Little Sound Dj v1.5.7

Operation Manual

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

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Michael Hope
H. Mulder
Jeff Frohwein
Hex125
VORC
…And all the people on the Little Sound Dj mailing list!

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

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, each with 4-bit resolution.

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

Little Sound Dj uses the hexadecimal number system for representing values. It works just the same way as the traditional decimal number system. The only difference is that it has base 16, and thus consists of 16 unique symbols: the digits 0 to 9, followed by the letters A to F. For clarity, this manual will mark hexadecimal values with a dollar sign.

As an example, let's print a list of numbers twice – first with decimal digits, then with hexadecimal digits…

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
$1	$2	$3	$4	$5	$6	$7	$8	$9	$A	$B	$C	$D	$E	$F	$10	$11	$12	$13

Note that the values of the two lists are really identical; just the representations differ. The reason to use the hexadecimal system here is to save screen space; with hexadecimal numbers, it is possible to represent every byte value using no more than two digits. (The value range is 0 to 255 – that is, $0 to $FF.)

Representing negative numbers with two digits only can be a problem. In Little Sound Dj, the numbers are wrapping. That means, when subtracting one from the smallest possible number ($0), it will jump to the highest possible value ($FF). So $FF can represent -1 as well as 255, depending on the situation.

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

CURSOR – pressing any arrow key

LEFT/RIGHT – pressing left or right arrow
UP/DOWN – pressing up or down arrow

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.
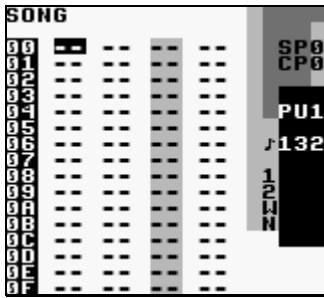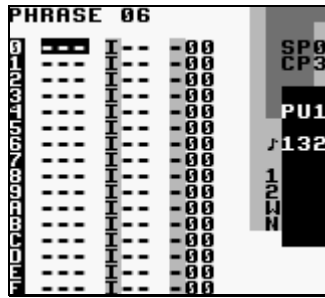
The Song Screen   *The Phrase Editor Screen*   *The Instrument Screen*
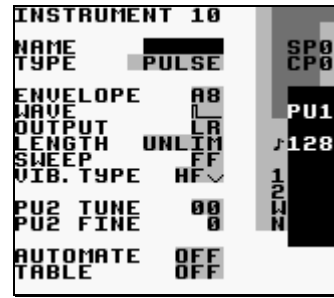
The phrase editor is the most fundamental sequencing screen in Little Sound Dj. This is where to enter the note data to play, in an up-to-down piano roll style. Try pressing A when the cursor is on an empty step. You'll see that the empty step changes from "---" to the note "C-3" (note C, third octave). 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.
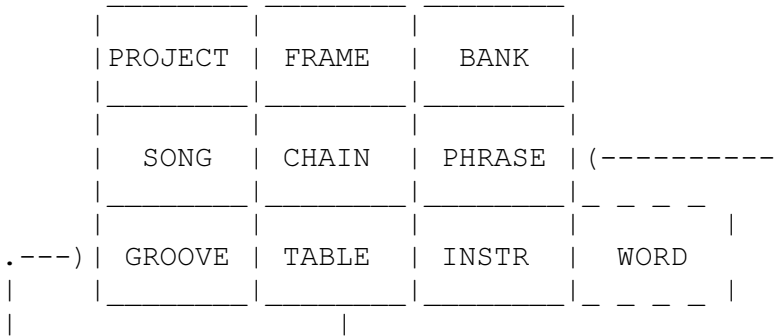
If you want to listen to the phrase, you can start and stop playing it by pressing START. You'll probably notice that the sound is very monotonous. If you want to, you can change the parameters of the sound in the instrument screen, which can be reached by pressing SELECT + DOWN while standing in the 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

```
 _____ _____ _____
|         |         |         |
|PROJECT  | FRAME   |  BANK   |
|_____|_____|_____|
|         |         |         |
|  SONG   | CHAIN   | PHRASE  |(----------.
|_____|_____|_____|_ _ _ _     |
|         |         |         |       |    |
.---)| GROOVE | TABLE   | INSTR   |  WORD     |
|   |_____|_____|_____|_ _ _ _  |  |
|_____|_____|
```

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.

2.3. Phrase Screen
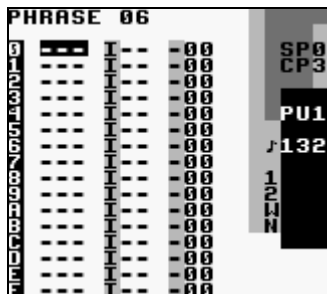
The phrase screen is the most fundamental part of the sequencer; this is where you enter the actual note data. The phrase screen has four columns: the note column, the instrument select column, the command column and the command value column. To create a new phrase, you will have to go to the chain screen and press A twice on an empty step. Then, press SELECT + RIGHT to edit the phrase you just created.

You can enter data by pressing A + CURSOR. A + LEFT/RIGHT changes the values in small steps (+-1), A + UP/DOWN changes the values in big steps (+-$10). You can delete a value by pressing B + A.

The different channels all share the same set of phrases; that is, no phrase is ever assigned to a specific channel. A phrase might however sound very different, depending on the channel it is played back on. Example: If you have programmed phrase 0 to play a melody using a pulse instrument, that phrase can be played back in either of the pulse channels with good results, but it's usually nonsensical to play back the phrase in the wave or noise channels.

The note column may look a bit different depending on which instrument type is used. For example, KIT instruments have an extra note column, in order to make it possible to use two drum kits simultaneously.

The number of phrases is limited to 255 ($FF). The number of the phrase that is being edited is displayed in the top left corner of the screen. All phrases are 16 steps long by default, but it is also possible to set a shorter length by using the 'H' ("HOP") command.

2.4. Chain Screen

Chains are used for linking together several phrases into one unity, thus creating a longer rhythm block, a melody or a bass line.

The chain screen contains two columns. The first column contains the list of phrases that are to be played by this chain, while the second column transposes the phrase that's on the same row.

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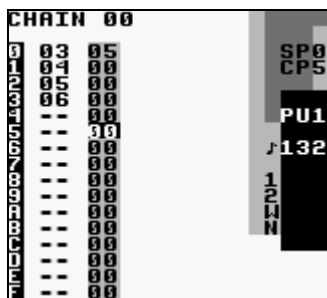
This chain would play phrase 3, adding 5 semitones to each note, and then play each of the phrases 4, 5, 6, without transposing.

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 ($80).

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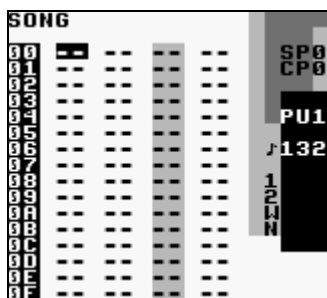
The song screen is the highest level of the sequencer. It contains 4 columns, one for each channel. The columns contain lists of chains, which will be played in piano-roll style, up to down. The number of rows in the song screen is limited to 256 ($100).

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 1/60th 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.
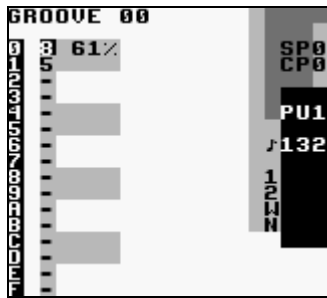
Example:
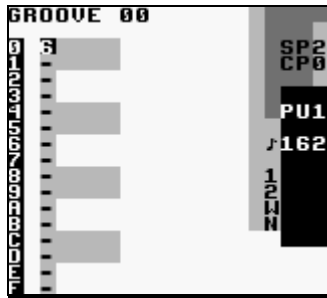
This groove would make the sequencer spend approximately 6/60th of a second on every note step.

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

Example:

This groove would make the sequencer spend 8/60th of a second on even note steps, and 5/60th 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 ($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 tables to instruments (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, which are played up-to-down. 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.

The transpose column has special functionality when using KIT or NOISE type instruments. For KIT, the transpose column works as a pitch shifter. For NOISE, the transpose column has the same effect as issuing the S ('SHAPE') command.

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.

The table above creates an amplitude envelope with short attack and medium sustain. It could be used for a base instrument.

Arpeggiato example

A typical use for tables is to create arpeggiatos. This is a musical term for playing scales very fast, so that the listener will get the impression that a chord is played.

This table would emulate striking a major chord.

To view a different table, press B + CURSOR.

Tip: There is a shortcut between the PHRASE and TABLE screens. It is activated when standing in the phrase screen, and pressing SELECT + RIGHT while standing on an A command. Then you can edit the table selected with the A command, and when you are done, jump back using SELECT + LEFT.

The number of tables is limited to 32 ($20).

2.8. Instrument Screen
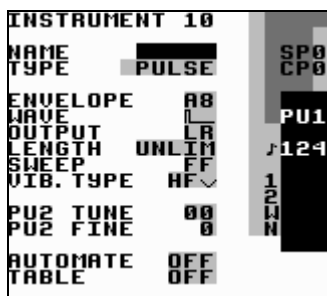
Here, you can edit the instrument parameters. It's possible to copy and paste entire instruments, by pressing B while holding SELECT for copy and pressing A while holding SELECT for paste.

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!)
AUTOMATE – an option that extends the TABLE functionality. When AUTOMATE is activated, Little Sound Dj advances through the tables by one step for each time the instrument is triggered.
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
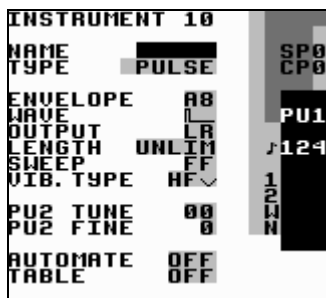
These parameters are special for pulse instruments:

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.
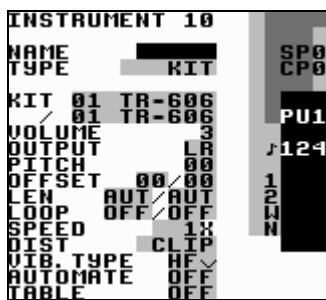
Wave Instrument Parameters
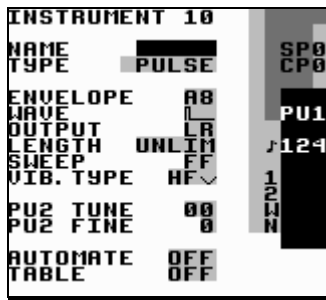
These parameters are special for wave instruments:

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 that should be used when two kits are mixed together. CLIP is
the default type. SHAPE and SHAP2 sound similar to CLIP, but with more high frequencies
and less bass. WRAP can be used to add some interesting digital distortion. When pressing
A+(LEFT,LEFT) while CLIP value is selected, the program jumps out of range and starts
playback of sound from the raw memory contents.
VIB. TYPE – change the effect of the Vibrato ('V') command.

Noise Instrument Parameters
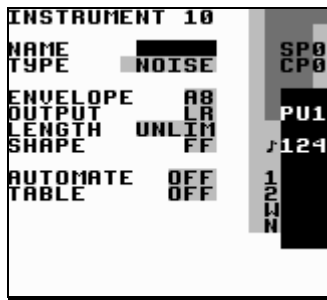
These parameters are special for noise instruments:

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 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, all-pass or notch
Q – also known as resonance; this value accentuates the cutoff frequency
PHASE [TYPE] – NORMAL transforms the wave using a simple phase algorithm; RESYNC and RESYN2 create effects similar to when you sync one oscillator to another using an analog synthesizer.
VOLUME – wave volume
CUTOFF – filter cutoff frequency
PHASE – phase value
VSHIFT – vertical shift

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 ('F01') 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. It is possible to set a new tempo either by pressing A + CURSOR keys, or by tapping the A button in pace with the desired 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.

2.12. Border Information

A lot of useful data is displayed in the screen border.
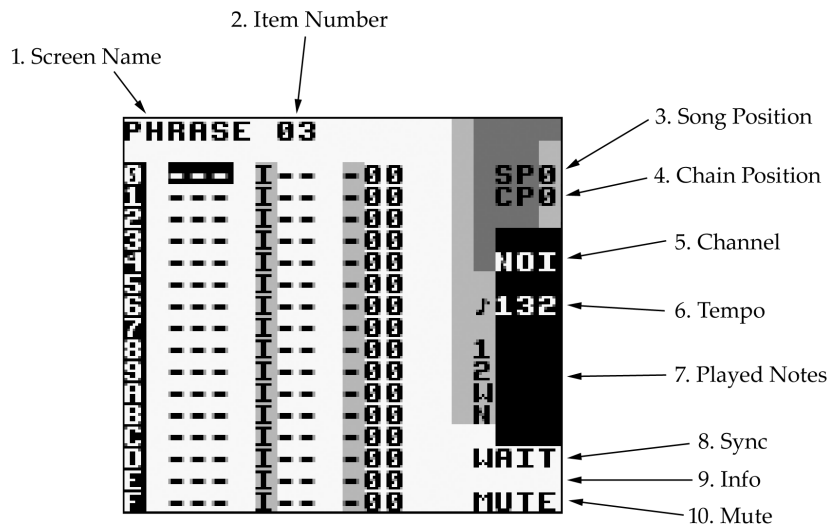
1. Screen name.
2. Frame/groove/phrase/chain/instrument/table number.
3. SP – edited Song Position.
4. CP – edited Chain Position.
5. The active channel, or, horizontal song position.
6. The current tempo, in BPM.
7. Played notes.
8. Sync information.
9. Info row, for display of different information.
10. Mute. (The characters will be lit when pressing B + SELECT or B + START.)

3. Advanced Techniques

3.1. Copy and Paste

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. Cloning

Cloning is a shortcut that can save you much unnecessary copy and paste action. It allows you to create copies of chains or phrases directly from the song and chain screens.

Usage from SONG screen: Move the cursor to the chain number representing the chain you wish to clone. Press SELECT + (B, A). Little Sound Dj now replaces the previous chain number with the one of the new clone.

Usage from CHAIN screen: Move the cursor to the phrase number representing the phrase you wish to clone. Press SELECT + (B, A). Little Sound Dj now replaces the previous phrase number with the one of the new clone.

3.3. Muting and Soloing 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.

Correspondingly, a channel can be played solo by pressing B + START. If the B button is released before START, the other channels will stay muted. If the START button is released first, all channels will be turned on again.

3.4. 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.

3.5. 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…
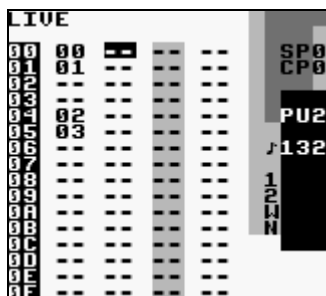
Assume that we start playing pulse channel 1 at song position 4. The player will now loop chains 2 and 3. Defining a number of such micro-loops to alternate between would provide a good starting point for a live performance.

3.6. 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
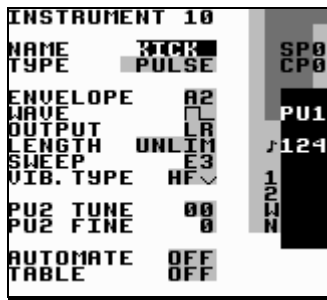
Use pulse channel 1 for creating kick drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to $C1. Wave should be 50-50 high/low, even though other waves can be used for making the instrument sound more distorted. The sweep value is maybe the most important 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
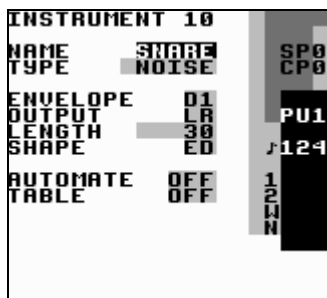
Use the noise channel for creating snare drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to $C1. Use the length parameter to create more snappy sounding snares. The shape parameter can be used for adjusting the timbre – shape values close to $EC might prove useful.

Hi-Hats and Cymbals
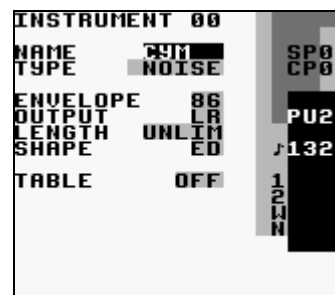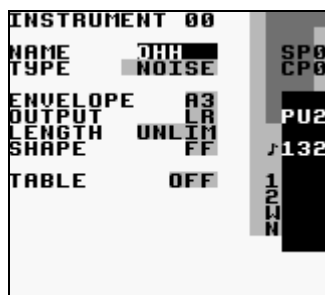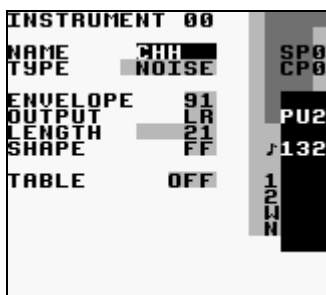
Hi-hats are created using the noise channel. Use a shape value of $FF for selecting a timbre with high frequency content. Change the envelope and length parameters for creating the

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 a table that uses the transpose column to change the noise shape rapidly.

3.7. Programming Wave Instruments using Tables

To create more dynamic wave instruments, it is a good idea to use the soft synthesizer in the bank screen for generating wave frame banks, and then play through them on the go by using the F command. Here are some examples for how it can be done by using tables.

Before trying these examples, you should first go to the instrument screen and check that the wave frame number is set to the beginning of a bank. For example, if you want to play back bank $00-$0F, set the frame number to 0. If you want to play back bank $10-$1F, set the frame number to $10.

Play back frames 0 to $F once   *Loop frames 0 to $F*   *Loop frames 0 to $F "Ping Pong" Style*

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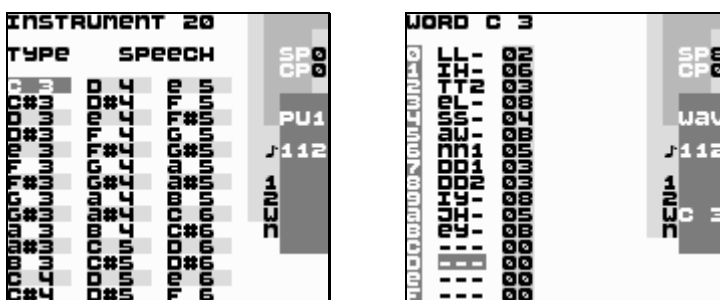
If you want to edit a word, press SELECT + RIGHT to get to the WORD screen. It has two columns; the left column contains the allophones to be played, the right column sets duration. The word above is programmed to say "Little Sound Dj".

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. 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 should 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 a special MIDI sync cable for Game Boy. Check
http://www.littlesounddj.com for the latest information on how to get one.

Usage: 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.

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.

Usage: 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, $F=max); the second digit sets the release (0,8: no change, 1-7: decrease, 9-$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. If selecting a groove that's already being used for playing, this command will have no effect.

Example:

 G04 - select groove 4

L: Legato

Legato is Italian for "tied;" an indication to play music in a smooth, connected fashion. The L command performs 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: Master Volume

This command changes the master output volume. The first digit modifies the left output, the second digit the right. The volume can either be set with an absolute value, or changed by a relative value.

Values 0-7 are used to specify absolute volumes. Values 8-$F give the volume a relative change; 8 is no change, 9-$B increase, $D-$F decrease.

Examples:

M77 – maximize volume
M08 – turn off left output channel, leave right output channel as is
M99 – increase master volume with 1 step
MFE – decrease left volume with 1 step, right volume with 2 steps

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 ($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. The first digit affects pitch, the second change velocity.

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 shape filter. The first digit sets pitch, the second digit alters the noise modulation. The command is relative, meaning that the command value will be added to the currently used shape value.

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 – set tempo to 128 ($80) 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
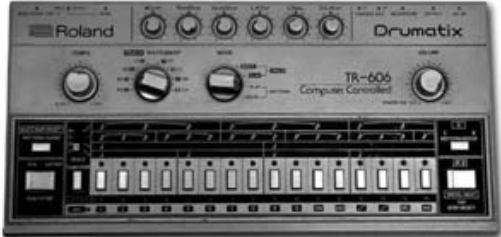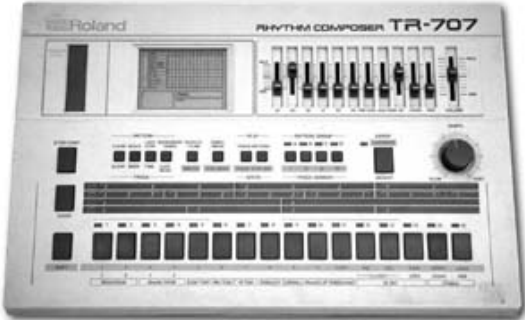
[LIVE MODE] START: start playing this channel
[LIVE MODE] SELECT + START: stop playing this channel

B + SELECT: mute this channel
B + START: solo this channel

8. The Sample Kits

Kit	Origin	Year	Info	Sounds
Speech	General Instruments	1981	 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.	59
TR-606	Roland	1981	 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.	8
TR-707	Roland	1984	 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.	15
TR-727	Roland	1985	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.	15

TR-808	Roland	1980	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.	16
TR-909	Roland	1983	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.	11
CR-78	Roland	1978	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.	14

CR-8000	Roland	1981	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.	14
DR-55	Boss	1979	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.	5
DR-110	Boss	1983	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.	6

Drumulator	E-mu	1983		12
			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.	
DMX	Oberheim	1984		10
			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.	
KR-55	Korg	1979		10
			The Korg KR-55 was designed as an organ-top rhythm box.	

LinnDrum	Linn	1982	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.	15
Rhythm Ace	Ace Tone	1973	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.	9
Sequential Circuits	Tom	1984	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!	8
Acieed	House	1990's	This set of vocal samples was derived from a bunch of popular Acid House tracks. Can you dig it?	14