



**Little Sound Dj v1.0B**

**Operation Manual**

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# Index

<b>1. Introduction.....</b>	<b>5</b>
1.1. Welcome! .....	5
1.2. Important Message .....	5
1.3. Game Boy Sound.....	5
1.4. Hexadecimal Number System.....	5
1.5. Key Presses.....	6
1.6. Getting Started.....	6
<b>2. The Screens.....</b>	<b>7</b>
2.1. Screen Map.....	7
2.2. Starting And Stopping.....	7
2.3. Phrase Screen .....	8
2.4. Chain Screen .....	8
2.5. Song Screen .....	9
2.6. Groove Screen.....	9
2.7. Arpeggiator Table Screen.....	10
2.8. Wave Screen.....	11
2.9. Instrument Screen .....	12
2.10. Project Screen.....	14
2.11. Border Information .....	14
<b>3. Advanced Editing.....</b>	<b>15</b>
3.1. Copying And Pasting .....	15
3.2. Live Mode.....	15
3.3. Micro-Loops.....	15
3.4. Creating Drum Instruments .....	16
<b>4. Game Boy to Game Boy sync .....</b>	<b>18</b>
4.1. Important!.....	18
4.2. Activating sync.....	18
4.3. Using sync with both carts in song play mode .....	18
4.4. Using sync with both carts in live play mode.....	18
<b>5. Commands.....</b>	<b>19</b>
A: Run Arpeggiator Table.....	19
E: Amplitude Envelope .....	19
F: Wave Frame (channel 2 only).....	19
G: Groove Select .....	19
H: Hop .....	20
K: Kill note.....	20
M: Set Master Volume .....	20
O: Set Outputs .....	20
P: Pitch Bend (channel 0,1,2 only).....	21
R: Retrig the latest played note .....	21
S: Sweep (channel 0,3 only) .....	21

T: Tempo.....	22
V: Vibrato (channels 0,1,2 only) .....	22
W: Wave (channels 0,1 only) .....	23
<b>6. Overview Of Key Presses.....</b>	<b>23</b>

## **1. Introduction**

### **1.1. Welcome!**

Thank you and congratulations for purchasing Little Sound Dj! A lot of effort has been put in this release, in order 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.

Channel 0: Quadrangular wave with envelope and sweep functions.

Channel 1: Quadrangular wave with envelope function.

Channel 2: Voluntary waveforms.

Channel 3: Noise with envelope and sweep 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 (8 bits) as two consecutive hexadecimal 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

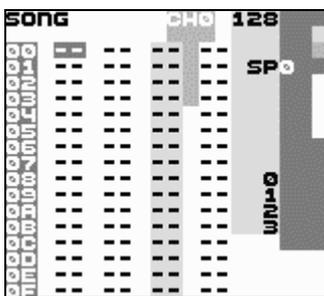
CURSOR – pressing any arrow key

SELECT + A – pressing A while holding SELECT

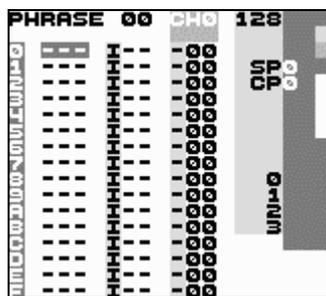
SELECT + (B, B) – pressing B twice, while holding SELECT

## 1.6. Getting Started

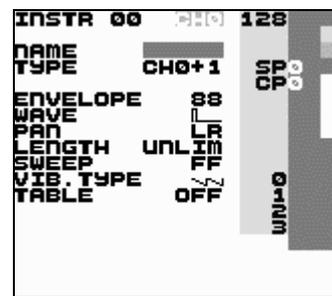
When starting up Little Sound Dj at the first time, you will be presented to the song sequencer screen. It contains four editable columns, one for each channel. At this time, all steps will contain the symbol "--", indicating that all song sequencer steps are empty. Now, let's leave the song screen for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



*The Song Screen*



*The Phrase Editor Screen*



*The Instrument Screen*

The phrase editor is the most basic 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

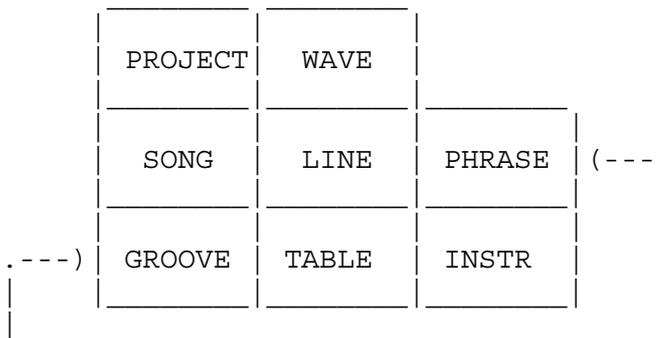
holding A. Now, try to move around the cursor with the arrow keys and edit some other note values.

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.)

## 2. The Screens

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

### 2.1. Screen Map



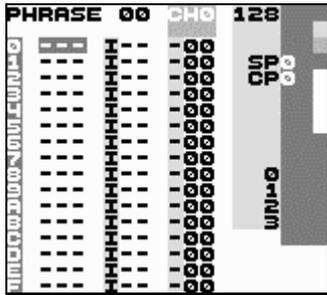
### 2.2. Starting And Stopping

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 "CH" field at the top of the screen.

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.

It is always possible to mute all channels temporarily by pressing B + SELECT. If B and SELECT is released exactly at the same time, all channels will stay muted until a key is pressed.

### 2.3. Phrase Screen



The phrase screen is the most basic 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. As a default, phrases are set to the length 16 steps.

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.

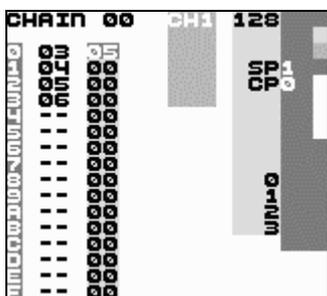
The number of phrases is limited to 255 (hexadecimal: FF). The number of the phrase that is being edited is displayed in the top left corner of the screen.

### 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 half-notes to each note, and then play each of the phrases 4, 5, 6, without transposing.

To create a new phrase, move the cursor to an empty step and press A.

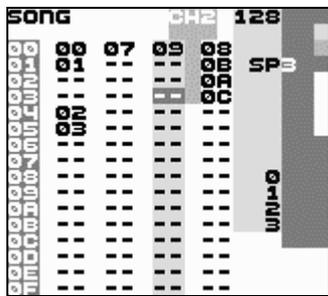
To edit a phrase, move the cursor to the phrase number and press SELECT + RIGHT.

If editing a chain, you can go to the next most chain in a neighboring channel by moving the cursor as far to the left/right as possible, releasing the cursor key, and pressing left/right again. 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 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 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 create a new chain, move the cursor to an empty step and press A.

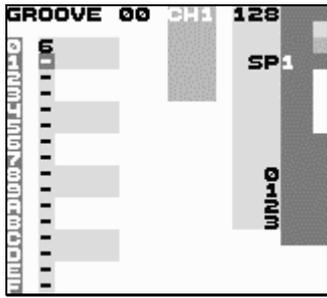
To edit a chain, move the cursor to the chain number and press SELECT + RIGHT.

## 2.6. Groove Screen

The groove screen allows you to edit grooves. Grooves define the rhythms with which phrases or tables should be played. 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.

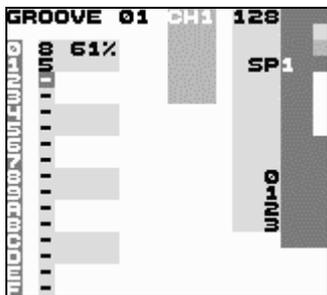
Example:



This groove would make the sequencer spend  $6/60^{\text{th}}$  of a second on each note step.

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

Example:



This groove would make the sequencer spend  $8/60^{\text{th}}$  of a second on even note steps, and  $5/60^{\text{th}}$  of a second on odd note steps. This would create a swing, described by the percentage value, which is calculated by the formula  $(\text{first step ticks})/(\text{first step ticks} + \text{second step ticks})$ . 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 executing the Groove ("G") command.

You can select the groove you wish to edit by pressing B + CURSOR. Special feature: 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. Arpeggiator Table Screen

The arpeggiator table screen contains five columns. First out the transpose column, which contains the numbers of half notes with which the notes being played should be transposed.

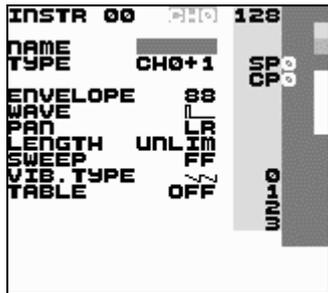


When you are done editing, you can select the wave frame you wish to play, either by using the instrument editor or the SET WAVE FRAME ("F") command.

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

The number of wave frames is limited to 256 (hexadecimal: 100).

## 2.9. 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.

### General Instrument Parameters

These parameters are used in all kinds of instruments.

NAME – press A on this space to give the instrument its own name. This helps avoiding confusion.

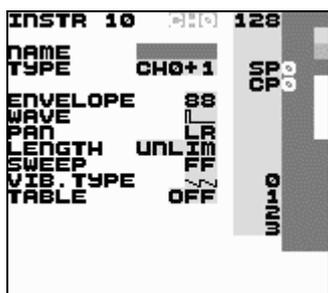
TYPE – use this to specify which channel the instrument should be used for. Different parameters will be listed, depending on your choice.

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 selected table, move the cursor to this parameter and press SELECT + LEFT.

### Channel 0/1 Instrument Parameters



These parameters are special for channel 0 and 1 type instruments:

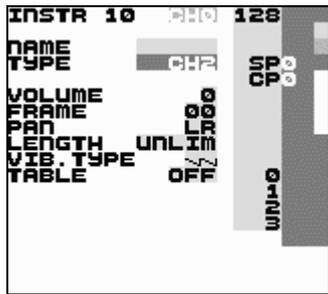
ENVELOPE - first digit is initial amplitude (0-F); second digit is release (0,8: none, 1-7: decrease amplitude, 9-F: increase amplitude).

WAVE - choose the wave type to be used.

SWEEP - modulate the frequency. This only works on channel 0. See SWEEP command documentation for further information.

VIB. TYPE - change the effect of the VIBRATO command.

### Channel 2 Instrument Parameters



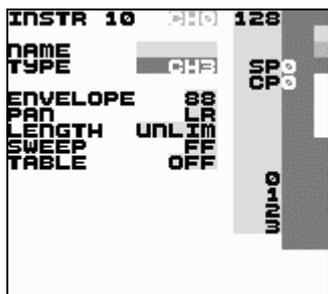
These parameters are special for channel 2 type instruments:

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

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

VIB. TYPE - change the effect of the VIBRATO command.

### Channel 3 Instrument Parameters



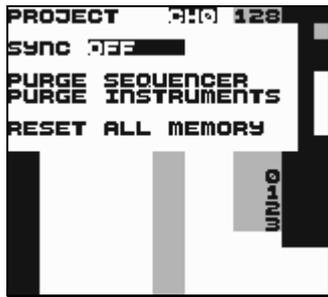
These parameters are special for channel 3 type instruments:

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

SWEEP - modulate the frequency. See Sweep ("S") command for further information.

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

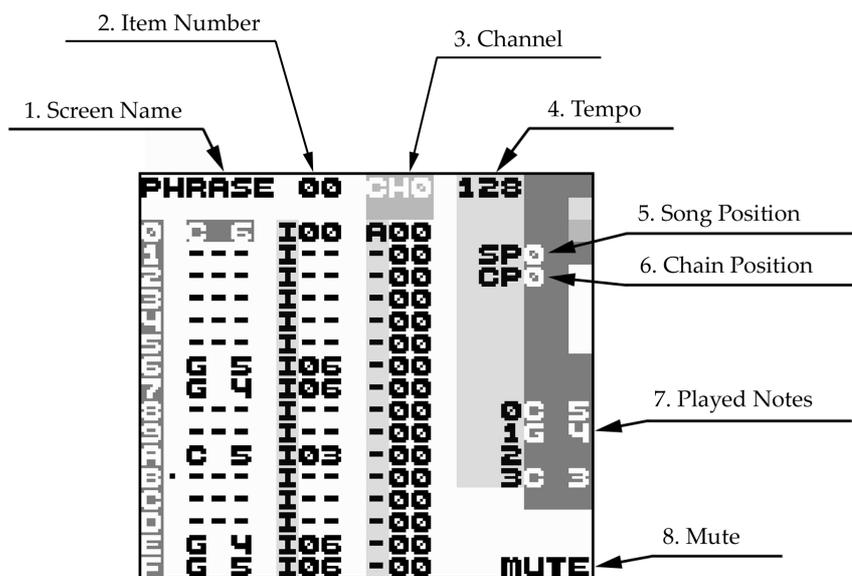
## 2.10. Project Screen



Here, you can choose to reset all memory, to purge unused phrases and chains, or to purge unused instruments. Purging might make things easier to overview, since it clears unused data and helps keep numbers low. This is also the place to activate Game Boy to Game Boy sync. You can read more about that in chapter 4.

## 2.11. 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. The active channel, or, horizontal song position.
4. The current tempo, in BPM.
5. SP - Song Position.
6. CP - Chain Position.
7. Played notes.
8. Mute. (Will be lit when pressing B + SELECT.)

## **3. Advanced Editing**

### **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.

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. 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.

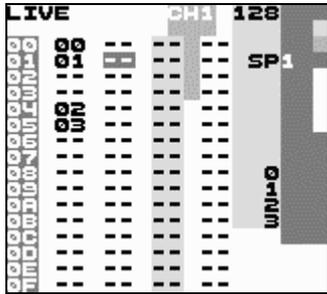
To begin playing a channel at a specific song position, go to the channel and song position you want to play, and press START. To stop playing a channel, go to the channel and press SELECT + START.

### **3.3. 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) doesn't rewind the song position to the first 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 channel 0 at song position 4. One could expect that the sequencer would play chains 2 and 3, and 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.

### 3.4. Creating Drum Instruments

Creating good-sounding drum instruments might be a bit troublesome, if you've had no prior experience with drum synthesis. Here are some starting-out ideas.

Kick



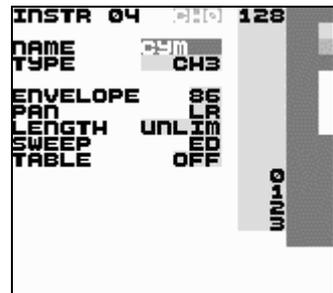
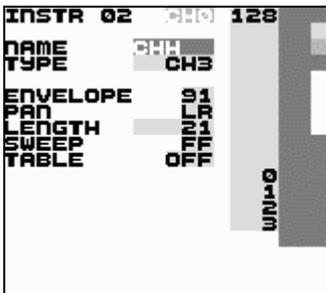
Use Channel 0 for creating kick drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to C1. Wave should be 50-50 high/low, even though other waves can be used for making the instrument sound more distorted. The sweep value is maybe the most important part in 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



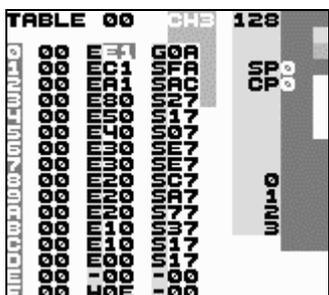
Use Channel 3 for creating snare drum sounds. The amplitude envelope should have a strong attack and fast decay – try setting it to C1. Use the length parameter to create more snappy sounding snares. The sweep parameter can be used for adjusting the timbre – sweep values close to EC might prove useful.

### Hi-Hats And Cymbals



Hi-hats are created using channel 3. Use a sweep 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 sweep value near EE to create a somewhat rougher timbre.

### Taking Advantage Of Tables



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

## **4. Game Boy To Game Boy Sync**

Little Sound Dj v1.0B 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.)

### **4.1. 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 deactivated before turning off your Game Boys. Doing otherwise might cause song data corruption.

### **4.2. 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 LEFT or 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...

### **4.3. 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.

### **4.4. 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.

## **5. Commands**

Commands can be used in phrases and tables.

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

This command starts running a table. This command may be used inside a table, for jumping to another table.

Example:

A03 - run table 3

### **E: Amplitude Envelope**

For channels 0, 1 and 3:

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

For channel 2:

E00 - volume 0%  
E01 - volume 25%  
E02 - volume 50%  
E03 - volume 100%

### **F: Wave Frame (channel 2 only)**

With this command, you can select the wave frame that channel 2 should use.

Example:

F02 - start using wave frame 2 for channel 2 sounds

### **G: Groove Select**

Use this command for selecting the groove that should be used 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

## **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 Outputs**

Use this command to pan channels.

## **P: Pitch Bend (channel 0,1,2 only)**

Example:

P02 - bend up pitch with speed 2

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

## **R: Retrig the latest played note**

If a value larger than zero is given, this command will repeat the retriggering with a period of n ticks. On some drum-machines, this effect is called "flam".

Example:

R00 - retrig note once

R03 - medium speed flam

R01 - the fastest flam

## **S: Sweep (channel 0,3 only)**

This command modulates the pitch, using the Game Boy hardware. It can be good for creating drum sounds. It's really difficult to understand this command by pure logic; the best idea probably is to try some different values and see what you can come up with.

This information is taken from the Pan of ATX Game Boy hardware documentation:

---8<---

FOR CHANNEL 0:

Bit 6-4 - Sweep Time

Bit 3 - Sweep Increase/Decrease

0: Subtraction (frequency decreases)

1: Addition (frequency increases)

Bit 2-0 - Number of sweep shift (n: 0-7)

Sweep Time: 111: sweep off - no freq change

110: 7.8 ms (1/128Hz)

101: 15.6 ms (2/128Hz)

100: 23.4 ms (3/128Hz)

011: 31.3 ms (4/128Hz)

010: 39.1 ms (5/128Hz)

001: 46.9 ms (6/128Hz)

000: 54.7 ms (7/128Hz)

The change of frequency (NR13, NR14) at each shift is calculated by the following formula where X(0) is initial freq & X(t-1) is last freq:

$$X(t) = X(t-1) +/- X(t-1)/2^n$$



## **W: Wave (channels 0,1 only)**

This command allows you to select one of the four different waveforms available for channel 0 and 1.

## **6. 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: touch note

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

|

+--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 all 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

START: start/stop playing this phrase

SELECT + START: start/stop playing all channels

B + SELECT: mute all channels temporarily