



**Little Sound Dj v1.4.0**

**Operation Manual**

## **Little Sound Dj Operation Manual**

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This program was developed using The Game Boy Developer's Kit (GBDK).

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## **1. Introduction**

### **1.1. Welcome!**

Thank you and congratulations for purchasing Little Sound Dj! A lot of effort has been put into this release, to make the program as fast-worked and powerful as possible. The amount of new concepts might seem overwhelming at first, especially if you've had no prior experience with the "tracker" type of music programs. I can only advise you not to panic, and to go through this documentation in an easy pace. Try to experiment and have fun in the process. Within a few days, you should have learned how to operate one of the most competent portable composing systems available! Good luck!

/Johan Kotlinski (johan@littlesounddj.com)

### **1.2. Important Message**

Turning off the Game Boy while playing music might corrupt your song data. Remember to stop playing before turning off your Game Boy!

### **1.3. Game Boy Sound**

The Game Boy sound chip has four channels.

Pulse Channel 1: Quadrangular wave with envelope and sweep functions.

Pulse Channel 2: Quadrangular wave with envelope function.

Wave Channel: Voluntary waveforms, dual soft-mixed sample kits and speech synthesis.

Noise Channel: Noise with envelope and shape functions.

### **1.4. Hexadecimal Number System**

In order to save CPU power and screen space, Little Sound Dj uses the hexadecimal number system. It consists of 16 unique symbols: the numbers 0 to 9 and the letters A to F. For example, the decimal number 15 is represented as F in the hexadecimal numbering system. The hexadecimal system is useful, since it can represent every byte using no more than two digits.

## 1.5. Key Presses

In this documentation, key presses are marked up in this fashion:

A – A button

B – B button

START – start button

SELECT – select button

LEFT – left arrow

RIGHT – right arrow

UP – up arrow

DOWN – down arrow

LEFT/RIGHT – pressing left or right arrow

UP/DOWN – pressing up or down arrow

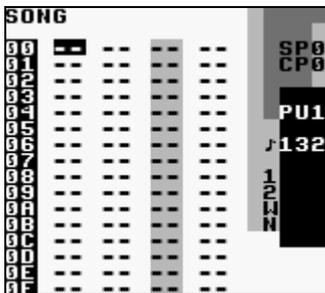
CURSOR – pressing any arrow key

SELECT + A – pressing A while holding SELECT

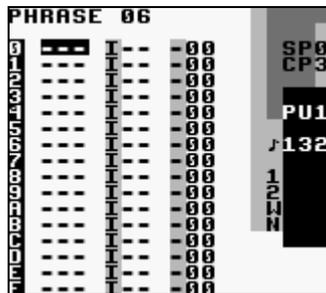
SELECT + (B, B) – pressing B twice, while holding SELECT

## 1.6. Getting Started

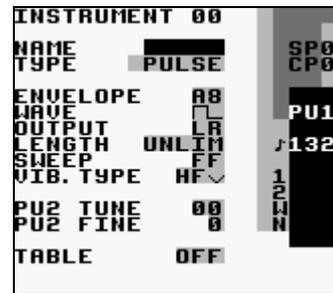
When starting up Little Sound Dj at the first time, you will be presented to the song sequencer screen. It contains four editable columns, one for each channel. At this time, all steps will contain the symbol "--", indicating that all song sequencer steps are empty. Now, let's leave the song screen for a while; press SELECT + RIGHT for entering the chain editor screen, then press SELECT + RIGHT again for entering the phrase editor screen.



*The Song Screen*



*The Phrase Editor Screen*



*The Instrument Screen*

The phrase editor is the most fundamental sequencing screen in Little Sound Dj. This is where to enter the note data to play, in an up-to-down piano roll style. Try pressing A when the cursor is on an empty step. You'll see that the empty step changes from "--" to the note

“C-3” (note C, third octave). You can adjust that note value by pressing any arrow key while holding A. Now, try to move around the cursor with the arrow keys and edit some other note values.

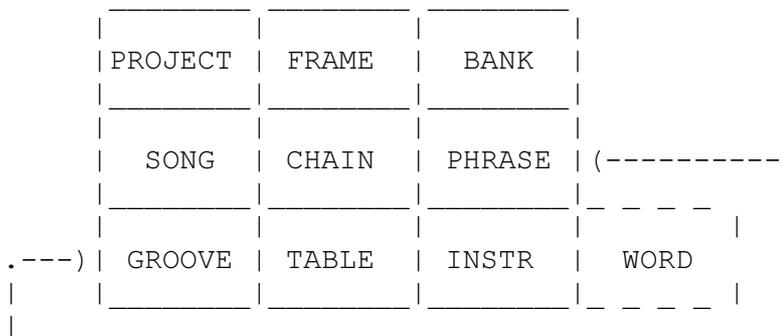
If you want to listen to the phrase, you can start and stop playing it by pressing START. You’ll probably notice that the sound is very monotonous. If you want to, you can change the parameters of the sound in the instrument screen, which can be reached by pressing SELECT + DOWN while standing in the phrase screen. Try changing the envelope and wave settings for quick results. (You can change a parameter by moving the cursor to it, and then pressing A + CURSOR.)

Note the order of which we went to the different screens: SONG->CHAIN->PHRASE->INSTRUMENT. We went to the screens in this order, because songs are built of chains, which are built of phrases, which are built of instruments. In the following chapter, we will learn more about this structure, and about the different screens in Little Sound Dj.

## 2. The Screens

Little Sound Dj has several screens. You can navigate between the screens by pressing SELECT + CURSOR.

### 2.1. Screen Map



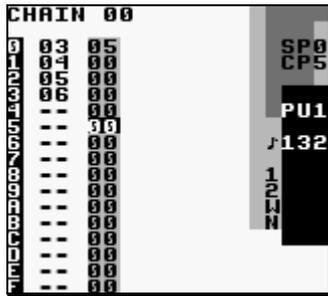
### 2.2. Starting And Stopping

When pressing START in the song screen, Little Sound Dj will always try to play all four channels. When pressing START in the other screens, Little Sound Dj will only try to play the channel that's indicated in the three-letter field at the right edge of the screen (“PU1”, “PU2”, “WAV” or “NOI”).

If you want to start playing all four channels from some other screen than the song screen, you can do that by pressing SELECT + START.



Example:



This chain would play phrase 3, adding 5 semitones to each note, and then play each of the phrases 4, 5, 6, without transposing.

To create a chain, go to the song screen and press A twice on an empty step. Then, press SELECT + RIGHT to edit the chain you just created. To add a phrase to the chain, move the cursor to an empty step and press A. If you want to add a new phrase, press A twice.

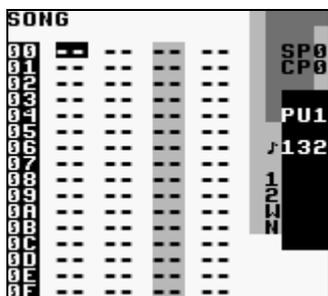
To edit a phrase, move the cursor to the phrase number and press SELECT + RIGHT.

If editing a chain, you can go to the next most chain in a neighboring channel by pressing B + LEFT/RIGHT. This channel switching method works well in the phrase screen, too.

If editing a phrase inside a chain with several phrases, you can scroll between the different phrases in the chain by pressing B + UP/DOWN, or by simply moving the cursor up or down. In this way, editing four phrases placed after each other will be much like editing a virtual 64-step phrase.

The different channels all share the same set of chains; that is, no chain is ever assigned to a specific channel. The number of chains is limited to 128 (hexadecimal: 80).

## 2.5. Song Screen



The song screen is the highest level of the sequencer. It contains 4 columns, one for each channel. The columns contain lists of chains, which will be played in piano-roll style, up to down. The number of rows in the song screen is limited to 256 (hexadecimal: 100).

To add a chain, move the cursor to an empty step and press A. If you want to add a chain that hasn't been used before, press A twice.

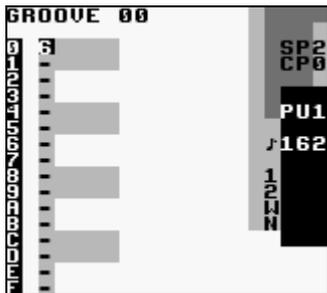
To edit a chain, move the cursor to the chain number and press SELECT + RIGHT.

## 2.6. Groove Screen

The groove screen allows you to edit grooves. Grooves define the speed with which phrases or tables should be played back. The different sound channels do not necessarily have to be synchronized to each other; this means that you can use a separate groove for each phrase and table.

For understanding the groove concept, you need to know that the sequencer's time handling is based on an abstract time period called "tick". One tick is approximately 1/60<sup>th</sup> of a second (this can be changed by using the Tempo ("T") command). In the groove screen, you can specify for how many ticks each note step should be played.

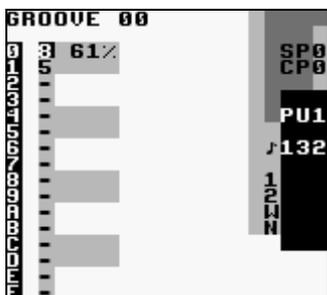
Example:



This groove would make the sequencer spend approximately 6/60<sup>th</sup> of a second on every note step.

You can also use the groove screen to create custom rhythms.

Example:



This groove would make the sequencer spend 8/60<sup>th</sup> of a second on even note steps, and 5/60<sup>th</sup> of a second on odd note steps. This would create a swing feeling, described by the percentage value, which is calculated by the formula (even step ticks)/(even step ticks + odd

step ticks). With thoughtful programming, grooves can also be used to create triplets, and other complex rhythm structures.

Groove 0 is the default groove for all phrases. If you want to, you can easily switch to another groove by using the Groove ("G") command in the phrase screen.

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

Tip: Pressing A + UP/DOWN will change the swing percentage, while keeping the total number of ticks – and thus, the resulting song speed – constant. (Example: 7/6 58% => A + UP => 8/5 66%)

Tip 2: If you switch to the groove screen when the cursor is standing on a groove command in the phrase or table screens, Little Sound Dj will display the groove that is selected with the groove command.

The number of grooves is limited to 32 (hexadecimal: 20).

## 2.7. Table Screen

Tables are essentially sequences of transposes, commands and amplitude changes, which can be played at any speed and applied to any channel. By using tables, it is possible to modulate the sound of a channel greatly. If you want to, you can assign instruments to tables (by setting the TABLE setting in the instrument screen), so that a table will be started every time you play the instrument. It is the key to creating truly complex instruments in Little Sound Dj.

Tables contain six columns. First out is the envelope column, by which it is possible to create custom amplitude envelopes. Next is the transpose column, that can be used to transpose the note being played by a given number of semitones. The other columns are command columns, just like the one in the phrase screen.

### Custom envelope example

The first digit in the envelope column sets the amplitude; the second digit sets for how many ticks that amplitude should remain.



There are five types of instruments available:

- PULSE. This instrument type produces quadrangular waves, and is used in pulse channels 1 and 2.
- WAVE. This instrument type produces custom waveforms, and is used in the wave channel. (These waveforms can be edited in the frame screen.)
- KIT. This instrument type plays sampled kits, stored in ROM. (The samples are stored in 4 bits, 11.468 kHz.) This instrument is used in the wave channel.
- NOISE. This instrument type produces different kinds of pitched noise, and is used in the noise channel.
- SPEECH. This instrument is locked to instrument number 20, and is used for programming speech. For learning how to generate speech, please look up chapter 4.

### General Instrument Parameters

These parameters are used in almost all instrument types.

NAME – name the instrument by pressing A.

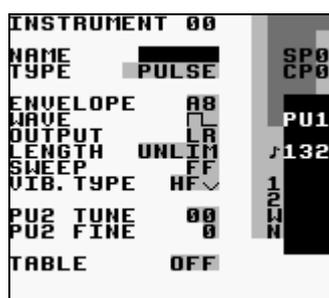
TYPE – use this to specify the instrument type. Different parameters will be listed, depending on your choice.

LENGTH - change the sound length.

PAN - pan the sound to left/right/both/none speakers. (Use the headphone output to hear the difference!)

TABLE - if not “OFF”, Little Sound Dj will start running the specified table when a note is played. If you want to edit the table, press SELECT + LEFT to get to the TABLE screen. If you want to select an unused table, tap A twice.

### Pulse Instrument Parameters



These parameters are special for pulse instruments:

ENVELOPE - first digit is initial amplitude (0-F); second digit is 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 the pulse1 channel. See Sweep/Shape ('S') command documentation for further information.

VIB. TYPE - change the effect of the Vibrato ('V') command. The "HF" vibrato type is short for High Frequency, and can be used for creating very interesting timbres. The other vibrato types are more conventional.

The PU2 detune settings can be used to create interesting phase effects, when the same melody is played on both pulse channels:

PU2 TUNE – detune pulse channel 2 in semitones.

PU2 FINE – detune pulse channel 2 in small steps.

### Wave Instrument Parameters



These parameters are special for wave instruments:

VOLUME - set amplitude (0=0%, 1=25%, 2=50%, 3=100%)

FRAME - set wave frame (Wave frames can be edited in the frame screen.)

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

### Kit Instrument Parameters



These parameters are special for kit instruments:

KIT – choose the kits to use. The first kit will be used in the left note column in the phrase screen, the second kit will be used in the right note column in the phrase screen.

PITCH – pitch adjust.

OFFSET –set the start loop point. If LOOP is set to OFF, this value can be used for skipping the initial part of a sound.

LEN – set the sound length. (AUT=always play the sample to its end.)

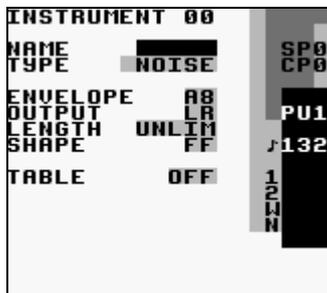
LOOP – loop the sample. (OFF=don't loop, ON=loop sound and start playing from OFFSET, ATK=loop sample and start playing from the beginning.)

SPEED – select full speed or half speed.

DIST – select the algorithm with which the two kits should be mixed together. WRAP can be used to add some interesting digital distortion.

VIB. TYPE – change the effect of the Vibrato ('V') command.

### Noise Instrument Parameters



These parameters are special for noise instruments:

ENVELOPE - first digit is initial amplitude (0-F); second digit is release (0,8: none, 1-7: decrease amplitude, 9-F: increase amplitude).

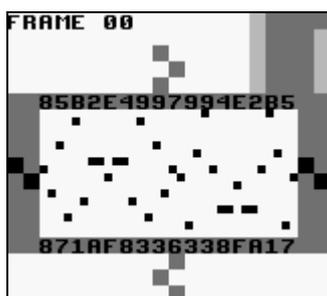
SHAPE - modulate the frequency. See Sweep/Shape ('S') command for further information.

### Speech Instrument Parameters

For information about how to generate speech, please read chapter 4.

The number of instruments is limited to 32 (hexadecimal: 20).

## 2.9. Wave Frame Screen



In this screen, you can edit the 256 (0-FF) wave frames, by using the cursors. The wave frames are used in the WAVE instrument type, and can be selected in the instrument screen or by using the SET WAVE FRAME ('F') command.

Copy and paste works well in this screen. A useful trick is drawing the first half of the wave, marking and copying it, and then pasting to the other half. You can then mark the other half and press A + UP/DOWN in order to flip it vertically. Pressing A + LEFT/RIGHT would flip the marked portion of the wave frame horizontally.

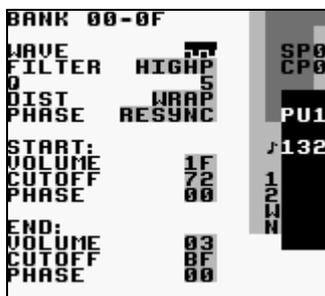
By default, the wave frames are filled with filtered square and saw tooth waves, divided into 16 sets. The first digit of the frame number chooses a set:

- 0-3: low-pass filtered saw tooth waves, 4 levels of resonance
- 4-7: low-pass filtered square waves, 4 levels of resonance
- 8-B: high-pass filtered saw tooth waves, 4 levels of resonance
- C-F: high-pass filtered square waves, 4 levels of resonance

The second digit of the frame number sets cutoff.

To view a different wave frame, press B + CURSOR.

## 2.10. Bank Screen



The bank screen features a soft synthesizer that generates wave frames. The 256 wave frames are divided into 16 banks of 16 frames each. When pressing START, the synthesizer generates a full bank of 16 frames.

WAVE – square or saw tooth

FILTER – low pass, high pass, band pass or all pass

Q – also known as resonance; this value attenuates the cutoff frequency

PHASE [TYPE] – NORMAL transforms the wave using a simple phase algorithm, RESYNC creates an effect similar to when you sync one oscillator to another using an analog synthesizer.

VOLUME – wave volume

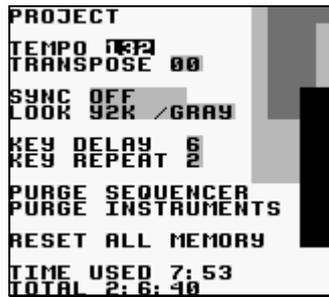
CUTOFF – filter cutoff frequency

PHASE – phase value

Most settings in this screen are applied to the entire bank, except for the VOLUME, CUTOFF and PHASE settings. For these settings, it is possible to set different values in the first and last frame of the bank. The program will then create a smooth fade between the first and last frame. For creating simple amplitude envelopes and filter sweeps, a sequence of frame ('F') commands can be used to sweep through the bank while playing a note.

To view a different bank, press B + CURSOR.

## 2.11. Project Screen



The project screen contains settings that affect the entire program.

- TEMPO – change the tempo.
- TRANSPOSE – adjust the pitch of the pulse and wave instruments, by a given number of semitones.
- SYNC – activate Game Boy to Game Boy synchronization. (Read more about this in chapter 5!)
- LOOK – change the font and color set.
- KEY DELAY – set the delay time before key repeat is activated.
- KEY REPEAT – set the period of the key repeat.
- PURGE SEQUENCER – clear all phrases and chains that are not used in the song.
- PURGE INSTRUMENT – clear all instruments that are not used in the song.
- RESET ALL MEMORY – reset all memory. If pressing SELECT + A instead of just A when answering yes on the “REALLY?” prompt, the “TOTAL” time counter will also be reset.

This screen also contains two clocks. The “TIME USED” clock displays the time Little Sound Dj has been used since the last memory reset, in hours and minutes. The “TOTAL” clock displays the time Little Sound Dj has been used in total, in days, hours and minutes.



### **3. Advanced Techniques**

#### **3.1. Copying And Pasting**

Little Sound Dj has a RAM clipboard for temporary data storage. Pressing B + A will cut a single value and store it on the clipboard. The value can then be pasted by pressing SELECT + A.

In most screens, it is possible to mark up blocks by pressing SELECT + B and moving the cursor around. When having marked up a block, it can be copied to the clipboard by pressing B, or cut to the clipboard by pressing SELECT + A. The clipboard contents can then be pasted by pressing SELECT + A.

Some quick-mark button presses are implemented:

SELECT + (B, B) - quick-mark a row

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

When having marked a block, you can often change all data inside that block by pressing A + CURSOR.

#### **3.2. Muting individual channels**

It is always possible to mute a channel temporarily by pressing B + SELECT. If the B button is released before SELECT, the channel will stay muted until B is pressed again.

#### **3.3. Live Mode**

The live mode is a special flavor of the song screen. It can be reached by pressing B + LEFT/RIGHT while standing in the song screen. In the live mode, it is possible to start and stop playing chains one by one. In contrast to the usual song screen, the different channels can be started and stopped independently. It is also possible to jump between different song positions while playing, without causing audio glitches or lost synchronization.

To begin playing a channel at a specific song position, go to the channel and song position you want to play, and press START. To stop playing a channel, go to the channel and press SELECT + START. To "solo" a channel, go to the channel and press B + START.

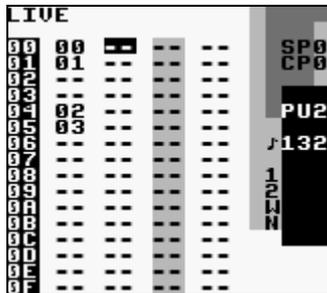
#### **3.4. Micro-Loops**

Micro-loop building is a useful live mode technique. This technique is based on the fact that the song sequencer (when being in the live mode) won't rewind the song position all the way

up to the first song sequencer step when encountering end of track; instead, it stops rewinding as soon as it encounters an empty step.

Example:

We have a setup that looks like this...

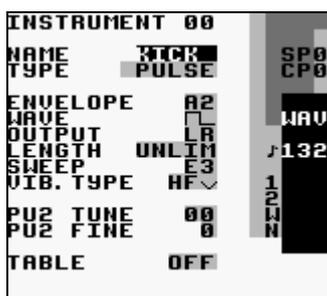


Assume that we start playing pulse channel 1 at song position 4. One could expect that the sequencer would play chains 2 and 3, and then go back to the first step for playing chains 0 and 1. This is not the case, when the live mode is activated! Instead, the player will loop chains 2 and 3. Defining a number of such micro-loops to alternate between would provide a good starting point for a live performance.

### 3.5. Creating Synthetic Drum Instruments

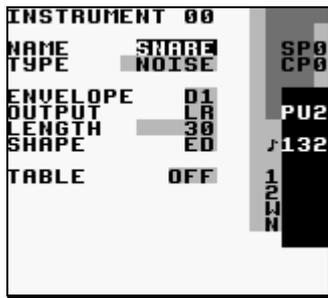
Creating good-sounding drum instruments without using the sampled drum kits might be a bit tricky, if you've had no prior experience with drum synthesis. Nevertheless, it's a very useful technique once you know it. Here are some starting-out ideas.

Kick



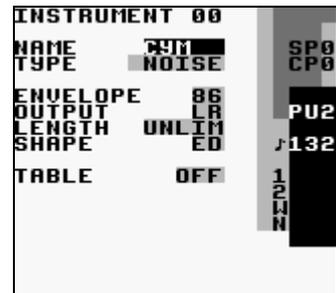
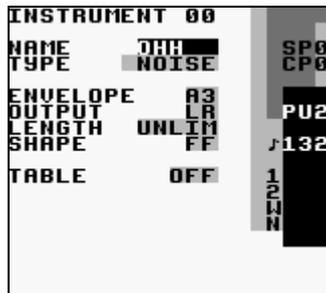
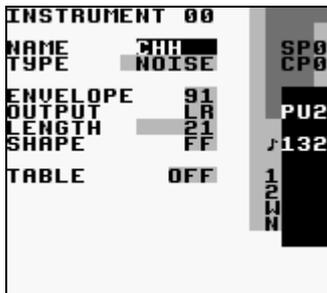
Use pulse channel 1 for creating kick drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to C1. Wave should be 50-50 high/low, even though other waves can be used for making the instrument sound more distorted. The sweep value is maybe the most important part in creating a successful kick instrument. It should have a high initial frequency and decay. Try setting it to a value of E3. For a more snappy sounding kick, try experimenting with the envelope and length parameters.

## Snare



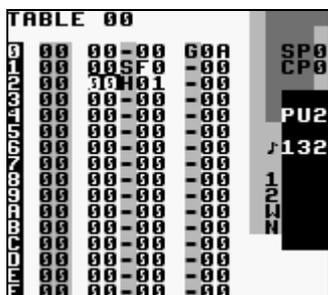
Use the noise channel for creating snare drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to C1. Use the length parameter to create more snappy sounding snares. The shape parameter can be used for adjusting the timbre – shape values close to EC might prove useful.

## Hi-Hats And Cymbals



Hi-hats are created using the noise channel. Use a shape value of FF for selecting a timbre with high frequency content. Change the envelope and length parameters for creating the desired amplitude envelope. For emulating cymbals, use a shape value near EE to create a somewhat rougher timbre.

## Taking Advantage Of Tables



For adding that extra punch to snares, you can use the table parameter in the instrument screen in order to auto-run a table that executes a sequence of shape (“S”) commands rapidly.

## 4. Speech Programming

### Introduction

Little Sound Dj contains fifty-nine discrete speech sounds (called allophones), stored in the first four kit banks. By combining these sounds, it is possible to create any English word or phrase.

### Linguistics

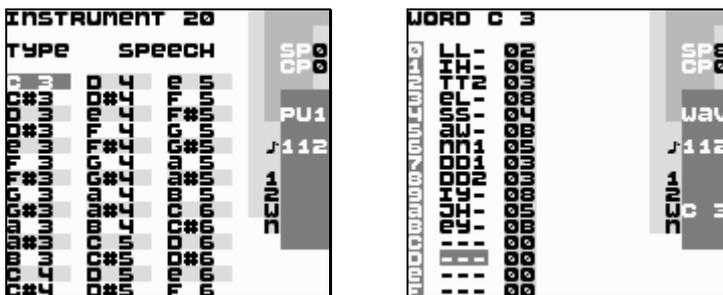
A few basic linguistic concepts will help you create your own library of words. First, there is no one-to-one correspondence between written letters and speech sounds; secondly, speech sounds are acoustically different depending on their position within a word.

The first problem compares to the problem that a child encounters when it learns to read. Each sound in a language may be represented by more than one letter, and conversely, each letter may represent more than one sound. Because of these spelling irregularities, it is necessary to think in terms of sounds, not letters, when using allophones.

The second, and equally important, point to understand is that the acoustic signal of a speech sound may differ depending on its position within a word. For example, the initial **K** sound in **coop** will be acoustically different from the **K**'s in **keep** and **speak**.

### Programming Words

Little Sound Dj has a special speech instrument. It is locked to instrument number 20 and can be used in the wave channel. It contains a set of 42 words, mapped out from note C-3 to note F-6.



If you want to edit a word, press SELECT + RIGHT to get to the WORD screen. It has two columns; the left column contains the allophones to be played, the right column sets duration. The word above is programmed to say “Little Sound Dj”.

In order to make things easy to remember, it is possible to rename the words by tapping A in the speech instrument screen. If you want to, it is also possible to cut and paste words in the speech instrument screen.

## 4.1. Guidelines for using the allophones

### Short vowels

\*IH – sitting, stranded  
\*EH – extent, gentlemen  
\*AE – extract, acting  
\*UH – cookie, full  
\*AD – talking, song  
\*AX – lapel, instruct

### Long vowels

IY – treat, people, penny  
EY – great, statement, tray  
AY – kite, sky, mighty  
OI – noise, toy, voice  
UW1 – after clusters with YY: computer  
UW2 – in monosyllabic words: two, food  
OW – zone, close, snow  
AW – sound, mouse, down  
EL – little, angle, gentlemen

### R-colored vowels

ER1 – letter, furniture, interrupt  
ER2 – monosyllables: bird, fern, burn  
OR – fortune, adorn, store  
AR – farm, alarm, garment  
YR – hear, earring, irresponsible  
XR – hair, declare, stare

### Resonants

WW – we, warrant, linguist  
RR1 – initial position: read, write, x-ray  
RR2 – initial clusters: brown, crane, grease  
LL – like, hello, steel  
YY1 – clusters: cute, beauty, computer  
YY2 – initial position: yes, yarn, yo-yo

### Voiced fricatives

VV – vest, prove, even  
DH1 – word-initial position: this, then, they  
DH2 – word-final and between vowels: bathe, bathing  
ZZ – zoo, phase  
ZH – beige, pleasure

### Voiceless fricatives

\*FF – fire, fox  
\*TH – this, they  
\*SS – sit, smile  
SH – shirt, leash, nation  
HH1 – before front vowels: YR, IY, IH, EY, EH, XR, AE  
HH2 – before back vowels: UW, UH, OW, OY, AO, OR, AR  
WH – white, whim, twenty

### Voiced stops

BB1 – final position: rib; between vowels: fibber, in clusters: bleed, brown  
BB2 – initial position before a vowel: beast  
DD1 – final position: played, end  
DD2 – initial position: down; clusters: drain  
GG1 – before high front vowels: YR, IY, IH, EY, EH, XR  
GG2 – before high back vowels: UW, UH, OW, OY, AX; and clusters: green, glue  
GG3 – before low vowels: AE, AW, AY, AR, AA, AO, OR, ER; and medial clusters: anger; and final position: peg

### **Voiceless stops**

PP – pleasure, ample, trip

TT1 – final clusters before SS: tests, its

TT2 – all other positions: test, street

KK1 – before front vowels: YR, IY, IH, EY,

EH, XR, AY, AE, ER, AX; initial clusters:

cute, clown, scream

KK2 – final position: speak; final clusters:

task

KK3 – before back vowels: UW, UH, OW,

OY, OR, AR, AO; initial clusters: crane,

quick, clown, scream

### **Affricates**

CH – church, feature

JH – judge, injure

### **Nasal**

MM – milk, alarm, example

NN1 – before front and central vowels:

YR, IY, IH, EY, EH, XR, AE, ER, AX, AW,

AY, UW; final clusters: earn

NN2 – before back vowels: UH, OW, OY,

OR, AR, AA

\* These allophones can be repeated.

## **5. Game Boy To Game Boy Sync**

Little Sound Dj implements Game Boy to Game Boy sync, starting with v1.0B. This requires two Game Boys, two Little Sound Dj cartridges and one Game Boy link cable. (Link cables can be purchased in most toy stores.)

### **Important!**

You must never plug or unplug the link cable to a Game Boy that is turned on. You must also make sure that the SYNC mode is set to OFF before turning off your Game Boys. Doing otherwise might cause song data corruption.

### **Activating sync**

Make sure that both Game Boys are turned off. Connect the Game Boys using the link cable. Now, turn on the Game Boys, and go to the PROJECT screens.

In the PROJECT screen, you'll find a SYNC parameter, which can be adjusted by pressing A + LEFT or A + RIGHT. Set the first Game Boy to MASTER and the second Game Boy to SLAVE. Now, the second Game Boy will receive ticks from the first Game Boy through the link cable, ensuring that they will play at the same tempo.

The sync works in two different ways, depending on whether the sequencer is in live mode or not...

### **Using sync with both carts in song play mode**

Press START on the slave Game Boy. It will display the text "WAIT" in the bottom right corner, indicating that it is waiting for tick signals from the master Game Boy. Now, press START on the master Game Boy, and the slave Game Boy will start playing on the same song position as the master Game Boy.

Pressing START again on the master Game Boy will stop both Game Boys, putting the slave Game Boy in WAIT mode.

### **Using sync with both carts in live play mode**

Both Game Boys are operated as usual, the difference being that they stay synced.

Sync will be lost on one occasion only: when the master Game Boy is stopped, and the slave Game Boy is still playing. Then, stop the slave Game Boy and start again.

### **MIDI sync**

MIDI sync requires the MIDI Sync Device produced by Daniel Viksporre (daniel@noisetraffic.com).

Plug in the sync device before turning on your Game Boy. Then, set Little Sound Dj to "MIDI" slave sync mode. Pressing START will now make Little Sound Dj wait for and sync with any incoming MIDI clock signals. Little Sound Dj should use phrase grooves based on 6 ticks.

(Information about how to find the MIDI Sync Device can be found at <http://www.noisetraffic.com>.)

### **Nanoloop sync**

Nanoloop is a Game Boy music program that can be found on <http://www.nanoloop.de>. Nanoloop can sync to Little Sound Dj using a normal Game Boy link cable.

Set Little Sound Dj to "NANO" master sync mode, and set Nanoloop to MIDI slave mode. Little Sound Dj should use grooves based on 6 ticks.

## **6. Commands**

Commands can be used in phrases and tables. Tip: Simply tapping A on a command letter will display a scrolling help text in the lower right corner!

### **A: Run Arpeggiator Table**

Run a table. This command can be used inside a table, for jumping to another table.

Example:

A03 - run table 3

### **D: Delay**

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

### **E: Amplitude Envelope**

For pulse and noise channels:

The first value digit sets the initial amplitude (0=min, F=max); the second digit sets the release (0,8: off, 1-7: decrease, 9-F: increase).

For the wave channel:

E00 - volume 0%

E01 - volume 25%

E02 - volume 50%

E03 - volume 100%

### **F: Wave Frame (wave instruments only)**

Change the wave frame that's being played on the wave channel. This command is relative, meaning that the command value will be added to the current frame number. If issuing this command several times, a filter-sweep sound can be achieved.

Example:

F01 – if wave frame 3 is being played, advance 1 frame and start playing frame number 4

## G: Groove Select

Select the groove to use when playing phrases or tables in this channel. If selecting a groove that's already being used for playing, this command will have no effect.

Example:

G04 - select groove 4

## L: Slide

A slide is a pitch bend that stops when it reaches a given note.

Example:

```
C-4 ---  
F-4 L04  
--- ---  
--- ---
```

This will result in a pitch bend that starts with C-4 and then bends to F-4 with the speed 4. For pitching down, use negative command values (e.g., 80-FF).

## H: Hop

This command has two different functions, depending on whether it is used in the phrase or the table screen.

In the phrase screen, it is used for jumping to the next phrase, without playing the current phrase to its end.

Example:

H00 - hop to next phrase  
H03 - hop to next phrase and start play at phrase row 3

In the table screen, it is used for creating loops.

Example:

H21 - hop to table position 1, 2 times.  
H04 - hop to table position 4 forever.

## **K: Kill note**

Example:

K00 - kill note instantly  
K03 - kill note after 3 ticks

## **M: Set Master Volume**

Example:

M77 - max volume  
M35 - medium, panned slightly to the right  
M00 - very quiet

## **O: Set Output**

Pan channel to left, right, none or both outputs.

## **P: Pitch Bend/Pitch Shift (pulse and wave channels only)**

Bend the pitch. When this command is used on "kit" instruments, it sounds more like a pitch shifter (can be very useful).

Example:

P02 - bend up pitch with speed 2  
PFE - bend down pitch with speed 2 (hexadecimal FE=-2)

## **R: Re-trig the latest played note**

Play the latest played note again. The first digit modulates the volume (0=no change, 1-7=increase, 8-F=decrease). The second digit sets a period for the re-triggering. If a value larger than zero is given, the re-triggering will be repeated with a period of n ticks. On some drum-machines, this effect is called "flam".

Example:

R00 – re-trig note once  
RF3 - medium speed flam, decreasing amplitude (echo effect)  
R01 – very fast flam

## **S: Sweep/Shape (pulse 1, kit and noise instruments only)**

This command has different effects for different channels.

On pulse channel 1, 'S' modulates the pitch, using the Game Boy hardware. It is useful for creating bass drums and percussion.

When used on kit instruments, 'S' changes the loop points. The first digit modulates the offset value; the second digit modulates the loop length. (1-7=increase, 9-F=decrease.)

On the noise channel, 'S' works like a filter. The command is relative, meaning that the command value will be added to the currently used shape value.

It's next to impossible to explain this command by logic; the best idea probably is to experiment and see what you can come up with.

## **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. If the groove has some other number of ticks per note step, the BPM value should be adjusted according to the formula  $LSDJ\_BPM=(DESIRED\_BPM*TICKS\_PER\_STEP)/6$ .

Example:

T80 - tempo = 80 hexadecimal BPM = 128 decimal BPM

## **V: Vibrato (pulse and wave channels only)**

Example:

V42 - period=4, depth=2

## **W: Wave (pulse channels only)**

Select one of the four different waveforms available for the pulse channels.

## **7. Overview Of Key Presses**

This is an overview of key presses valid in the phrase screen. The key pressing philosophy expressed here is used as consequently as possible throughout the entire program.

A: insert note on empty step

A + RIGHT: note up

A + LEFT: note down

A + UP: octave/+10 up

A + DOWN: octave/-10 down

B + A: cut note to clipboard

SELECT + B: start marking

SELECT + (B, B): mark row

SELECT + (B, B, B): mark all

| [When having marked a block...]

+--A + RIGHT: all marked up

+--A + LEFT: all marked down

+--A + DOWN: all marked octave/-10 down

+--A + UP: all marked octave/+10 up

+--SELECT + A: cut the marked block to the clipboard

SELECT + (B, B, B, B): copy the entire screen to the clipboard

SELECT + A: paste from the clipboard

B + RIGHT: view the phrase in the rightmost channel

B + LEFT: view the phrase in the leftmost channel

B + UP: view previous phrase in chain

B + DOWN: view next phrase in chain

[SONG MODE] START: start/stop playing this phrase

[SONG MODE] SELECT + START: start/stop playing all channels

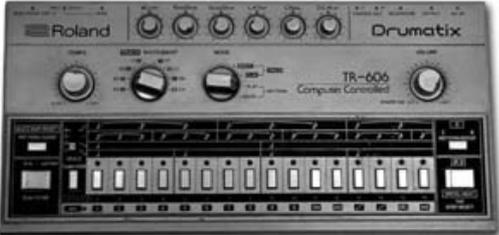
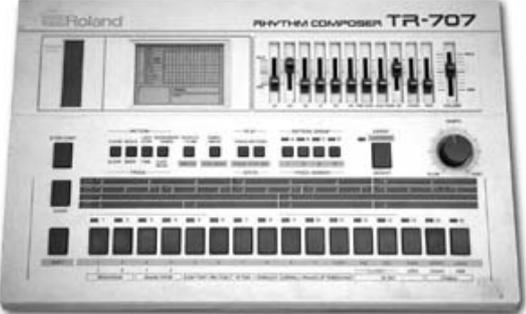
[LIVE MODE] START: start playing this channel

[LIVE MODE] SELECT + START: stop playing this channel

B + SELECT: mute this channel

[LIVE MODE] B + START: solo this channel

## 8. The Sample Kits

Kit	Origin	Year	Info	Sounds
Speech	General Instruments	1981	 <p>The SP0256-AL2 Speech Processor IC contains a programmable digital filter that can be made to model a vocal tract. The 16k ROM stores both data and instructions. The pulse width modulated output can produce speech with a frequency range of 5kHz and a dynamic range of 42 dB.</p>	59
TR-606	Roland	1981	 <p>The Roland TR-606 Drumatix is a programmable analogue drum machine. It was designed to couple with the TB-303 Bassline. The TR-606 has a very original sound and remains popular today.</p>	8
TR-707	Roland	1984	 <p>The Roland TR-707 has the same functions as the TR-909 with all PCM sounds. Starting with this model, Roland began using an LCD display to show the rhythm matrix and tempo.</p>	15
TR-727	Roland	1985	<p>The Roland TR-727 is identical to the TR-707, with the exception that its sounds are Ethnic/Latin percussion. It is meant to complement a rhythm section, rather than be a main unit.</p>	15

TR-808	Roland	1980	 <p>The Roland TR-808 has played a defining role for the 80's Hip Hop and Electro movement. It is still highly popular, thanks to its unmistakably original sounds.</p>	16
TR-909	Roland	1983	 <p>The Roland TR-909 is one of the most popular drum machines ever. It has PCM sounds for cymbal and hi-hat but all other instruments still come from analogue circuitry. The sounds are very useful for House and Techno music.</p>	11
CR-78	Roland	1978	 <p>The Roland CR-78 is perhaps the most luxurious rhythm machine ever made. The guiro and tambourine are still unique as of today, and bass, snare and bongos are very soft and rich sound.</p>	14

CR-8000	Roland	1981	 <p>The Roland CR-8000 was introduced after the TR-808 -- it has the same analog engine. The hi-hat sounds more realistic than older rhythm machines, but the hand clap sounds like an electric snare.</p>	14
DR-55	Boss	1979	 <p>The Boss Dr. Rhythm range of drum machines is especially designed for guitar players who need a mobile drummer. The DR-55 is a simple analogue drum machine with a very rough and direct sound.</p>	5
DR-110	Boss	1983	 <p>The DR-110, the successor of the DR-55, has analogue sound but is programmed digitally using a LCD rhythm matrix. It quite possibly has the best analogue handclap ever.</p>	6

Drumulator	E-mu	1983	 <p>The Drumulator was the first sample based drum machine to sell for less than \$1000. It's known for its classic and gritty lo-fi sound, and the machine can be heard in several 80's Electro tracks.</p>	12
DMX	Oberheim	1984	 <p>The Oberheim DMX is less realistic than the Linn, but slightly more powerful. The sounds are very 80's pop, but it was also used in early Hip Hop and Electro.</p>	10
KR-55	Korg	1979	 <p>The Korg KR-55 was designed as an organ-top rhythm box.</p>	10

LinnDrum	Linn	1982	 <p>The LinnDrum originally sold for \$3,000 and about 5.000 units were produced. It provided the rhythm tracks of many 1980's hit records.</p>	15
Rhythm Ace	Ace Tone	1973	 <p>Ace Tone was the first company to produce electric rhythm boxes in Japan. In the UK, Bentley Pianos (who put stickers on all their products) distributed Ace Tone, and thus the machine is also known as the Bentley Rhythm Ace.</p>	9
Sequential Circuits	Tom	1984	 <p>The sounds are a bit dirty and harsh sounding, especially next to its older brother Drumtraks, but that also gives Tom its character. The snare sounds like nothing else on this planet - it's electric!</p>	8
Acieed	House	1990's	 <p>This set of vocal samples was derived from a bunch of popular Acid House tracks. Can you dig it?</p>	14