LSDj Complete MIDI Mapping and Integration Specification

1. Introduction

This document consolidates all details about the LSDj MIDI mapping and integration specification, covering note tables, CC assignments, live mode, SysEx, RetroPlug, Arduinoboy integration, and project management. It is the ultimate reference for musicians and developers working with LSDj and related MIDI workflows.

2. Key Features

• Comprehensive MIDI CC map for all LSDj channels and instruments.

• Standardized CC7 for volume across all channels.

• Support for polyphonic and monophonic performance modes with detune (CC96) and arpeggiator (CC97–99).

• Dedicated live mode using Channels 5 and 6 for row and chain triggering (Ableton-style).

• SysEx-based instrument, chain, and song transfer (libLSDJ compatible).

• Integration with RetroPlug for DAW-based workflows and project management.

• Enhanced Arduinoboy firmware support including headless mode and LED/button repurposing.

3. Technical Requirements

• Game Boy hardware with LSDj cartridge or emulator.

• Arduinoboy interface or RetroPlug for MIDI I/O.

• DAW (Digital Audio Workstation) with MIDI automation and SysEx support.

• Firmware capable of handling CC0–127, with CC7 reserved for volume.

• Headless mode configuration via SysEx for embedded setups.

4. MIDI Note Tables

The following combined note table lists all supported note ranges and mappings for each LSDj channel.

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Vibed by Peter Swimm

MIDI Note #	Note Name	Channel	Mapping
36	C2	Pulse 1	Note 36
37	C#2	Pulse 1	Note 37
38	D2	Pulse 1	Note 38
39	D#2	Pulse 1	Note 39
40	E2	Pulse 1	Note 40
41	F2	Pulse 1	Note 41
42	F#2	Pulse 1	Note 42
43	G2	Pulse 1	Note 43
44	G#2	Pulse 1	Note 44
45	A2	Pulse 1	Note 45
46	A#2	Pulse 1	Note 46
47	B2	Pulse 1	Note 47
48	C3	Pulse 1	Note 48
49	C#3	Pulse 1	Note 49
50	D3	Pulse 1	Note 50
51	D#3	Pulse 1	Note 51
52	E3	Pulse 1	Note 52
53	F3	Pulse 1	Note 53
54	F#3	Pulse 1	Note 54
55	G3	Pulse 1	Note 55
56	G#3	Pulse 1	Note 56
57	A3	Pulse 1	Note 57
58	A#3	Pulse 1	Note 58
59	B3	Pulse 1	Note 59
60	C4	Pulse 1	Note 60
61	C#4	Pulse 1	Note 61
62	D4	Pulse 1	Note 62
63	D#4	Pulse 1	Note 63
64	E4	Pulse 1	Note 64
65	F4	Pulse 1	Note 65
66	F#4	Pulse 1	Note 66
67	G4	Pulse 1	Note 67
68	G#4	Pulse 1	Note 68
69	A4	Pulse 1	Note 69
70	A#4	Pulse 1	Note 70
71	B4	Pulse 1	Note 71
72	C5	Pulse 1	Note 72
73	C#5	Pulse 1	Note 73
74	D5	Pulse 1	Note 74
75	D#5	Pulse 1	Note 75
76	E5	Pulse 1	Note 76
77	F5	Pulse 1	Note 77
78	F#5	Pulse 1	Note 78
79	G5	Pulse 1	Note 79
80	G#5	Pulse 1	Note 80
81	A5	Pulse 1	Note 81
82	A#5	Pulse 1	Note 82

83	B5	Pulse 1	Note 83
84	C6	Pulse 1	Note 84
36	C2	Pulse 2	Note 36
37	C#2	Pulse 2	Note 37
38	D2	Pulse 2	Note 38
39	D#2	Pulse 2	Note 39
40	E2	Pulse 2	Note 40
41	F2	Pulse 2	Note 41
42	F#2	Pulse 2	Note 42
43	G2	Pulse 2	Note 43
44	G#2	Pulse 2	Note 44
45	A2	Pulse 2	Note 45
46	A#2	Pulse 2	Note 46
47	B2	Pulse 2	Note 47
48	C3	Pulse 2	Note 48
49	C#3	Pulse 2	Note 49
50	D3	Pulse 2	Note 50
51	D#3	Pulse 2	Note 51
52	E3	Pulse 2	Note 52
53	F3	Pulse 2	Note 53
54	F#3	Pulse 2	Note 54
55	G3	Pulse 2	Note 55
56	G#3	Pulse 2	Note 56
57	A3	Pulse 2	Note 57
58	A#3	Pulse 2	Note 58
59	B3	Pulse 2	Note 59
60	C4	Pulse 2	Note 60
61	C#4	Pulse 2	Note 61
62	D4	Pulse 2	Note 62
63	D#4	Pulse 2	Note 63
64	E4	Pulse 2	Note 64
65	F4	Pulse 2	Note 65
66	F#4	Pulse 2	Note 66
67	G4	Pulse 2	Note 67
68	G#4	Pulse 2	Note 68
69	A4	Pulse 2	Note 69
70	A#4	Pulse 2	Note 70
71	B4	Pulse 2	Note 71
72	C5	Pulse 2	Note 72
73	C#5	Pulse 2	Note 73
74	D5	Pulse 2	Note 74
75	D#5	Pulse 2	Note 75
76	E5	Pulse 2	Note 76
77	F5	Pulse 2	Note 77
78	F#5	Pulse 2	Note 78
79	G5	Pulse 2	Note 79
80	G#5	Pulse 2	Note 80
81	A5	Pulse 2	Note 81

82	A#5	Pulse 2	Note 82
83	B5	Pulse 2	Note 83
84	C6	Pulse 2	Note 84
36	C2	Wave	Note 36 / Sample
37	C#2	Wave	Note 37 / Sample
38	D2	Wave	Note 38 / Sample
39	D#2	Wave	Note 39 / Sample
40	E2	Wave	Note 40 / Sample
41	F2	Wave	Note 41 / Sample
42	F#2	Wave	Note 42 / Sample
43	G2	Wave	Note 43 / Sample
44	G#2	Wave	Note 44 / Sample
45	A2	Wave	Note 45 / Sample
46	A#2	Wave	Note 46 / Sample
47	B2	Wave	Note 47 / Sample
48	C3	Wave	Note 48 / Sample
49	C#3	Wave	Note 49 / Sample
50	D3	Wave	Note 50 / Sample
51	D#3	Wave	Note 51 / Sample
52	E3	Wave	Note 52 / Sample
53	F3	Wave	Note 53 / Sample
54	F#3	Wave	Note 54 / Sample
55	G3	Wave	Note 55 / Sample
56	G#3	Wave	Note 56 / Sample
57	A3	Wave	Note 57 / Sample
58	A#3	Wave	Note 58 / Sample
59	B3	Wave	Note 59 / Sample
60	C4	Wave	Note 60 / Sample
61	C#4	Wave	Note 61 / Sample
62	D4	Wave	Note 62 / Sample
63	D#4	Wave	Note 63 / Sample
64	E4	Wave	Note 64 / Sample
65	F4	Wave	Note 65 / Sample
66	F#4	Wave	Note 66 / Sample
67	G4	Wave	Note 67 / Sample
68	G#4	Wave	Note 68 / Sample
69	A4	Wave	Note 69 / Sample
70	A#4	Wave	Note 70 / Sample
71	B4	Wave	Note 71 / Sample
72	C5	Wave	Note 72 / Sample
73	C#5	Wave	Note 73 / Sample
74	D5	Wave	Note 74 / Sample
75	D#5	Wave	Note 75 / Sample
76	E5	Wave	Note 76 / Sample
77	F5	Wave	Note 77 / Sample
78	F#5	Wave	Note 78 / Sample
79	G5	Wave	Note 79 / Sample
80	G#5	Wave	Note 80 / Sample

81	A5	Wave	Note 81 / Sample
82	A#5	Wave	Note 82 / Sample
83	B5	Wave	Note 83 / Sample
84	C6	Wave	Note 84 / Sample
36	C2	Noise	Noise Trigger
37	C#2	Noise	Noise Trigger
38	D2	Noise	Noise Trigger
39	D#2	Noise	Noise Trigger
40	E2	Noise	Noise Trigger
41	F2	Noise	Noise Trigger
42	F#2	Noise	Noise Trigger
43	G2	Noise	Noise Trigger
44	G#2	Noise	Noise Trigger
45	A2	Noise	Noise Trigger
46	A#2	Noise	Noise Trigger
47	B2	Noise	Noise Trigger
48	C3	Noise	Noise Trigger
49	C#3	Noise	Noise Trigger
50	D3	Noise	Noise Trigger
51	D#3	Noise	Noise Trigger
52	E3	Noise	Noise Trigger
53	F3	Noise	Noise Trigger
54	F#3	Noise	Noise Trigger
55	G3	Noise	Noise Trigger
56	G#3	Noise	Noise Trigger
57	A3	Noise	Noise Trigger
58	A#3	Noise	Noise Trigger
59	B3	Noise	Noise Trigger
60	C4	Noise	Noise Trigger
61	C#4	Noise	Noise Trigger
62	D4	Noise	Noise Trigger
63	D#4	Noise	Noise Trigger
64	E4	Noise	Noise Trigger
65	F4	Noise	Noise Trigger
66	F#4	Noise	Noise Trigger
67	G4	Noise	Noise Trigger
68	G#4	Noise	Noise Trigger
69	A4	Noise	Noise Trigger
70	A#4	Noise	Noise Trigger
71	B4	Noise	Noise Trigger
72	C5	Noise	Noise Trigger
73	C#5	Noise	Noise Trigger
74	D5	Noise	Noise Trigger
75	D#5	Noise	Noise Trigger
76	E5	Noise	Noise Trigger
77	F5	Noise	Noise Trigger
78	F#5	Noise	Noise Trigger
79	G5	Noise	Noise Trigger

80	G#5	Noise	Noise Trigger
81	A5	Noise	Noise Trigger
82	A#5	Noise	Noise Trigger
83	B5	Noise	Noise Trigger
84	C6	Noise	Noise Trigger
36	C2	Ch5 Rows	Trigger Row 0
37	C#2	Ch5 Rows	Trigger Row 1
38	D2	Ch5 Rows	Trigger Row 2
39	D#2	Ch5 Rows	Trigger Row 3
40	E2	Ch5 Rows	Trigger Row 4
41	F2	Ch5 Rows	Trigger Row 5
42	F#2	Ch5 Rows	Trigger Row 6
43	G2	Ch5 Rows	Trigger Row 7
44	G#2	Ch5 Rows	Trigger Row 8
45	A2	Ch5 Rows	Trigger Row 9
46	A#2	Ch5 Rows	Trigger Row 10
47	B2	Ch5 Rows	Trigger Row 11
48	C3	Ch5 Rows	Trigger Row 12
49	C#3	Ch5 Rows	Trigger Row 13
50	D3	Ch5 Rows	Trigger Row 14
51	D#3	Ch5 Rows	Trigger Row 15
52	E3	Ch6 Chains	Trigger Chain 0
53	F3	Ch6 Chains	Trigger Chain 1
54	F#3	Ch6 Chains	Trigger Chain 2
55	G3	Ch6 Chains	Trigger Chain 3
56	G#3	Ch6 Chains	Trigger Chain 4
57	A3	Ch6 Chains	Trigger Chain 5
58	A#3	Ch6 Chains	Trigger Chain 6
59	B3	Ch6 Chains	Trigger Chain 7
60	C4	Ch6 Chains	Trigger Chain 8
61	C#4	Ch6 Chains	Trigger Chain 9
62	D4	Ch6 Chains	Trigger Chain 10
63	D#4	Ch6 Chains	Trigger Chain 11
64	E4	Ch6 Chains	Trigger Chain 12
65	F4	Ch6 Chains	Trigger Chain 13
66	F#4	Ch6 Chains	Trigger Chain 14
67	G4	Ch6 Chains	Trigger Chain 15

5. MIDI CC Assignments

The MIDI CC assignments for LSDj have been standardized with CC7 reserved for volume and other controls reorganized into consistent ranges.

CC	Ch1 Pulse1	Ch2 Pulse2	Ch3 Wave	Ch4 Noise	Ch5 Global	Ch6 Live Mode
0	-	-	-	-	-	-
1	-	-	-	-	-	-
2	-	-	-	-	-	-

3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	Volume (0-127)	Volume (0-127)	Volume (0-127)	Volume (0-127)	-	-
8	Panning	Panning	Panning	Panning	-	-
9	Envelope	Envelope	Envelope	Envelope	-	-
10	Pan	Pan	Pan	Pan	-	-
11	Pitch Offset	Pitch Offset	Pitch Offset	Pitch Offset	-	-
12	Fine Pitch	Fine Pitch	Fine Pitch	Fine Pitch	-	-
13	Sweep	Sweep	Wave Synth Mode	Noise Vibrato Depth	-	-
14	Pitch	Pitch	Pitch	Pitch	-	-
15	Vibrato Depth	Vibrato Depth	Vibrato Depth	Vibrato Depth	-	-
16	Vibrato Speed	Vibrato Speed	Vibrato Speed	Vibrato Speed	-	-
17	Duty Cycle	Duty Cycle	Duty Cycle	Duty Cycle	-	-
18	Waveform Select	Waveform Select	Waveform Select	Waveform Select	-	-
19	Instrument Select	Instrument Select	Instrument Select	Instrument Select	-	-
20	Instr Attack	Instr Attack	Instr Attack	Noise Vibrato Speed	Tempo	Live Mode Enable
21	Instr Decay	Instr Decay	Instr Decay	Instr Attack	Groove Pattern Select	Next Row Trigger
22	Duty Cycle (Instr)	Duty Cycle (Instr)	Instr Vibrato Depth	Instr Decay	Song Position Pointer	Previous Row Trigger
23	Sweep (Instr)	Sweep (Instr)	Instr Vibrato Speed	Instr Vibrato Depth	Global Transpose	Start/Play (0=Last,1=Next,2=Prev)
24	FX Command	FX Command	FX Command	Instr Vibrato Speed	Global Volume	Stop Playback
25	Pulse Width (Instr)	Pulse Width (Instr)	Waveform Index / Sample Slot	FX Command	Instrument Slot Select (CC29/PC)	Chain Select (0–127)

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26	Instr Vibrato Depth	Instr Vibrato Depth	Wave Table Position	Instr Arpeggio Speed	Start/Stop Song	Row Select (0–15)
27	Instr Vibrato Speed	Instr Vibrato Speed	Wave Synth Mode / Sample Mode	Arpeggio Speed	Advance Pattern	Queue Next Chain
28	Instr Arpeggio Speed	Instr Arpeggio Speed	Wave Table Position	Slide Up Rate	Reset Song	-
29	Arpeggio Speed	Arpeggio Speed	Sample Start Offset	Slide Down Rate	Toggle Live Mode	-
30	Slide Up Rate	Slide Up Rate	Sample End Offset	Retrigger Speed	Cursor Up	-
31	Slide Down Rate	Slide Down Rate	Arpeggio Speed	Noise Shape	Cursor Down	-
32	Retrigger Speed	Retrigger Speed	Slide Up Rate	Noise Shape	Cursor Left	-
33	Live Mode Enable	Live Mode Enable	Slide Down Rate	Noise Clock Divider	Cursor Right	-
34	Mute/Unmute	Mute/Unmute	Retrigger Speed	Noise Envelope	A Button	-
35	Solo	Solo	Live Mode Enable	Noise Clock Divider	B Button	-
36	Queue Next Row	Queue Next Row	Mute/Unmute	Live Mode Enable	Select Button	-
37	Skip Current Row	Skip Current Row	Solo	Mute/Unmute	Start Button	-
38	FX Trigger Slot	FX Trigger Slot	Queue Next Row	Solo	Step Forward	-
39	Detune Amount (64=center)	Detune Amount (64=center)	Skip Current Row	Queue Next Row	Step Backward	-
40	Arpeggiator Enable	Arpeggiator Enable	FX Trigger Slot	Skip Current Row	Pattern Up	-
41	Arpeggio Rate	Arpeggio Rate	Detune Amount (64=center)	FX Trigger Slot	Pattern Down	-

42	Arpeggio Pattern	Arpeggio Pattern	Arpeggiator Enable	Detune Amount (64=center)	Phrase Up	-
43	Enable MIDI Out Mode	Enable MIDI Out Mode	Arpeggio Rate	Arpeggiator Enable	Phrase Down	-
44	-	-	Arpeggio Pattern	Arpeggio Rate	Jump to Chain Start	-
45	-	-	Enable MIDI Out Mode	Arpeggio Pattern	Select Instrument Slot Up	-
46	-	-	-	Enable MIDI Out Mode	Select Instrument Slot Down	-
47	-	-	-	-	Open FX Column	-
48	-	-	-	-	Toggle Table/Wave Edit	-
49	-	-	-	-	Note Entry Mode	-
50	-	-	-	-	Note Preview Toggle	-
51	-	-	-	-	SH-101 Entry Mode	-
52	-	-	-	-	Step Advance Amount	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	Poly Mode Toggle (0=Mono,127=Poly)	-
-	-	-	-	-	-	-
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-	-	-	-	-	-	-
-	-	-	-	-	Instrument 0-15 MIDI Out Toggle	-
-	-	-	-	-	Instrument 16-31 MIDI Out Toggle	-
-	-	-	-	-	Instrument 32-47 MIDI Out Toggle	-
-	-	-	-	-	Instrument 48-63 MIDI Out Toggle	-
-	-	-	-	-	All Instruments MIDI Out Toggle	-

6. Live Mode & Special Features

Channels 5 and 6 provide live performance controls, including row and chain triggering, playback navigation, and SH-101 style note entry.

7. Integration Notes

• RetroPlug integration for instrument archiving, editing, and DAW automation.

• Arduinoboy headless mode support with SysEx for configuration.

• libLSDJ compatibility for exporting/importing instruments and songs.

• CC mapping aligned with DAW-friendly automation ranges.

8. Risks & Mitigation

Risk	Challenge	Mitigation
MIDI duplex	Enabling Out disables In	Use CC toggles to switch modes.
SysEx overflow	Large transfers may drop data	Use chunked transfers and flow control.
CPU load	Polyphony and arpeggiator overhead	Provide compile-time flags to disable extras.
Hardware memory	SysEx + CC parsing consume RAM	Limit live mode features and optimize firmware.

Appendix – References

• MIDI Specification: https://www.midi.org/specifications

• Game Boy Sound Hardware: https://gbdev.gg8.se/wiki/articles/Gameboy_sound_hardware

• Arduinoboy Project: https://github.com/trash80/Arduinoboy

• mGB: https://github.com/trash80/mGB

• RetroPlug: https://github.com/tommitytom/RetroPlug

• libLSDJ: https://github.com/stijnfrishert/libLSDJ

Appendix – Glossary of Terms

• CC (Control Change): MIDI messages used to modify parameters in real-time.

• SysEx (System Exclusive): MIDI messages used for device-specific data transfer.

• Chain: A sequence of phrases in LSDj used to structure songs.

• Phrase: A group of notes or patterns within a chain.

• Instrument: A sound preset in LSDj with waveform and effect parameters.

• Polyphonic Mode: Multiple notes can play simultaneously across channels.

• Monophonic Mode: Only one note plays per channel.

• RetroPlug: A VST/AU plugin that emulates Game Boy hardware.