4 (sweep allows note to sweep quickly up and down like pitch bend)
9. Press START to hear the note.



## **Project Screen**

Project screen manages songs that you write.

TEMPO

TRANSPOSE

SYNC – allows LSDJ to synchronize with other LSDJ, nanoloop, and midi via sync cable.

CLONE – allows cloning chains. It is used for fast cutting and pasting of phrases.

LOOK – changing font and color set

PURGE SEQUENCER - clear all the unused chains and phrases.

PURGE INSTRUMENTS – clear all the unused instruments.

LOAD/SAVE FILE – allow loading different songs and saving file changes.

## **Instrument Screen**

It's an instrument for the music patterns. It allows a pattern to be heard in a particular sound you selected and designed. There are 4 types of instruments.

Pulse: used in channel 1 and channel 2

Wave: plays back synthesized waves using synth screen

Kit: plays sample kits stored in the ROM. The samples are in 4bit/11,468kHz)

Noise: filtered noise used in noise channel.

NAME - Name the instrument by pressing A.

TYPE - The instrument type. (pulse/ wave/ noise)

LENGTH - Change the sound length.

PAN - Pan the sound to left/right/both/none speakers.

VIB. TYPE - Change the effect of the Vibrato (V) command.

TABLE - Off or enter specific table number.

AUTOMATE - This option extends the table functionality. When automation is activated, Little Sound DJ advances through the tables by one step for each time the instrument is triggered.

### Pulse Instrument Screen

ENVELOPE - First digit sets initial amplitude (0-\$F), and the second digit sets release (0, 8: none, 1-7: decrease amplitude, 9-\$F: increase amplitude).

WAVE - Choose the wave type to be used.

SWEEP - Modulate the frequency. This only works on pulse channel 1.

PU2 TUNE - Detunes pulse channel 2 in semitones.

PU FINE - Detunes pulse channel 1 downwards, channel 2 upwards.

### Wave Instrument Screen

The wave instrument can play back synth sounds generated by the soft synthesizer found in the SYNTH screen.

VOLUME: Set amplitude (0=0%, 1=25%, 2=50%, 3=100%)

SYNTH: Select the synth sound to play back. To edit the synth sound being used, press SELECT + DOWN to go to the SYNTH screen.

PLAY: How to play back the synth sound: Once, loop, pingpong loop or manual.

AUTOMATE: By selecting AUTOMATE off, only the first wave in the synth sound will be played, allowing you to step through the sound manually using the F command.

LENGTH: Sets the length of the synth sound.

REPEAT: Sets the loop point of the synth sound.

SPEED: Sets how fast the synth sound should be played back.

## **Table Screen**

Tables are essentially sequences of transposes, commands and amplitude changes, which can be executed at any speed and applied to any channel.

Amplitude Column - The first digit represent the initial volume and the second digit represents release.

Transpose column

Command column - enter command name and parameters.

## Groove Screen

Grooves determines the speed which your phrases and tables are played back. They can be used to give your songs some extra swing. The different sound channels do not need to be synchronized to each other.

### Groove Screen – How to make swing

LSDJ runs on an abstract clock called 'ticks'. LSDJ contains 60 ticks in a second, which means each smallest resolution (16th note) will play 6 ticks. In Groove screen, you can also change the number of ticks to create an odd rhythm to give a swing feel.

In the example, the sequencer spends 8/60th of a second on even note steps, and 5/60th of a second on odd note steps.

Grooves can also be used to create triplets and other complex rhythm structures. Groove 0 is the default groove for all phrases.

=> If we assume that the base groove is on 6 ticks, a beat will be all in all  $4*6=24$  ticks long... Like this (in phrase sequencer):

Step 0: 6 ticks

Step 1: 6 ticks

Step 2: 6 ticks

+ Step 3: 6 ticks

-----

= 1 Beat: 24 ticks

If we want to program a triplet, we can create three steps to be exactly as long as a beat. That is, the 24 ticks of a beat should be divided on three steps. 24 divided by 3 gives us 8 ticks a step.

So we can then program an alternate groove with 8 ticks per step, and the result would be like this:

Step 0: 8 ticks

Step 1: 8 ticks

+ Step 2: 8 ticks

= 1 Beat: 24 ticks

You can select the groove you wish to edit by pressing B + CURSOR.

## Commands

Commands can be used in phrases and tables for altering the sound.

A: Run Table.

This command can be used in phrases, or inside a table, for jumping to another table.

C: Chord

Produce chords by doing a simple arpeggio that extends the base note with given semitones.

Ex) C37 plays a minor chord: 0, 3, 7, 0, 3, 7, 0, 3, 7, . . .

CCC plays 0, C, C, 0, C, C, 0, C, C, . . .

D: Delay

Delay the triggering of a note with the given number of ticks.

E: Amplitude Envelope.

Creates volume envelope. For Pulse and Noise, the first digit sets the initial amplitude (0:min, F:max), the second envelop sets the release( 0, 8: no change, 1-7:decrease, 9-F: increase). For Wave, E00: volume 0%, E02: volume 50%, and E03: volume 100%.

G: Groove

This command selects different Groove tables. The Groove screen determines how fast a phrase runs. The Groove command can run independently from other chains or phrases. By changing the number of ticks or the ratio between the ticks, interesting rhythmic variations can be created.

H: Hop

When HOP command is placed in a table, LSDJ playback engine jumps back to the step indicated and runs through the phrase again, looping for a determined number of times.

K: Kill

The Kill command will stop a note in a given number of ticks.

L: Slide (legato)

R:RE-Trigger the latest played note

P: Pitch bend

The speed with, which the note bends. The difference between L and P command is L slides to a next note, whereas P simply starts a slide up and down.

S: Sweep/Shape

This command has different effects for different instrument types.

In Pulse Instruments - S modulates pitch, using the Game Boy hardware. It is useful for creating bass drums and percussion. The first digit affects pitch, the second changes pitch bend velocity.

In Kit Instruments - S changes the loop points.

The first digit modulates the offset value, and the second digit modulates the loop length. (1-7=increase, 9-\$F=decrease.) This command can be very useful for creating a wide range of percussive and timbres effects.

Noise Instruments - On the noise channel, S works like a shape filter. The first digit alters pitch and the second digit alters the noise modulation. The command is relative, meaning that the pitch/noise modulation values will be added to the currently used values.

T: Tempo

Change the tick frequency so that the given BPM will be produced. The BPM setting will be accurate only if the active groove has 6 ticks per note step.

V: VIBRATO

Vibrate pitch. This command has no effect on noise instruments.



Example: V42 period=4, depth=2

W: Wave

The W command is used to select one of the four preset pulse waveforms. It can only be used with pulse instruments.

## Helpful Sites

### Online Community

<http://www.micromusic.net/>

<http://8bitcollective.com/>

<http://truechiptilldeath.com/>

### Software/ hardware

### Midines

<http://www.wayfar.net/>

### Arduinoboy

<http://code.google.com/p/arduinoboy/>

### Game Boy

#### Little Sound DJ

<http://www.littlesounddj.com/>

<http://little-scale.blogspot.com/2008/11/how-to-prepare-samples-and-create-lsdj.html>

### Nanoloop

<http://www.nanoloop.de/>

### More hardware and software

#### Atrari ST

#### MaxYMiser

<http://www.preromanbritain.com/maxymiser/index.html>

### Nintendo Entertainment System

[http://www.nullsleep.com/treasure/mck\\_guide/](http://www.nullsleep.com/treasure/mck_guide/)

[http://www.nullsleep.com/treasure/nsf\\_cart\\_guide/](http://www.nullsleep.com/treasure/nsf_cart_guide/)

[http://www.nullsleep.com/treasure/dpcm\\_howto/](http://www.nullsleep.com/treasure/dpcm_howto/)

## Trackers

Renoise 2.6

<http://www.renoise.com> (Professional music tracker and composing tool. [Hosts VST Plugins])

MilkyTracker v0.90.80      Creates .MOD and .XM module files.

<http://www.milkytracker.org/>

Melody Player v6.1.3      Play Midi, MOD, S3M and files created with Harmony or Melody Assistant.

<http://www.myriad-online.com/en/products/melodyplayer.htm>

Converts Midi into NES format

<http://electronica.fm/category/tags/arduino>

## Emulator Key Press

Game Boy	Emulator
<b>A</b>	<b>Z</b>
<b>B</b>	<b>X</b>
<b>Start</b>	<b>Return</b>
<b>Select</b>	<b>Backspace</b>
<b>Left Arrow</b>	<b>Left Arrow</b>
<b>Right Arrow</b>	<b>Right Arrow</b>
<b>Up Arrow</b>	<b>Up Arrow</b>
<b>Down Arrow</b>	<b>Down Arrow</b>