Nord Stage 3 Program File Documentation

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Let's get started

This file documents the Nord Stage 3 program file structure. It is handmade by NUF users and is not officially supported by Nord Keyboards / Clavia DMI AB. While we certainly hope this document is useful, none of the authors or contributors place any guarantees as to the accuracy of the data.

We contacted Nord Keyboards / Clavia DMI AB support about this project, and the answer was that they are fine with this project, and it can be published :)

https://ns3-program-viewer.herokuapp.com web application is the project behind this initiative. Source is located here: https://github.com/Chris55/ns3-program-viewer

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Summary

Disclaimer

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- Thanks to other NUF member(s): @rpossemo

Revision

rev	date	description
0.1	23-Sep-2020	Draft version
0.2	26-Sep-2020	Added Delay section

License

File Structure

This mapping corresponds to the Nord Stage 3 program file (file extension ns3f).

The file version used is 3.04 (generated with OS v2.54), and the file length is 592 bytes. Some older versions have a length of 574 bytes and a smaller header.

Offset 0x04 defines the file format.

Each memory offset corresponds to an 8-bit value.

0x01 (hex) = 00000001 -> bit 0 is '1'

0x84 (hex) = 10000100 -> bit 7 and 2 are '1'

In the documentation `--xxxxxx` (b5-0) means Bit5 to Bit0.

offset	bits	description
0x0000	cccccccc	ascii C - 0x43, 4-byte Clavia ID
0x0001	cccccccc	ascii B - 0x42
0x0002	cccccccc	ascii I - 0x49
0x0003	cccccccc	ascii N - 0x4E
0x0004	ffffffff	(f) file format
0x0005	--------	0
0x0006	--------	0
0x0007	--------	0
0x0008	cccccccc	ascii n - 0x6E, 4-byte NS3 Program file ID
0x0009	cccccccc	ascii s - 0x73,
0x000A	cccccccc	ascii 3 - 0x33,
0x000B	cccccccc	ascii f - 0x66,
0x000C	bbbbbbbb	(b) bank lsb (0 = A, 1 = B . . .)
0x000D	--------	0
0x000E	llllllll	(l) location lsb (0 = 11, 1 = 12 . . .)
0x000F	--------	0
0x0010	cccccccc	(c) program category
0x0011	--------	
0x0012	--------	
0x0013	--------	
0x0014	iiiiiiii	(i) file version (16-bit)
0x0015	iiiiiiii	
0x0016	--------	
0x0017	--------	
0x0018	cccccccc	CRC1 (32-bit)
0x0019	cccccccc	
0x001A	cccccccc	
0x001B	cccccccc	
0x001C	--------	
0x001D	--------	
0x001E	--------	
0x001F	--------	
0x0020	--------	
0x0021	--------	
0x0022	--------	
0x0023	--------	
0x0024	--------	
0x0025	--------	
0x0026	--------	
0x0027	--------	
0x0028	--------	
0x0029	--------	
0x002A	--------	
0x002B	--------	
0x002C	--------	0
0x002D	--------	0

offset	bits	description
0x002E	vvvvvvvv	version 16-bit integer value in Big Endian format
0x002F	vvvvvvvv	
0x0030	--------	11
0x0031	pppssssss	(p) panel, (s) split
0x0032	ssssssss	
0x0033	ssssssss	
0x0034	sddpvvvr	(d) piano layer detune, (p) organ pitch stick, (v) organ vibrato mode, (r) rotary speaker speed
0x0035	mwwwaaap	(m) rotary speaker stop mode, (w) rotary speaker speed morph wheel, (a) rotary speaker speed morph after touch, (p) rotary speaker speed morph control pedal
0x0036	pp------	
0x0037	--------	
0x0038	tttttccc	(t) transpose, (c) master clock rate
0x0039	cccccddd	(d) rotary speaker drive
0x003A	ddddk-ss	(k) dual keyboard, (s) dual keyboard style
0x003B	--------	
0x003C	--------	
0x003D	--------	
0x003E	--------	
0x003F	--------	
0x0040	--------	
0x0041	--------	
0x0042	--------	
0x0043	ozzzzvvv	(o) piano on, (z) piano kb zone, (v) piano volume
0x0044	vvvvwwww	(w) piano volume morph wheel
0x0045	wwwwaaaa	(a) piano volume morph after touch
0x0046	aaaapppp	(p) piano volume morph control pedal
0x0047	pppooooo	(o) piano octave shift
0x0048	pstttmmm	(p) piano pitch stick, (s) piano sustain pedal, (t) piano type, (m) piano model
0x0049	mmvviiii	(v) piano sample variation, (i) piano sample name
0x004A	iiiiiiii	
0x004B	iiiiiiii	
0x004C	iiiiiiii	
0x004D	iiiisrpk	(s) piano soft release,(r) piano string resonance, (p) piano pedal noise, (k) piano kb touch
0x004E	k-ttt---	(t) piano timbre
0x004F	--------	
0x0050	--------	
0x0051	--------	
0x0052	ozzzzvvv	(o) synth on, (z) synth kb zone, (v) synth volume
0x0053	vvvvwwww	(w) synth volume morph wheel
0x0054	wwwwaaaa	(a) synth volume morph after touch
0x0055	aaaapppp	(p) synth volume morph control pedal
0x0056	pppooooo	(o) synth octave shift
0x0057	ps--xxxx	(p) synth pitch stick, (s) synth sustain pedal, (x) user sample name
0x0058	xxxxxxxx	
0x0059	xxxxxxxx	
0x005A	xxxxxxxx	
0x005B	xxxxxxxx	
0x005C	xxxxxxxx	
0x005D	xxxxxxxx	
0x005E	xxxxxxxx	
0x005F	xxxxxxxx	
0x0060	xxxxxxxx	
0x0061	xxxxxxxx	
0x0062	xxxxxxxx	
0x0063	xxxxxxxx	
0x0064	xxxxxxxx	
0x0065	xxxxxxxx	

offset	bits	description
0x0066	xxxxxxxx	
0x0067	xxxxxxxx	
0x0068	xxxxxxxx	
0x0069	xxxxxxxx	
0x006A	xxxxxxxx	
0x006B	xxxxxxxx	
0x006C	xxxxxxxx	
0x006D	--------	
0x006E	--------	
0x006F	--------	
0x0070	--------	
0x0071	--------	
0x0072	--------	
0x0073	--------	
0x0074	--------	
0x0075	--------	
0x0076	--------	
0x0077	--------	
0x0078	--------	
0x0079	--------	
0x007A	--------	
0x007B	--------	
0x007C	--------	
0x007D	--------	
0x007E	--------	
0x007F	--------	
0x0080	hosrrppc	(h) synth kh hold, (o) synth arp on, (o) synth arp kb sync, (r) synth arp range, (p) synth arp pattern, (c) synth arp master clock
0x0081	rrrrrrrw	(r) synth arp rate, (w) synth arp rate morph wheel
0x0082	wwwwwwwa	(a) synth arp rate morph after touch
0x0083	aaaaaaap	(p) synth arp rate morph control pedal
0x0084	pppppppv	(v) synth voice
0x0085	vggggggg	(g) synth glide
0x0086	uuvvvlll	(g) synth unison, (v) synth vibrato, (l) synth lfo wave
0x0087	mrrrrrrr	(m) synth lfo master clock, (r) synth lfo rate
0x0088	wwwwwwww	(w) synth lfo rate morph wheel
0x0089	aaaaaaaa	(a) synth lfo rate morph after touch
0x008A	pppppppp	(r) synth lfo rate control pedal
0x008B	aaaaaaad	(a) synth mod env attack, (d) synth mod env decay
0x008C	ddddddrr	(a) synth mod env release
0x008D	rrrrrvtt	(v) synth mod env velocity, (t) synth oscillator type
0x008E	twwwwwww	(w) synth oscillator 1 wave form
0x008F	ww-ccccp	(c) synth oscillator config, (c) synth pitch
0x0090	ppppplll	(l) synth oscillator control
0x0091	llllwwww	(w) synth oscillator control morph wheel
0x0092	wwwwaaaa	(a) synth oscillator control morph after touch
0x0093	aaaapppp	(p) synth oscillator control morph control pedal
0x0094	ppppllll	(l) synth lfo mod env
0x0095	lllwwwww	(w) synth lfo mod env morph wheel
0x0096	wwwaaaaa	(a) synth lfo mod env morph after touch
0x0097	aaappppp	(p) synth lfo mod env morph control pedal
0x0098	pppttfff	(t) synth filter type, (f) synth filter freq
0x0099	fffffwww	(w) synth filter freq morph wheel
0x009A	wwwwwaaa	(a) synth filter freq morph after touch
0x009B	aaaaappp	(p) synth filter freq morph control pedal
0x009C	ppppphhh	(h) synth filter hp freq res
0x009D	hhhhwwww	(w) synth filter hp freq res morph wheel
0x009E	wwwwaaaa	(a) synth filter hp freq res morph after touch
0x009F	aaaapppp	(p) synth filter hp freq res morph control pedal

offset	bits	description
0x00A0	ppppllll	(l) synth filter lfo amount
0x00A1	lllwwwww	(w) synth filter lfo amount morph wheel
0x00A2	wwwaaaaa	(a) synth filter lfo amount morph after touch
0x00A3	aaappppp	(p) synth filter lfo amount morph control pedal
0x00A4	pppmmmmm	(m) synth filter vel mod env amount
0x00A5	mmttddaa	(t) synth filter kb track, (d) synth filter drive, (a) synth amp env attack
0x00A6	aaaaaddd	(d) synth amp env decay
0x00A7	ddddrrrr	(r) synth amp env release
0x00A8	rrrvvsss	(r) synth amp env velocity, (s) synth sample id
0x00A9	ssssssss	
0x00AA	ssssssss	
0x00AB	ssssssss	
0x00AC	ssssssf--	(f) synth fast attack
0x00AD	--------	0
0x00AE	--------	0
0x00AF	--------	0
0x00B0	--------	0
0x00B1	--------	0
0x00B2	--------	0
0x00B3	--------	0
0x00B4	--------	0
0x00B5	--------	07
0x00B6	ozzzzvvv	(o) organ on, (z) organ kb zone, (v) organ volume
0x00B7	vvvvwwww	(w) organ volume morph wheel
0x00B8	wwwwaaaa	(a) organ volume morph after touch
0x00B9	aaaappppp	(p) organ volume morph control pedal
0x00BA	pppooooo	(o) organ octave shift
0x00BB	stttl---	(s) organ sustain-pedal,(t) organ type,(l) organ live mode
0x00BC	--------	0
0x00BD	--------	1A
0x00BE	1111wwww	organ preset 1 drawbar (1), (w) organ preset 1 drawbar 1 morph wheel
0x00BF	waaaaapp	(a) organ preset 1 drawbar 1 morph after touch, (p) organ preset 1 drawbar 2 morph control pedal
0x00C0	ppp2222w	organ preset 1 drawbar (2), (w) organ preset 1 drawbar 2 morph wheel
0x00C1	wwwwaaaa	(a) organ preset 1 drawbar 2 morph after touch
0x00C2	appppp33	(p) organ preset 1 drawbar 2 morph control pedal, organ preset 1 drawbar (3),
0x00C3	33wwwwwa	(w) organ preset 1 drawbar 3 morph wheel, (a) organ preset 1 drawbar 3 morph after touch
0x00C4	aaaappppp	(p) organ preset 1 drawbar 3 morph control pedal
0x00C5	p4444www	organ preset 1 drawbar (4), (w) organ preset 1 drawbar 4 morph wheel
0x00C6	wwaaaaap	(a) organ preset 1 drawbar 4 morph after touch, (p) organ preset 1 drawbar 4 morph control pedal,
0x00C7	pppp5555	organ preset 1 drawbar (5),
0x00C8	wwwwwaaa	(w) organ preset 1 drawbar 5 morph wheel, (a) organ preset 1 drawbar 5 morph after touch
0x00C9	aappppp6	(p) organ preset 1 drawbar 5 morph control pedal, organ preset 1 drawbar (6),
0x00CA	666wwwww	(w) organ preset 1 drawbar 6 morph wheel
0x00CB	aaaaappp	(a) organ preset 1 drawbar 6 morph after touch, (p) organ preset 1 drawbar 6 morph control pedal
0x00CC	pp7777ww	organ preset 1 drawbar (7), (w) organ preset 1 drawbar 7 morph wheel
0x00CD	wwwaaaaa	(a) organ preset 1 drawbar 7 morph after touch
0x00CE	ppppp888	(p) organ preset 1 drawbar 7 morph control pedal, organ preset 1 drawbar (8),
0x00CF	8wwwwwaa	(w) organ preset 1 drawbar 8 morph wheel, (a) organ preset 1 drawbar 8 morph after touch
0x00D0	aaappppp	(p) organ preset 1 drawbar 8 morph control pedal
0x00D1	9999wwww	organ preset 1 drawbar (9), (w) organ preset 1 drawbar 9 morph wheel
0x00D2	waaaaapp	(a) organ preset 1 drawbar 9 morph after touch, (p) organ preset 1 drawbar 9 morph control pedal

offset	bits	description
0x00D3	pppvphds	(v) organ vibrato on, (p) organ percussion on, (h) organ percussion harmonic third, (d) organ percussion decay fast, (s) organ percussion volume soft
0x00D4	--------	0
0x00D5	--------	0
0x00D6	--------	0
0x00D7	--------	0
0x00D8	--------	1A
0x00D9	1111wwww	organ preset 2 drawbar (1), (w) organ preset 2 drawbar 1 morph wheel
0x00DA	waaaaapp	(a) organ preset 2 drawbar 1 morph after touch, (p) organ preset 2 drawbar 2 morph control pedal
0x00DB	ppp2222w	organ preset 2 drawbar (2), (w) organ preset 2 drawbar 2 morph wheel
0x00DC	wwwwaaaa	(a) organ preset 2 drawbar 2 morph after touch
0x00DE	appppp33	(p) organ preset 2 drawbar 2 morph control pedal, organ preset 2 drawbar (3),
0x00DF	33wwwwwa	(w) organ preset 2 drawbar 3 morph wheel, (a) organ preset 2 drawbar 3 morph after touch
0x00E0	aaaapppp	(p) organ preset 2 drawbar 3 morph control pedal
0x00E1	p4444www	organ preset 2 drawbar (4), (w) organ preset 2 drawbar 4 morph wheel
0x00E2	wwaaaaap	(a) organ preset 2 drawbar 4 morph after touch, (p) organ preset 2 drawbar 4 morph control pedal,
0x00E3	pppp5555	organ preset 2 drawbar (5),
0x00E4	wwwwwaaa	(w) organ preset 2 drawbar 5 morph wheel, (a) organ preset 2 drawbar 5 morph after touch
0x00E5	aappppp6	(p) organ preset 2 drawbar 5 morph control pedal, organ preset 2 drawbar (6),
0x00E6	666wwwww	(w) organ preset 2 drawbar 6 morph wheel
0x00E7	aaaaappp	(a) organ preset 2 drawbar 6 morph after touch, (p) organ preset 2 drawbar 6 morph control pedal
0x00E8	pp7777ww	organ preset 2 drawbar (7), (w) organ preset 2 drawbar 7 morph wheel
0x00E9	wwwaaaaa	(a) organ preset 2 drawbar 7 morph after touch
0x00EA	ppppp888	(p) organ preset 2 drawbar 7 morph control pedal, organ preset 2 drawbar (8),
0x00EB	8wwwwwaa	(w) organ preset 2 drawbar 8 morph wheel, (a) organ preset 2 drawbar 8 morph after touch
0x00EC	aaappppp	(p) organ preset 2 drawbar 8 morph control pedal
0x00ED	9999wwww	organ preset 2 drawbar (9), (w) organ preset 2 drawbar 9 morph wheel
0x00EE	waaaaapp	(a) organ preset 2 drawbar 9 morph after touch, (p) organ preset 2 drawbar 9 morph control pedal
0x00EF	ppp-----	
0x00F0	--------	
0x00F1	--------	
0x00F2	--------	
0x00F3	--------	
0x00F4	ozzz--ss	(o) extern on, (z) extern kb zone, (s) extern octave shift
0x00F5	s-------	
0x00F6	ps----mm	(p) extern pitch stick, (s) extern sustain pedal, (m) extern midi control
0x00F7	-------v	(v) extern midi cc
0x00F8	vvvvvvww	(w) extern midi cc morph wheel
0x00F9	wwwwwwaa	(a) extern midi cc morph after touch
0x00FA	aaaaaapp	(p) extern midi cc morph control pedal
0x00FB	pppppp--	
0x00FC	--------	
0x00FD	-------v	(v) extern midi program
0x00FE	wwwwwwaa	(a) extern midi program after touch
0x00FF	aaaaaapp	(p) extern midi program control pedal
0x0100	pppppp--	
0x0101	-------v	(v) extern volume
0x0102	vvvvvvww	(w) extern volume morph wheel
0x0103	wwwwwwaa	(a) extern volume morph after touch
0x0104	aaaaaapp	(p) extern volume morph control pedal
0x0105	pppppp--	
0x0106	--------	

offset	bits	description
0x0107	--------	
0x0108	--------	
0x0109	--------	
0x010A	--------	
0x010B	ossnrrtt	(o) rotary speaker on, (s) rotary speaker source, (n) effect 1 on, (r) effect-1-source, (t) effect 1 type
0x010C	tcrrrrrr	(c) effect 1 master clock, (r) effect 1 rate
0x010D	rwwwwwww	(w) effect 1 rate morph wheel
0x010E	waaaaaaa	(a) effect 1 rate morph after touch
0x010F	apppppppp	(p) effect 1 rate morph control pedal
0x0110	paaaaaaa	(a) effect 1 amount
0x0111	wwwwwwww	(w) effect 1 amount morph wheel
0x0112	aaaaaaaa	(a) effect 1 amount morph after touch
0x0113	pppppppp	(p) effect 1 amount morph control pedal
0x0114	ossttrr	(o) effect 2 on, (s) effect 2 source, (t) effect 2 type, (r) effect 2 rate
0x0115	rrrrraaa	(a) effect 2 amount
0x0116	aaaawwww	(w) effect 2 amount morph wheel
0x0117	wwwwaaaa	(a) effect 2 amount morph after touch
0x0118	aaaapppp	(p) effect 2 amount morph control pedal
0x0119	pppossc	(o) delay on, (s) delay source, (m) delay master clock
0x011A	tttttttx	(t) delay tempo, (x) delay tempo lsw
0x011B	xxxxxxpw	(w) delay tempo morph wheel
0x011C	wwwwwwxx	(x) delay tempo morph wheel lsw
0x011D	xxxxxpaa	(a) delay tempo morph after touch
0x011E	aaaaaxxx	(x) delay tempo morph after touch lsw
0x011F	xxxxpccc	(c) delay tempo morph control pedal
0x0120	ccccxxxx	(x) delay tempo morph control pedal lsw
0x0121	xxxmmmmm	(t) delay mix
0x0122	mmwwwwww	(w) delay mix morph wheel
0x0123	wwaaaaaa	(a) delay mix morph after touch
0x0124	aapppppp	(p) delay mix morph control pedal
0x0125	ppoffbbb	(o) delay ping pong, (f) delay filter, (b) delay feedback
0x0126	bbbbwwww	(w) delay feedback morph wheel
0x0127	wwwwaaaa	(a) delay feedback morph after touch
0x0128	aaaapppp	(p) delay feedback morph control pedal
0x0129	ppppa---	(a) delay analog mode
0x012A	--------	
0x012B	--------	
0x012C	--------	
0x012D	--------	
0x012E	--------	
0x012F	--------	
0x0130	--------	
0x0131	--------	
0x0132	--------	
0x0133	--------	
0x0134	------ot	(o) reverb on, (t) reverb type
0x0135	ttbrrrrr	(o) reverb bright, (r) reverb amount
0x0136	rrwwwwww	(w) reverb amount morph wheel
0x0137	wwaaaaaa	(a) reverb amount morph after touch
0x0138	aapppppp	(p) reverb amount morph control pedal
0x0139	ppocccccc	(o) compressor on, (c) compressor amount
0x013A	ccf-----	(f) compressor fast
0x013B	--------	Piano Panel B, same as offset 0x34, offset from Panel A is 0x107 (263 bytes)
0x013C	--------	
...		
0x0240	--------	
0x0241	--------	end of Panel B
0x0242	--------	0

offset	bits	description
0x0243	--------	0
0x0244	--------	0
0x0245	--------	0
0x0246	--------	0
0x0247	--------	0
0x0248	--------	0
0x0249	--------	0
0x024A	--------	5
0x024B	--------	0
0x024C	--------	0
0x024D	--------	0
0x024E	--------	0
0x024F	--------	0

Extern On

Offset in file: 0xF4 (b7)

```
0 = off, 1 = on
```

Extern Kb Zone

Offset in file: 0xF4 (b6-3)

See: Organ Kb Zone for detailed explanation.

Extern Octave Shift

Offset in file: 0xF4 (b1-0) and 0xF5 (b7)

```
Octave Shift = value - 6
```

Extern Pitch Stick

Offset in file: 0xF6 (b7)

```
0 = off, 1 = on
```

Extern Sustain Pedal

Offset in file: 0xF6 (b6)

```
0 = off, 1 = on
```

Extern Midi Control

Offset in file: 0xF6 (b1-0)

```
0 = Midi CC
1 = Program
2 = Volume
```

Extern Midi CC

Offset in file: 0xF7 (b0) and 0xF8 (b7-2)

```
07-bit value = 0/127
```

Extern Midi Program

Offset in file: 0xFD (b0) and 0xFE (b7-2)

```
07-bit value = 0/127
```

Extern Volume

Offset in file: 0x101 (b0) and 0x102 (b7-2)

```
07-bit value = 0/127
```

Compressor On

Offset in file: 0x139 (b5)

```
0 = off, 1 = on
```

Compressor Amount

Offset in file: 0x139 (b4-0) and 0x13A (b7-6)

```
7-bit value 0/127 = 0/10
```

Compressor Fast

Offset in file: 0x13A (b5)

```
0 = off, 1 = on
```

Delay On

Offset in file: 0x119 (b3)

```
0 = off, 1 = on
```

Delay Source

Offset in file: 0x119 (b2-1)

```
0 = Organ, 1, Piano, 2 = Synth
```

Delay Master Clock

Offset in file: 0x119 (b0)

```
0 = off, 1 = on
```

Delay Tempo

Offset in file:

```
tempo is using 14-bit

MSW 0x11A (b7-1): 7-bit value
0/127 = 1.5 s to 20 ms (same as MIDI #CC 94, see table below)

LSW 0x11A (b0) and 0x11B (b7-2): 7-bit value
LSW used for fine tempo value (only used with Tag Tempo)

When Tempo knob is used, LSW is always 0, possible MSW value:
  0 = 1500,1.5 s 40 bpm (1/4)
  1 = 1420,1.42 s 42 bpm (1/4)
  2 = 1360,1.36 s 44 bpm (1/4)
  3 = 1300,1.30 s 46 bpm (1/4)
  4 = 1250,1.25 s 48 bpm (1/4)
  5 = 1200,1.20 s 50 bpm (1/4)
  6 = 1150,1.15 s 52 bpm (1/4)
  7 = 1100,1.11 s 54 bpm (1/4)
  8 = 1070,1.07 s 56 bpm (1/4)
  9 = 1030,1.03 s 58 bpm (1/4)
  10 = 1000,1.00 s 60 bpm (1/4)
  11 = 952,952 ms 63 bpm (1/4)
  12 = 909,909 ms 66 bpm (1/4)
  13 = 870,870 ms 69 bpm (1/4)
```

```
14 = 833,833 ms 72 bpm (1/4)
15 = 789,789 ms 76 bpm (1/4)
16 = 750,750 ms 80 bpm (1/4)
17 = 732,732 ms 82 bpm (1/4)
18 = 714,714 ms 84 bpm (1/4)
20 = 682,682 ms 88 bpm (1/4)
21 = 667,667 ms 90 bpm (1/4)
22 = 652,652 ms 92 bpm (1/4)
19 = 698,698 ms 86 bpm (1/4)
23 = 638,638 ms 94 bpm (1/4)
24 = 625,625 ms 96 bpm (1/4)
25 = 612,612 ms 98 bpm (1/4)
26 = 600,600 ms 100 bpm (1/4)
27 = 588,588 ms 102 bpm (1/4)
28 = 577,577 ms 104 bpm (1/4)
29 = 566,566 ms 106 bpm (1/4)
30 = 556,556 ms 108 bpm (1/4)
31 = 545,545 ms 110 bpm (1/4)
32 = 541,541 ms 111 bpm (1/4)
33 = 536,536 ms 112 bpm (1/4)
34 = 531,531 ms 113 bpm (1/4)
35 = 526,526 ms 114 bpm (1/4)
36 = 522,522 ms 115 bpm (1/4)
37 = 517,517 ms 116 bpm (1/4)
38 = 513,513 ms 117 bpm (1/4)
39 = 508,508 ms 118 bpm (1/4)
40 = 504,504 ms 119 bpm (1/4)
41 = 500,500 ms 120 bpm (1/4)
42 = 496,496 ms 121 bpm (1/4)
43 = 492,492 ms 122 bpm (1/4)
44 = 488,488 ms 123 bpm (1/4)
45 = 484,484 ms 124 bpm (1/4)
46 = 480,480 ms 125 bpm (1/4)
47 = 476,476 ms 126 bpm (1/4)
48 = 472,472 ms 127 bpm (1/4)
49 = 469,469 ms 128 bpm (1/4)
50 = 465,465 ms 129 bpm (1/4)
51 = 462,462 ms 130 bpm (1/4)
52 = 458,458 ms 131 bpm (1/4)
53 = 455,455 ms 132 bpm (1/4)
54 = 451,451 ms 133 bpm (1/4)
55 = 448,448 ms 134 bpm (1/4)
56 = 444,444 ms 135 bpm (1/4)
57 = 441,441 ms 136 bpm (1/4)
58 = 438,438 ms 137 bpm (1/4)
59 = 435,435 ms 138 bpm (1/4)
60 = 432,432 ms 139 bpm (1/4)
61 = 429,429 ms 140 bpm (1/4)
62 = 423,423 ms 142 bpm (1/4)
63 = 417,417 ms 144 bpm (1/4)
64 = 411,411 ms 146 bpm (1/4)
65 = 405,405 ms 148 bpm (1/4)
66 = 400,400 ms 150 bpm (1/4)
67 = 395,395 ms 152 bpm (1/4)
68 = 390,390 ms 154 bpm (1/4)
69 = 385,385 ms 156 bpm (1/4)
70 = 380,380 ms 158 bpm (1/4)
71 = 375,375 ms 80 bpm (1/8)
72 = 366,366 ms 82 bpm (1/8)
73 = 357,357 ms 84 bpm (1/8)
74 = 349,349 ms 86 bpm (1/8)
```

```
  75 = 341,341 ms 88 bpm (1/8)
  76 = 333,333 ms 90 bpm (1/8)
  77 = 326,326 ms 92 bpm (1/8)
  78 = 319,319 ms 94 bpm (1/8)
  79 = 313,313 ms 96 bpm (1/8)
  80 = 306,306 ms 98 bpm (1/8)
  81 = 300,300 ms 100 bpm (1/8)
  82 = 288,288 ms 104 bpm (1/8)
  83 = 278,278 ms 108 bpm (1/8)
  84 = 268,268 ms 112 bpm (1/8)
  85 = 259,259 ms 116 bpm (1/8)
  86 = 250,250 ms 120 bpm (1/8)
  87 = 238,238 ms 126 bpm (1/8)
  88 = 227,227 ms 132 bpm (1/8)
  89 = 217,217 ms 138 bpm (1/8)
  90 = 197,197 ms 152 bpm (1/8)
  91 = 188,188 ms 80 bpm (1/16)
  92 = 179,179 ms 84 bpm (1/16)
  93 = 170,170 ms 88 bpm (1/16)
  94 = 163,163 ms 92 bpm (1/16)
  95 = 156,156 ms 96 bpm (1/16)
  96 = 150,150 ms 100 bpm (1/16)
  97 = 144,144 ms 104 bpm (1/16)
  98 = 139,139 ms 108 bpm (1/16)
  99 = 134,134 ms 112 bpm (1/16)
 100 = 129,129 ms 116 bpm (1/16)
 101 = 125,125 ms 120 bpm (1/16)
 102 = 119,119 ms 126 bpm (1/16)
 103 = 114,114 ms 132 bpm (1/16)
 104 = 109,109 ms 138 bpm (1/16)
 105 = 104,104 ms 144 bpm (1/16)
 106 = 99,99 ms 152 bpm (1/16)
 107 = 94,94 ms 160 bpm (1/16)
 108 = 83,83 ms 180 bpm (1/16)
 109 = 75,75 ms 200 bpm (1/16)
 110 = 68,68 ms 220 bpm (1/16)
 111 = 63,63 ms 240 bpm (1/16)
 112 = 58,58 ms 260 bpm (1/16)
 113 = 54,54 ms 280 bpm (1/16)
 114 = 50,50 ms 300 bpm (1/16)
 115 = 47,47 ms 320 bpm (1/16)
 116 = 44,44 ms 340 bpm (1/16)
 117 = 42,42 ms 360 bpm (1/16)
 118 = 39,39 ms 380 bpm (1/16)
 119 = 38,38 ms 400 bpm (1/16)
 120 = 34,34 ms 440 bpm (1/16)
 121 = 31,31 ms 480 bpm (1/16)
 122 = 30,30 ms 500 bpm (1/16)
 123 = 28,28 ms 540 bpm (1/16)
 124 = 26,26 ms 580 bpm (1/16)
 125 = 24,24 ms 620 bpm (1/16)
 126 = 22,22 ms 680 bpm (1/16)
 127 = 20,20 ms 750 bpm (1/16)


Note: When Tap Tempo is used, LSW is different from 0.
A linear interpolation is done to define the fine tempo value.

if 'Delay Master Clock' is enabled 7-bit value 0/127 = 1/2 to 1/64
  0 = 1/2
  1 = 1/2
```

```
2 = 1/2
3 = 1/2
4 = 1/2
5 = 1/2
6 = 1/2
7 = 1/2
8 = 1/4D
9 = 1/4D
10 = 1/4D
11 = 1/4D
12 = 1/4D
13 = 1/4D
14 = 1/4D
15 = 1/4D
16 = 1/2T
17 = 1/2T
18 = 1/2T
19 = 1/2T
20 = 1/2T
21 = 1/2T
22 = 1/2T
23 = 1/4S
24 = 1/4S
25 = 1/4S
26 = 1/4S
27 = 1/4S
28 = 1/4S
29 = 1/4S
30 = 1/4S
31 = 1/4
32 = 1/4
33 = 1/4
34 = 1/4
35 = 1/4
36 = 1/4
37 = 1/4
38 = 1/8D
39 = 1/8D
40 = 1/8D
41 = 1/8D
42 = 1/8D
43 = 1/8D
44 = 1/8D
45 = 1/8D
46 = 1/4T
47 = 1/4T
48 = 1/4T
49 = 1/4T
50 = 1/4T
51 = 1/4T
52 = 1/4T
53 = 1/8S
54 = 1/8S
55 = 1/8S
56 = 1/8S
57 = 1/8S
58 = 1/8S
59 = 1/8S
60 = 1/8S
61 = 1/8
62 = 1/8
```

```
63 = 1/8
64 = 1/8
65 = 1/8
66 = 1/8
67 = 1/8
68 = 1/16D
69 = 1/16D
70 = 1/16D
71 = 1/16D
72 = 1/16D
73 = 1/16D
74 = 1/16D
75 = 1/16D
76 = 1/8T
77 = 1/8T
78 = 1/8T
79 = 1/8T
80 = 1/8T
81 = 1/8T
82 = 1/8T
83 = 1/16S
84 = 1/16S
85 = 1/16S
86 = 1/16S
87 = 1/16S
88 = 1/16S
89 = 1/16S
90 = 1/16S
91 = 1/16
92 = 1/16
93 = 1/16
94 = 1/16
95 = 1/16
96 = 1/16
97 = 1/16
98 = 1/16T
99 = 1/16T
100 = 1/16T
101 = 1/16T
102 = 1/16T
103 = 1/16T
104 = 1/16T
105 = 1/16T
106 = 1/32
107 = 1/32
108 = 1/32
109 = 1/32
110 = 1/32
111 = 1/32
112 = 1/32
113 = 1/32T
114 = 1/32T
115 = 1/32T
116 = 1/32T
117 = 1/32T
118 = 1/32T
119 = 1/32T
120 = 1/32T
121 = 1/64
122 = 1/64
123 = 1/64
```

```
  124 = 1/64
  125 = 1/64
  126 = 1/64
  127 = 1/64


Morph Wheel:
0x11B (b1): polarity (1 = positive, 0 = negative)
0x11B (b0), 0x11C (b7-0), and 0x11D (b7-3): 14-bit raw value

Morph After Touch:
0x11D (b2): polarity (1 = positive, 0 = negative)
0x11D (b1-0), 0x11E (b7-0), and 0x11F (b7-4): 14-bit raw value

Morph Control Pedal:
0x11F (b3): polarity (1 = positive, 0 = negative)
0x11F (b2-0), 0x120 (b7-0), and 0x121 (b7-5): 14-bit raw value

if polarity = 1 then Morph offset value = raw value + 1
if polarity = 0 then Morph offset value = raw value - 16383

Final 'To' Morph value = 'From value (original volume)' + 'Morph offset value'
Morph Enabled if  'From value' <> 'Morph offset value'
```

Delay Ping Pong

Offset in file: 0x125 (b5)

```
0 = off, 1 = on
```

Delay Filter

Offset in file: 0x125 (b4-3)

```
  0 = Bypass
  1 = LP
  2 = HP
  3 = BP
```

Delay Analog Mode

Offset in file: 0x129 (b3)

```
0 = off, 1 = on
```

Delay Feedback

Offset in file: 0x125 (b2-0) and 0x126 (b7-4)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10

Morph Wheel:
0x126 (b3): polarity (1 = positive, 0 = negative)
0x126 (b2-b0) and 0x127 (b7-4): 7-bit raw value
```

```
Morph After Touch:
0x127 (b3): polarity (1 = positive, 0 = negative)
0x127 (b2-b0) and 0x128 (b7-4): 7-bit raw value

Morph Control Pedal:
0x128 (b3): polarity (1 = positive, 0 = negative)
0x128 (b2-b0) and 0x129 (b7-4): 7-bit raw value
```

Delay Mix

Offset in file: 0x121 (b4-0) and 0x122 (b7-6)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10

Morph Wheel:
0x122 (b5): polarity (1 = positive, 0 = negative)
0x122 (b4-b0) and 0x123 (b7-6): 7-bit raw value

Morph After Touch:
0x123 (b5): polarity (1 = positive, 0 = negative)
0x123 (b4-b0) and 0x124 (b7-6): 7-bit raw value

Morph Control Pedal:
0x124 (b5): polarity (1 = positive, 0 = negative)
0x124 (b4-b0) and 0x125 (b7-6): 7-bit raw value
```

Effect 1 On

Offset in file: 0x10B (b4)

```
0 = off, 1 = on
```

Effect 1 Source

Offset in file: 0x10B (b3-2)

```
0 = Organ, 1, Piano, 2 = Synth
```

Effect 1 Type

Offset 0 in file: 0x10B (b1-0) and 0x10C (b7)

```
0 = A-Pan
1 = Trem
2 = RM
3 = WA-WA
4 = A-WA1
5 = A-WA2
```

Effect 1 Amount

Offset in file: 0x110 (b6-0)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10
```

```
Morph Wheel:
0x111 (b7): polarity (1 = positive, 0 = negative)
0x111 (b6-b0): 7-bit raw value

Morph After Touch:
0x112 (b7): polarity (1 = positive, 0 = negative)
0x112 (b6-b0): 7-bit raw value

Morph Control Pedal:
0x113 (b7): polarity (1 = positive, 0 = negative)
0x113 (b6-b0): 7-bit raw value
```

Effect 1 Rate

Offset in file: 0x10C (b5-0) and 0x10D (b7)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10

if 'Effect 1 Master Clock' is enabled 7-bit value 0/127 = 4/1 to 1/32
  0 = 4/1
  1 = 4/1
  2 = 4/1
  3 = 4/1
  4 = 4/1
  5 = 4/1
  6 = 4/1
  7 = 4/1
  8 = 4/1
  9 = 4/1T
  10 = 4/1T
  11 = 4/1T
  12 = 4/1T
  13 = 4/1T
  14 = 4/1T
  15 = 4/1T
  16 = 4/1T
  17 = 4/1T
  18 = 2/1
  19 = 2/1
  20 = 2/1
  21 = 2/1
  22 = 2/1
  23 = 2/1
  24 = 2/1
  25 = 2/1
  26 = 2/1T
  27 = 2/1T
  28 = 2/1T
  29 = 2/1T
  30 = 2/1T
  31 = 2/1T
  32 = 2/1T
  33 = 2/1T
  34 = 2/1T
  35 = 1/1
  36 = 1/1
  37 = 1/1
  38 = 1/1
  39 = 1/1
  40 = 1/1
```

```
41 = 1/1
42 = 1/1
43 = 1/1T
44 = 1/1T
45 = 1/1T
46 = 1/1T
47 = 1/1T
48 = 1/1T
49 = 1/1T
50 = 1/1T
51 = 1/1T
52 = 1/2
53 = 1/2
54 = 1/2
55 = 1/2
56 = 1/2
57 = 1/2
58 = 1/2
59 = 1/2
60 = 1/2T
61 = 1/2T
62 = 1/2T
63 = 1/2T
64 = 1/2T
65 = 1/2T
66 = 1/2T
67 = 1/2T
68 = 1/2T
69 = 1/4
70 = 1/4
71 = 1/4
72 = 1/4
73 = 1/4
74 = 1/4
75 = 1/4
76 = 1/4
77 = 1/4T
78 = 1/4T
79 = 1/4T
80 = 1/4T
81 = 1/4T
82 = 1/4T
83 = 1/4T
84 = 1/4T
85 = 1/4T
86 = 1/8
87 = 1/8
88 = 1/8
89 = 1/8
90 = 1/8
91 = 1/8
92 = 1/8
93 = 1/8
94 = 1/8T
95 = 1/8T
96 = 1/8T
97 = 1/8T
98 = 1/8T
99 = 1/8T
100 = 1/8T
101 = 1/8T
```

```
  102 = 1/8T
  103 = 1/16
  104 = 1/16
  105 = 1/16
  106 = 1/16
  107 = 1/16
  108 = 1/16
  109 = 1/16
  110 = 1/16
  111 = 1/16T
  112 = 1/16T
  113 = 1/16T
  114 = 1/16T
  115 = 1/16T
  116 = 1/16T
  117 = 1/16T
  118 = 1/16T
  119 = 1/16T
  120 = 1/32
  121 = 1/32
  122 = 1/32
  123 = 1/32
  124 = 1/32
  125 = 1/32
  126 = 1/32
  127 = 1/32


Morph Wheel:
0x10D (b6): polarity (1 = positive, 0 = negative)
0x10D (b5-b0) and 0x10E (b7): 7-bit raw value

Morph After Touch:
0x10E (b6): polarity (1 = positive, 0 = negative)
0x10E (b5-b0) and 0x10F (b7): 7-bit raw value

Morph Control Pedal:
0x10F (b6): polarity (1 = positive, 0 = negative)
0x10F (b5-b0) and 0x110 (b7): 7-bit raw value
```

Effect 1 Master Clock

Offset in file: 0x10C (b6)

```
0 = off, 1 = on
```

Effect 2 On

Offset in file: 0x114 (b7)

```
0 = off, 1 = on
```

Effect 2 Source

Offset in file: 0x114 (b6-5)

```
0 = Organ, 1, Piano, 2 = Synth
```

Effect 2 Type

Offset in file: 0x114 (b4-2)

```
0 = PHAS1
1 = PHAS2
2 = FLANG
3 = VIBE
4 = CHOR1
5 = CHOR2
```

Effect 2 Amount

Offset in file: 0x115 (b2-0) and 0x116 (b7-4)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10

Morph Wheel:
0x116 (b3): polarity (1 = positive, 0 = negative)
0x116 (b2-b0) and 0x117 (b7-4): 7-bit raw value

Morph After Touch:
0x117 (b3): polarity (1 = positive, 0 = negative)
0x117 (b2-b0) and 0x118 (b7-4): 7-bit raw value

Morph Control Pedal:
0x118 (b3): polarity (1 = positive, 0 = negative)
0x118 (b2-b0) and 0x119 (b7-4): 7-bit raw value
```

Effect 2 Rate

Offset in file: 0x114 (b1-0) &nd 0x115 (b7-3)

```
7-bit value 0/127 = 0/10
```

Reverb On

Offset in file: 0x114 (b7)

```
0 = off, 1 = on
```

Reverb Type

Offset in file: 0x134 (b0) and 0x135 (b7-6)

```
0 = Room 1
1 = Room 2
2 = Stage 1
3 = Stage 2
4 = Hall 1
5 = Hall 2
```

Reverb Amount

Offset in file: 0x135 (b4-0) and 0x136 (b7-6)

See: Organ Volume for detailed Morph explanation.

```
7-bit value 0/127 = 0/10

Morph Wheel:
0x136 (b5): polarity (1 = positive, 0 = negative)
```

```
0x136 (b4-b0) and 0x137 (b7-6): 7-bit raw value

Morph After Touch:
0x137 (b5): polarity (1 = positive, 0 = negative)
0x137 (b4-b0) and 0x138 (b7-6): 7-bit raw value

Morph Control Pedal:
0x138 (b5): polarity (1 = positive, 0 = negative)
0x138 (b4-b0) and 0x139 (b7-6): 7-bit raw value
```

Reverb Bright

Offset in file: 0x135 (b5)

```
0 = off, 1 = on
```

Rotary Speaker On

Offset in file: 0x10b (bit7)

```
0 = off, 1 = on
```

Rotary Speaker Source

Offset in file: 0x10b (b6 and b5)

```
0 = Organ, 1, Piano, 2 = Synth
```

Rotary Speaker Drive

Offset in file: 0x39 (b2 to b0) and 0x3a (b7 to b4)

```
7-bit value 0/127 converted to 0/10

Note: Panel A value is used for panel A & B
```

Rotary Speaker Stop Mode

Offset in file: 0x35 (bit7)

```
0 = enabled (Speed Stop), 1 = disabled (Speed Slow)

Note: Panel A value is used for panel A & B
```

Rotary Speaker Speed

Offset in file: 0x34 (bit0)

```
0 = Slow/Stop, 1 = Fast

Morph Wheel:         0x35 (b6-4)
Morph After Touch:   0x35 (b3-1)
Morph Control Pedal: 0x35 (b0) and 0x36 (b7-6)

011 = 0x03 = morph off
100 = 0x04 = morph on

Note: Panel A value is used for panel A & B
```

Organ On

Offset in file: 0xB6 (b7)

```
0 = off, 1 = on
```

Organ Kb Zone

Offset in file: 0xB6 (b6-3)

```
value     |      | value
--------- | ---- | -------
x000 0xxx |  0   | o---
x000 1xxx |  1   | -o--
x001 0xxx |  2   | --o-
x001 1xxx |  3   | ---o
x010 0xxx |  4   | oo--
x010 1xxx |  5   | -oo-
x011 0xxx |  6   | --oo
x011 1xxx |  7   | ooo-
x100 0xxx |  8   | -ooo
x100 1xxx |  9   | oooo
```

Organ Volume

Offset in file:

```
Volume:
0xB6 (b2-b0), 0xB7 (b7-4): 7-bit = 0/127 range
  0 = Off
  1 = -84.2 dB
  2 = -72.1 dB
  3 = -65.1 dB
  4 = -60.1 dB
  5 = -56.2 dB
  6 = -53.0 dB
  7 = -50.3 dB
  8 = -48.0 dB
  9 = -46.0 dB
  10 = -44.2 dB
  11 = -42.5 dB
  12 = -41.0 dB
  13 = -39.6 dB
  14 = -38.3 dB
  15 = -37.1 dB
  16 = -36.0 dB
  17 = -34.9 dB
  18 = -33.9 dB
  19 = -33.0 dB
  20 = -32.1 dB
  21 = -31.1 dB
  22 = -30.5 dB
  23 = -29.7 dB
  24 = -28.9 dB
  25 = -28.2 dB
  26 = -27.6 dB
  27 = -26.9 dB
  28 = -26.3 dB
  29 = -25.7 dB
  30 = -25.1 dB
  31 = -24.5 dB
  32 = -23.9 dB
  33 = -23.4 dB
```

```
34 = -22.9 dB
35 = -22.4 dB
36 = -21.9 dB
37 = -21.4 dB
38 = -21.0 dB
39 = -20.5 dB
40 = -20.1 dB
41 = -19.6 dB
42 = -19.2 dB
43 = -18.8 dB
44 = -18.4 dB
45 = -18.0 dB
46 = -17.6 dB
47 = -17.3 dB
48 = -16.9 dB
49 = -16.5 dB
50 = -16.2 dB
51 = -15.8 dB
52 = -15.5 dB
53 = -15.2 dB
54 = -14.9 dB
55 = -14.5 dB
56 = -14.2 dB
57 = -13.9 dB
58 = -13.6 dB
59 = -13.3 dB
60 = -13.0 dB
61 = -12.7 dB
62 = -12.5 dB
63 = -12.2 dB
64 = -11.9 dB
65 = -11.6 dB
66 = -11.4 dB
67 = -11.1 dB
68 = -10.9 dB
69 = -10.6 dB
70 = -10.3 dB
71 = -10.1 dB
72 = -9.9 dB
73 = -9.6 dB
74 = -9.4 dB
75 = -9.1 dB
76 = -8.9 dB
77 = -8.7 dB
78 = -8.5 dB
79 = -8.2 dB
80 = -8.0 dB
81 = -7.8 dB
82 = -7.6 dB
83 = -7.4 dB
84 = -7.2 dB
85 = -7.0 dB
86 = -6.8 dB
87 = -6.6 dB
88 = -6.4 dB
89 = -6.2 dB
90 = -6.0 dB
91 = -5.8 dB
92 = -5.6 dB
93 = -5.4 dB
94 = -5.2 dB
```

```
  95 = -5.0 dB
  96 = -4.9 dB
  97 = -4.7 dB
  98 = -4.5 dB
  99 = -4.3 dB
  100 = -4.2 dB
  101 = -4.0 dB
  102 = -3.8 dB
  103 = -3.6 dB
  104 = -3.5 dB
  105 = -3.3 dB
  106 = -3.1 dB
  107 = -3.0 dB
  108 = -2.8 dB
  109 = -2.7 dB
  110 = -2.5 dB
  111 = -2.3 dB
  112 = -2.2 dB
  113 = -2.0 dB
  114 = -1.9 dB
  115 = -1.7 dB
  116 = -1.6 dB
  117 = -1.4 dB
  118 = -1.3 dB
  119 = -1.1 dB
  120 = -1.0 dB
  121 = -0.8 dB
  122 = -0.7 dB
  123 = -0.6 dB
  124 = -0.4 dB
  125 = -0.3 dB
  126 = -0.1 dB
  127 = 0.0 dB


Morph Wheel:
0xB7 (b3): polarity (1 = positive, 0 = negative)
0xB7 (b2-b0), 0xB8 (b7-b4): 7-bit raw value

Morph After Touch:
0xB8 (b3): polarity (1 = positive, 0 = negative)
0xB8 (b2-b0), 0xB9 (b7-b4): 7-bit raw value

Morph Control Pedal:
0xB9 (b3): polarity (1 = positive, 0 = negative)
0xB9 (b2-b0), 0xBA (b7-b4): 7-bit raw value

if polarity = 1 then Morph offset value = raw value + 1
if polarity = 0 then Morph offset value = raw value - 127

Final 'To' Morph value = 'From value (original volume)' + 'Morph offset value'
Morph Enabled if  'From value' <> 'Morph offset value'
```

Organ Octave Shift

Offset in file: 0xBA (b3-0)

```
Octave Shift = value - 6
```

Organ Pitch Stick

Offset in file: 0x34 (b4)

```
0 = off, 1 = on
```

Organ Sustain Pedal

Offset in file: 0xBB (b7)

```
0 = off, 1 = on
```

Organ Type

Offset in file: 0xBB (b6/5/4)

```
0 = B3
1 = Vox
2 = Farfisa
3 = Pipe1
4 = Pipe2
```

Organ Drawbars Preset 1

Offset in file: 0xBE

```
Drawbar value range is 0/8.
For Vox Organ each value is converted to 0/1: 0 (if value < 4) else 1
For Farfisa Organ drawbar 8 is not used and forced to 0

Drawbar 1: 0xBE (b7-4)
           Morph Wheel:         0xBE (b3-0) and 0xBF (b7)
           Morph After Touch:   0xBF (b6-2)
           Morph Control Pedal: 0xBF (b1-0) and 0xC0 (b7-5)

Drawbar 2: 0xC0 (b4-1)
           Morph Wheel:         0xC0 (b0) and 0xC1 (b7-4)
           Morph After Touch:   0xC1 (b3-0) and 0xC2 (b7)
           Morph Control Pedal: 0xC2 (b6-2)

Drawbar 3: 0xC2 (b1-0) and 0xC3 (b7-6)
           Morph Wheel:         0xC3 (b5-1)
           Morph After Touch:   0xC3 (b0) and 0xC4 (b7-4)
           Morph Control Pedal: 0xC4 (b3-0) and 0xC5 (b7)

Drawbar 4: 0xC5 (b6-3)
           Morph Wheel:         0xC5 (b2-0) and 0xC6 (b7-6)
           Morph After Touch:   0xC6 (b5-b1)
           Morph Control Pedal: 0xC6 (b0) and 0xC7 (b7-4)

Drawbar 5: 0xC7 (b3-0)
           Morph Wheel:         0xC8 (b7-3)
           Morph After Touch:   0xC8 (b2-0) and 0xC9 (b7-6)
           Morph Control Pedal: 0xC9 (b5-1)

Drawbar 6: 0xC9 (b0) and 0xCA (b7-5)
           Morph Wheel:         0xCA (b4-0)
           Morph After Touch:   0xCB (b7-3)
           Morph Control Pedal: 0xCB (b2-0) and 0xCC (b7-6)

Drawbar 7: 0xCC (b5-2)
           Morph Wheel:         0xCC (b1-0) and 0xCD (b7-5)
           Morph After Touch:   0xCD (b4-0)
           Morph Control Pedal: 0xCE (b7-3)

Drawbar 8: 0xCE (b2-0) and 0xCF (b7)
           Morph Wheel:         0xCF (b6-2)
```

```
           Morph After Touch:   0xCF (b1-0) and 0xD0 (b7-5)
           Morph Control Pedal: 0xD0 (b4-0)

Drawbar 9: 0xD1 (b7-4)
           Morph Wheel:         0xD1 (b3-0) and 0xBF (b7)
           Morph After Touch:   0xD2 (b6-2)
           Morph Control Pedal: 0xD2 (b1-0) and 0xD3 (b7-5)

Morph value is on 5-bit
b4 is polarity
b3-0 is raw 4-bit value

if polarity = 1 then Morph offset value = raw value + 1
if polarity = 0 then Morph offset value = raw value - 8

Final 'To' Morph value = 'From value (original volume)' + 'Morph offset value'
Morph Enabled if  'From value' <> 'Morph offset value'
```

Organ Drawbars Preset 2

Offset in file: 0xD9

```
Drawbar value range is 0/8.
For Vox Organ each value is converted to 0/1: 0 (if value < 4) else 1
For Farfisa Organ drawbar 8 is not used and forced to 0

Drawbar 1: 0xD9 (b7-4)
           Morph Wheel:         0xD9 (b3-0) and 0xDA (b7)
           Morph After Touch:   0xDA (b6-2)
           Morph Control Pedal: 0xDA (b1-0) and 0xDB (b7-5)

Drawbar 2: 0xDB (b4-1)
           Morph Wheel:         0xDB (b0) and 0xDC (b7-4)
           Morph After Touch:   0xDC (b3-0) and 0xDD (b7)
           Morph Control Pedal: 0xDD (b6-2)

Drawbar 3: 0xDD (b1-0) and 0xDE (b7-6)
           Morph Wheel:         0xDE (b5-1)
           Morph After Touch:   0xDE (b0) and 0xDF (b7-4)
           Morph Control Pedal: 0xDF (b3-0) and 0xE0 (b7)

Drawbar 4: 0xE0 (b6-3)
           Morph Wheel:         0xE0 (b2-0) and 0xE1 (b7-6)
           Morph After Touch:   0xE1 (b5-b1)
           Morph Control Pedal: 0xE1 (b0) and 0xE2 (b7-4)

Drawbar 5: 0xE2 (b3-0)
           Morph Wheel:         0xE3 (b7-3)
           Morph After Touch:   0xE3 (b2-0) and 0xE4 (b7-6)
           Morph Control Pedal: 0xE4 (b5-1)

Drawbar 6: 0xE4 (b0) and 0xE5 (b7-5)
           Morph Wheel:         0xE5 (b4-0)
           Morph After Touch:   0xE6 (b7-3)
           Morph Control Pedal: 0xE6 (b2-0) and 0xE7 (b7-6)

Drawbar 7: 0xE7 (b5-2)
           Morph Wheel:         0xE7 (b1-0) and 0xE8 (b7-5)
           Morph After Touch:   0xE8 (b4-0)
           Morph Control Pedal: 0xE9 (b7-3)
```

```
Drawbar 8: 0xE9 (b2-0) and 0xEA (b7)
           Morph Wheel:         0xEA (b6-2)
           Morph After Touch:   0xEA (b1-0) and 0xEB (b7-5)
           Morph Control Pedal: 0xEB (b4-0)

Drawbar 9: 0xEC (b7-4)
           Morph Wheel:         0xEC (b3-0) and 0xED (b7)
           Morph After Touch:   0xED (b6-2)
           Morph Control Pedal: 0xED (b1-0) and 0xEF (b7-5)

Morph value is on 5-bit
b4 is polarity
b3-0 is raw 4-bit value

if polarity = 1 then Morph offset value = raw value + 1
if polarity = 0 then Morph offset value = raw value - 8

Final 'To' Morph value = 'From value (original volume)' + 'Morph offset value'
Morph Enabled if  'From value' <> 'Morph offset value'
```

Organ Live Mode

Offset in file: 0xBB (b3) (NS3 Compact model only)

```
0 = off, 1 = on
```

Organ Vibrato On

Offset in file: 0xD3 (b4)

```
0 = off, 1 = on
```

Organ Vibrato Mode

Offset in file: 0x34 (b3-1)

```
0 = V1
1 = C1
2 = V2
3 = C2
4 = V3
5 = C3

if Organ type is Pipe1 or Pipe2, only C1 is allowed
if Organ type is Farfisa, mode C1/V3 are not available
if Organ type is Vox, mode C1/C2/C3 are not available
if Organ type is B3, all mode are available
```

Organ Percussion On

Offset in file: 0xD3 (b3)

```
0 = off, 1 = on

only if Organ type is B3
```

Organ Percussion Volume Soft

Offset in file: 0xD3 (b0)

```
0 = off, 1 = on

only if Organ type is B3
```

Organ Percussion Decay Fast

Offset in file: 0xD3 (b1)

```
0 = off, 1 = on

only if Organ type is B3
```

Organ Percussion Harmonic Third

Offset in file: 0xD3 (b2)

```
0 = off, 1 = on

only if Organ type is B3
```

Panel Enabled And Selection

Offset in file 0x31

```
Enabled (b6-5):
0 = A only
1 = B only
2 = A & B

Selected Panel (b7):
A = 0, B = 1 (not used here)

Note: if Dual Keyboard is On, both panel are enabled.
```

Piano On

Offset in file: 0x43 (b7)

```
0 = off, 1 = on
```

Piano Kb Zone

Offset in file: 0x43 (b6-3)

See: Organ Kb Zone for detailed explanation.

Piano Volume

Offset in file: 0x43 (b2-0), 0x44 (b7-4)

See: Organ Volume for detailed explanation.

```
Morph Wheel:
0x44 (b3): polarity (1 = positive, 0 = negative)
0x44 (b2-b0), 0x45 (b7-b4): 7-bit raw value

Morph After Touch:
0x45 (b3): polarity (1 = positive, 0 = negative)
0x45 (b2-b0), 0x46 (b7-b4): 7-bit raw value

Morph Control Pedal:
0x46 (b3): polarity (1 = positive, 0 = negative)
0x46 (b2-b0), 0x47 (b7-b4): 7-bit raw value
```

Piano Octave Shift

Offset in file: 0x47 (b3-0)

```
Octave Shift = value - 6
```

Piano Pitch Stick

Offset in file: 0x48 (b7)

```
0 = off, 1 = on
```

Piano Sustain Pedal

Offset in file: 0x48 (b6)

```
0 = off, 1 = on
```

Piano Type

Offset in file: 0x48 (b5-3)

```
0 = Grand
1 = Upright
2 = Electric
3 = Clav
4 = Digital
5 = Misc
```

Piano Model

Offset in file: 0x48 (b2-0) and 0x49 (b7-6)

```
0x00 0x00: model 1
0x00 0x01: model 2
.. and so on
0x02 0x01: model 10
```

Piano Name

Offset in file: 0x49 (b3-0) to 0x4D (b7-3)

```
32-bit Nord Sample ID
```

Piano Timbre

Offset in file: 0x4E (b5-3)

```
Grand, Upright, Digital, Misc Piano, and Harpsichord:
0 = None
1 = Soft
2 = Mid
3 = Bright

Electric Piano
0 = None
1 = Soft
2 = Mid
3 = Bright
4 = Dyno1
5 = Dyno2

Clavinet
0 = None
1 = Soft
2 = Treble
3 = Soft+Treble
4 = Brilliant
5 = Soft+Brill
6 = Treble+Brill
7 = Soft+Trb+Brill
```

Piano KB Touch

Offset in file: 0x4D (b0) and 0x4E (b7)

```
0 = Normal
1 = KB Touch 1
2 = Touch 2
3 = Touch 3
```

Piano Layer Detune

Offset in file: 0x34 (b6-5)

```
0 =  Off
1 =  1
2 =  2
3 =  3

Note: This parameter is common for both Panel. Layer Detune setting cannot be different
for each panel, only offset 0x34 is used.
```

Piano Soft Release

Offset in file: 0x4D (b4)

```
0 = off, 1 = on

Not available on Clavinet and Digital Piano
```

Piano Pedal Noise

Offset in file: 0x4D (b2)

```
0 = off, 1 = on

Only on Grand, Upright, and Electric piano.
```

Piano String Resonance

Offset in file: 0x4D (b3)

```
0 = off, 1 = on

Only on Grand and Upright piano.
```

File Version

Offset in file: 0x14 and 0x15

```
16-bit integer value in Little Endian format, ex 304 = v3.04

Notes:
From [https://www.nordkeyboards.com/products/nord-stage-3/nord-stage-3-update-history](https://www.nord

Programs stored with OS version
OS version          Program version
v0.92 (2017-06-15)  v3.00
v1.36 (2018-02-07)  v3.01
v1.50 (2018-10-22)  v3.02
vx.xx               v3.03
vx.xx               v3.04
```

File Format

Offset in file: 0x04

0 = header type 0 - legacy mode no CRC (Byte 0x18 to 0x2B are missing) 1 = header type 1 - default mode with additional bytes 0x18 to 0x2B (20 bytes).

Transpose

Offset in file: 0x38 (b7-3)

Enabled: 0x38 (b7) Value: 0x38 (b6-3)

```
7xxx xxxx : Transpose Off/On
x654 3xxx : Transpose value

Test1:  F8 38 : Transpose Off
Test2:  0D 80 : Transpose -6 semi
Test3:  0D 88 : Transpose -5 semi
Test4:  0D A8 : Transpose -1 semi
Test5:  0D B8 : Transpose +1 semi
Test6:  0D D8 : Transpose +5 semi
Test7:  0D E0 : Transpose +6 semi
```

Split

0ffset in file: 0x31 (b4 to b0) to 0x34 (b7 only)

```
|  0X31     |    0x32   |     0x33  |    0x34   | description
| xxx4 3210 | 7654 3210 | 7654 3210 | 7xxx xxxx |
| xxx4 xxxx | xxxx xxxx | xxxx xxxx | xxxx xxxx | split off/on
| xxxx 321x | xxxx xxxx | xxxx xxxx | xxxx xxxx | low off/on, mid off/on, high off/on
| xxxx xxx0 | 765x xxxx | xxxx xxxx | xxxx xxxx | low note (0 = F2, 1 = C3, 9 = C7)
| xxxx xxxx | xxx4 321x | xxxx xxxx | xxxx xxxx | mid note
| xxxx xxxx | xxxx xxx0 | 765x xxxx | xxxx xxxx | high note
| xxxx xxxx | xxxx xxxx | xxx5 4xxx | xxxx xxxx | low width (0 = 1, 1 = 6, 2 = 12)
| xxxx xxxx | xxxx xxxx | xxxx x32x | xxxx xxxx | mid width
| xxxx xxxx | xxxx xxxx | xxxx xxx0 | 7xxx xxxx | high width

Test1:  06 07 20 01 : Split Off

Test2:  16 07 20 01 : Width Off 1   1
                      Note  --  C4  C7

Test3:  1E 07 20 01 : Width 1   1   1
                      Note  F2  C4  C7

Test4:  1E 07 28 01 : Width 6   1   1
                      Note  F2  C4  C7

Test5:  1E 07 30 01 : Width 12  1   1
                      Note  F2  C4  C7

Test6:  18 07 30 01 : Width 12  Off Off
                      Note  F2  --  --

Test7:  18 27 30 01 : Width 12  Off Off
                      Note  C3  --  --

Test8:  18 47 30 01 : Width 12  Off Off
                      Note  F3  --  --

Test9:  18 67 30 01 : Width 12  Off Off
```

```
                     Note  C4  --  --

Test10: 18 87 30 01 : Width 12  Off Off
                     Note  F4  --  --

Test11: 18 A7 30 01 : Width 12  Off Off
                     Note  C5  --  --

Test12: 18 C7 30 01 : Width 12  Off Off
                     Note  F5  --  --

Test13: 18 E7 30 01 : Width 12  Off Off
                     Note  C6  --  --

Test14: 19 07 30 01 : Width 12  Off Off
                     Note  F6  --  --

Test15: 19 27 30 01 : Width 12  Off Off
                     Note  C7  --  --

Test16: 1B 27 30 01 : Width 12  Off 1     ! From test 15 to 16 only High Width was changed manually !
                     Note  F6  --  C7    ! Note Low in file is C7 but fixed on display to F6...

Test17: 1B 27 30 81 : Width 12  Off 6
                     Note  F6  --  C7

Test18: 1B 27 31 01 : Width 12  Off 12
                     Note  F6  --  C7

Test19: 1C 23 30 01 : Width 12  1   Off
                     Note  C3  F3  --   ! Note Mid in file is C3 but fixed on display to F3 !
```

Master Clock Rate

Offset in file: 0x38 (b2-0) 0x39 (b7-3)

```
bpm = value + 30
```

Dual Keyboard

Offset in file 0x3A (b3)

```
0 = Off
1 = On

Note: if Dual Keyboard is On, both panel are enabled.
```

Dual Keyboard Style

Offset in file 0x3A (b1-0)

```
0 = Panel
1 = Organ
2 = Piano
3 = Synth
```

Program Category

Offset in file: 0x10

```
  0 = Acoustic
  1 = Bass
  2 = Wind
```

```
4 = Fantasy
5 = FX
6 = Lead
7 = Organ
8 = Pad
10 = Pluck
11 = String
12 = Synth
13 = Vocal
14 = User
17 = None
21 = Grand
22 = Upright
23 = EPiano1
24 = EPiano2
27 = Clavinet
28 = Harpsi
30 = Arpeggio
255 = Undefined
```

Synth Filter Type

Offset in file: 0x98 (b4-2)

```
0 = LP12
1 = LP24
2 = Mini Moog
3 = LP+HP
4 = BP24
5 = HP24
```

Synth Filter Kb Track

Offset in file: 0xA5 (b5-4)

```
0 = Off
1 = 1/3
2 = 2/3
3 = 1
```

Synth Filter Drive

Offset in file: 0xA5 (b3-2)

```
0 = Off
1 = 1
2 = 2
3 = 3
```

Synth Filter LFO Amount

Offset in file: 0xA0 (b3-0) and 0xA1 (b7-5)

See: Organ Volume for detailed Morph explanation.

```
0/127 value = 0 / 10

Morph Wheel:
0xA1 (b4): polarity (1 = positive, 0 = negative)
0xA1 (b3-b0), 0xA2 (b7-b5): 7-bit raw value

Morph After Touch:
0xA2 (b4): polarity (1 = positive, 0 = negative)
0xA2 (b3-b0), 0xA3 (b7-b5): 7-bit raw value
```

```
Morph Control Pedal:
0xA3 (b4): polarity (1 = positive, 0 = negative)
0xA3 (b3-b0), 0xA4 (b7-b5): 7-bit raw value
```

Synth Filter Vel Mod Env Amount

Offset in file: 0xA4 (b4-0) and 0xA5 (b7-6)

```
Filter modulation (vel/env mod) is using this single 7-bit value to define two settings with a single k
Input Value is not the direct midi value as usual, instead it is coded on a special 0/120 range:
0   = 10.0 (100% left value) 'Vel Amount'
60  = 0.0 for both values
120 = 10.0 (100% right value) 'Mod Env Amount'
```

Synth Filter Freq

Offset in file: 0x98 (b1-0) and 0x99 (b7-3)

See: Organ Volume for detailed Morph explanation.

```
0/127 value = 14 Hz / 21 kHz
  0 = 14 Hz
  1 = 15 Hz
  2 = 15 Hz
  3 = 16 Hz
  4 = 17 Hz
  5 = 18 Hz
  6 = 19 Hz
  7 = 21 Hz
  8 = 22 Hz
  9 = 23 Hz
  10 = 24 Hz
  11 = 26 Hz
  12 = 28 Hz
  13 = 29 Hz
  14 = 31 Hz
  15 = 33 Hz
  16 = 35 Hz
  17 = 37 Hz
  18 = 39 Hz
  19 = 41 Hz
  20 = 44 Hz
  21 = 46 Hz
  22 = 49 Hz
  23 = 52 Hz
  24 = 55 Hz
  25 = 58 Hz
  26 = 62 Hz
  27 = 65 Hz
  28 = 69 Hz
  29 = 73 Hz
  30 = 78 Hz
  31 = 82 Hz
  32 = 87 Hz
  33 = 92 Hz
  34 = 98 Hz
  35 = 104 Hz
  36 = 110 Hz
  37 = 117 Hz
  38 = 123 Hz
  39 = 131 Hz
```

```
40 = 139 Hz
41 = 147 Hz
42 = 156 Hz
43 = 165 Hz
44 = 175 Hz
45 = 185 Hz
46 = 196 Hz
47 = 208 Hz
48 = 220 Hz
49 = 233 Hz
50 = 247 Hz
51 = 262 Hz
52 = 277 Hz
53 = 294 Hz
54 = 311 Hz
55 = 330 Hz
56 = 349 Hz
57 = 370 Hz
58 = 392 Hz
59 = 415 Hz
60 = 440 Hz
61 = 466 Hz
62 = 494 Hz
63 = 523 Hz
64 = 554 Hz
65 = 587 Hz
66 = 622 Hz
67 = 659 Hz
68 = 698 Hz
69 = 740 Hz
70 = 784 Hz
71 = 831 Hz
72 = 880 Hz
73 = 932 Hz
74 = 988 Hz
75 = 1.0 kHz
76 = 1.1 kHz
77 = 1.2 kHz
78 = 1.2 kHz
79 = 1.3 kHz
80 = 1.4 kHz
81 = 1.5 kHz
82 = 1.6 kHz
83 = 1.7 kHz
84 = 1.8 kHz
85 = 1.9 kHz
86 = 2.0 kHz
87 = 2.1 kHz
88 = 2.2 kHz
89 = 2.3 kHz
90 = 2.5 kHz
91 = 2.6 kHz
92 = 2.8 kHz
93 = 3.0 kHz
94 = 3.1 kHz
95 = 3.3 kHz
96 = 3.5 kHz
97 = 3.7 kHz
98 = 4.0 kHz
99 = 4.2 kHz
100 = 4.4 kHz
```

```
  101 = 4.7 kHz
  102 = 5.0 kHz
  103 = 5.3 kHz
  104 = 5.6 kHz
  105 = 5.9 kHz
  106 = 6.3 kHz
  107 = 6.6 kHz
  108 = 7.0 kHz
  109 = 7.5 kHz
  110 = 7.9 kHz
  111 = 8.4 kHz
  112 = 8.9 kHz
  113 = 9.4 kHz
  114 = 10 kHz
  115 = 11 kHz
  116 = 11 kHz
  117 = 12 kHz
  118 = 13 kHz
  119 = 13 kHz
  120 = 14 kHz
  121 = 15 kHz
  122 = 16 kHz
  123 = 17 kHz
  124 = 18 kHz
  125 = 19 kHz
  126 = 20 kHz
  127 = 21 kHz


* Morph Wheel:
0x99 (b2): polarity (1 = positive, 0 = negative)
0x99 (b1-b0), 0x9A (b7-b3): 7-bit raw value

Morph After Touch:
0x9A (b2): polarity (1 = positive, 0 = negative)
0x9A (b1-b0), 0x9B (b7-b3): 7-bit raw value

Morph Control Pedal:
0x9B (b2): polarity (1 = positive, 0 = negative)
0x9B (b1-b0), 0x9C (b7-b3): 7-bit raw value
```

Synth Filter HP Freq Res

Offset in file: 0x9C (b2-0) and 0x9D (b7-4)

```
for 'LP+HP' filter
  => Frequency High Pass value: 0/127 value = 14 Hz / 21 kHz
  0 = 14 Hz
  1 = 15 Hz
  2 = 15 Hz
  3 = 16 Hz
  4 = 17 Hz
  5 = 18 Hz
  6 = 19 Hz
  7 = 21 Hz
  8 = 22 Hz
  9 = 23 Hz
  10 = 24 Hz
  11 = 26 Hz
  12 = 28 Hz
  13 = 29 Hz
```

```
14 = 31 Hz
15 = 33 Hz
16 = 35 Hz
17 = 37 Hz
18 = 39 Hz
19 = 41 Hz
20 = 44 Hz
21 = 46 Hz
22 = 49 Hz
23 = 52 Hz
24 = 55 Hz
25 = 58 Hz
26 = 62 Hz
27 = 65 Hz
28 = 69 Hz
29 = 73 Hz
30 = 78 Hz
31 = 82 Hz
32 = 87 Hz
33 = 92 Hz
34 = 98 Hz
35 = 104 Hz
36 = 110 Hz
37 = 117 Hz
38 = 123 Hz
39 = 131 Hz
40 = 139 Hz
41 = 147 Hz
42 = 156 Hz
43 = 165 Hz
44 = 175 Hz
45 = 185 Hz
46 = 196 Hz
47 = 208 Hz
48 = 220 Hz
49 = 233 Hz
50 = 247 Hz
51 = 262 Hz
52 = 277 Hz
53 = 294 Hz
54 = 311 Hz
55 = 330 Hz
56 = 349 Hz
57 = 370 Hz
58 = 392 Hz
59 = 415 Hz
60 = 440 Hz
61 = 466 Hz
62 = 494 Hz
63 = 523 Hz
64 = 554 Hz
65 = 587 Hz
66 = 622 Hz
67 = 659 Hz
68 = 698 Hz
69 = 740 Hz
70 = 784 Hz
71 = 831 Hz
72 = 880 Hz
73 = 932 Hz
74 = 988 Hz
```

```
  75 = 1.0 kHz
  76 = 1.1 kHz
  77 = 1.2 kHz
  78 = 1.2 kHz
  79 = 1.3 kHz
  80 = 1.4 kHz
  81 = 1.5 kHz
  82 = 1.6 kHz
  83 = 1.7 kHz
  84 = 1.8 kHz
  85 = 1.9 kHz
  86 = 2.0 kHz
  87 = 2.1 kHz
  88 = 2.2 kHz
  89 = 2.3 kHz
  90 = 2.5 kHz
  91 = 2.6 kHz
  92 = 2.8 kHz
  93 = 3.0 kHz
  94 = 3.1 kHz
  95 = 3.3 kHz
  96 = 3.5 kHz
  97 = 3.7 kHz
  98 = 4.0 kHz
  99 = 4.2 kHz
  100 = 4.4 kHz
  101 = 4.7 kHz
  102 = 5.0 kHz
  103 = 5.3 kHz
  104 = 5.6 kHz
  105 = 5.9 kHz
  106 = 6.3 kHz
  107 = 6.6 kHz
  108 = 7.0 kHz
  109 = 7.5 kHz
  110 = 7.9 kHz
  111 = 8.4 kHz
  112 = 8.9 kHz
  113 = 9.4 kHz
  114 = 10 kHz
  115 = 11 kHz
  116 = 11 kHz
  117 = 12 kHz
  118 = 13 kHz
  119 = 13 kHz
  120 = 14 kHz
  121 = 15 kHz
  122 = 16 kHz
  123 = 17 kHz
  124 = 18 kHz
  125 = 19 kHz
  126 = 20 kHz
  127 = 21 kHz


for all other filters
  => Resonance:  0/127 value = 0 / 10
```

Synth On

Offset in file: 0x52 (b7)

```
0 = off, 1 = on
```

Synth Kb Zone

Offset in file: 0x52 (b6-3)

See: Organ Kb Zone for detailed explanation.

Synth Volume

Offset in file: 0x52 (b2-0) and 0x53 (b7-4)

See: Organ Volume for detailed explanation.

```
Morph Wheel:
0x53 (b3): polarity (1 = positive, 0 = negative)
0x53 (b2-b0), 0x54 (b7-b4): 7-bit raw value

Morph After Touch:
0x54 (b3): polarity (1 = positive, 0 = negative)
0x54 (b2-b0), 0x55 (b7-b4): 7-bit raw value

Morph Control Pedal:
0x55 (b3): polarity (1 = positive, 0 = negative)
0x55 (b2-b0), 0x56 (b7-b4): 7-bit raw value
```

Synth Octave Shift

Offset in file: 0x56 (b3-0)

```
Octave Shift = value - 6
```

Synth Pitch Stick

Offset in file: 0x57 (b7)

```
0 = off, 1 = on
```

Synth Sustain Pedal

Offset in file: 0x57 (b6)

```
0 = off, 1 = on
```

Synth Kb Hold

Offset in file: 0x80 (b7)

```
0 = off, 1 = on
```

Synth Voice

Offset in file: 0x84 (b0) and 0x85 (b7)

```
0 = Poly
1 = Legato
2 = Mono
```

Synth Glide

Offset in file: 0x85 (b6 to b0) 7 bits, range 0/10

```
0/127 value = 0 / 10
```

Synth Unison

Offset in file: 0x86 (b7/6)

```
0 = Off
1 = 1
2 = 2
3 = 3
```

Synth Vibrato

Offset in file: 0x86 (b5/4/3)

```
0 = Off
1 = Delay 1
2 = Delay 2
3 = Delay 3
4 = Wheel
5 = After Touch
```

Synth Oscillator Type

Offset in file: 0x8D (b1/0) and 0x8E (b7)

```
0 = Classic
1 = Wave
2 = Formant
3 = Super
4 = Sample
```

Synth Oscillator 1 Wave Form

Offset in file: 0x8E (b3-0) and 0x8F (b7/6)

ID	Classic	Wave	Formant	Super
0	Sine	Wave 2nd Harm	Format Wave Aaa	Super Wave Saw
1	Triangle	Wave 3rd Harm	Format Wave Eee	Super Wave Saw 2
2	Saw	Wave 4th Harm	Format Wave Iii	Super Wave Square
3	Square	Wave 5th Harm	Format Wave Ooo	Super Wave Square 2
4	Pulse 33	Wave 6th Harm	Format Wave Uuu	Super Wave Bright
5	Pulse 10	Wave 7th Harm	Format Wave Yyy	Super Wave Bright 2
6	ESaw	Wave 8th Harm	Format Wave AO	Super Wave Strings
7	ESquare	Wave Organ 1	Format Wave AE	Super Wave Organ
8		Wave Organ 2	Format Wave OE	
9		Wave Principal		
10		Wave Flute 1		
11		Wave Flute 2		
12		Wave Clarinet 1		
13		Wave Clarinet 2		
14		Wave Alto Sax		
15		Wave Tenor Sax		
16		Wave 2nd Spectra		
17		Wave 3rd Spectra		
18		Wave 4th Spectra		
19		Wave 5th Spectra		
20		Wave 6th Spectra		
21		Wave 7th Spectra		
22		Wave 8th Spectra		
23		Wave Saw Random		
24		Wave Saw Bright		
25		Wave Sqr Bright		
26		Wave Saw NoFund		
27		Wave EPiano 1		

```
28 |          | Wave EPiano 2      |
29 |          | Wave EPiano 3      |
30 |          | Wave DX 1          |
31 |          | Wave DX 2          |
32 |          | Wave Full Tines    |
33 |          | Wave Ac Piano      |
34 |          | Wave Ice 1         |
35 |          | Wave Ice 2         |
36 |          | Wave Clavinet 1    |
37 |          | Wave Clavinet 2    |
38 |          | Wave Clavinet 3    |
39 |          | Wave Triplets      |
40 |          | Wave Bell          |
41 |          | Wave Bar 1         |
42 |          | Wave Bar 2         |
43 |          | Wave Tines         |
44 |          | Wave Marimba       |
45 |          | Wave Tubular Bells |
```

Synth Oscillator Config

Offset in file: 0x8F (b4-1)

```
0 = None
1 = Pitch
2 = Shape
3 = Sync
4 = Detune
5 = MixSin
6 = MixTri
7 = MixSaw
8 = MixSqr
9 = MixBell
10 = MixNs1
11 = MixNs2
12 = FM1
13 = FM2
14 = RM
```

Synth Oscillator Control

Offset in file: 0x90 (b2/1/0) and 0x91 (b7/6/5/4)

See: Organ Volume for detailed Morph explanation.

```
Type                  Midi value conversion
Pitch (1)             0/127 => 0/24
Shape (2)             0/127 => 0/100 %
Sync (3)              0/127 => 0/10
Detune (4)            0/127 => 0/4
Mix* (5 to 11)        0/127 => 100/0 to 0/100
FM & RM (12 to 14)    0/127 => 0/100 %

Morph Wheel:
0x91 (b3): polarity (1 = positive, 0 = negative)
0x91 (b2-b0), 0x92 (b7-b4): 7-bit raw value

Morph After Touch:
0x92 (b3): polarity (1 = positive, 0 = negative)
0x92 (b2-b0), 0x93 (b7-b4): 7-bit raw value

Morph Control Pedal:
```

```
0x93 (b3): polarity (1 = positive, 0 = negative)
0x93 (b2-b0), 0x94 (b7-b4): 7-bit raw value
```

Synth Pitch

Offset in file: 0x8f (b0) and 0x90 (b7-3)

```
Midi value = 6-bit value + b0 forced to zero to have a standard Midi 7-bit value
value conversion: -12 (Sub) to +48
```

Synth LFO Mod Env

Offset in file: 0x94 (b3-0) and 0x95 (b7-5)

```
Osc modulation (lfo/env mod) is using this single 7-bit value to define two settings with a single knob
Input Value is not the direct midi value as usual, instead it is coded on a special 0/120 range:
0   = 10.0 (100% left value) 'LFO Amount'
60  = 0.0 for both values
120 = 10.0 (100% right value) 'Mod Env Amount'
```

Synth Fast Attack

Offset in file: 0xAC (b2)

```
0 = off, 1 = on
```

Synth Mod Env Attack

Offset in file: 0x8B (b7-1)

```
0/127 value = 0.5 ms / 45 s
  0 = 0.5 ms
  1 = 0.6 ms
  2 = 0.7 ms
  3 = 0.9 ms
  4 = 1.1 ms
  5 = 1.3 ms
  6 = 1.5 ms
  7 = 1.8 ms
  8 = 2.1 ms
  9 = 2.5 ms
  10 = 3.0 ms
  11 = 3.5 ms
  12 = 4.0 ms
  13 = 4.7 ms
  14 = 5.5 ms
  15 = 6.3 ms
  16 = 7.3 ms
  17 = 8.4 ms
  18 = 9.7 ms
  19 = 11 ms
  20 = 13 ms
  21 = 14 ms
  22 = 16 ms
  23 = 19 ms
  24 = 21 ms
  25 = 24 ms
  26 = 27 ms
  27 = 31 ms
  28 = 34 ms
  29 = 39 ms
  30 = 43 ms
  31 = 49 ms
```

```
32 = 54 ms
33 = 61 ms
34 = 68 ms
35 = 75 ms
36 = 84 ms
37 = 93 ms
38 = 103 ms
39 = 114 ms
40 = 126 ms
41 = 139 ms
42 = 153 ms
43 = 169 ms
44 = 186 ms
45 = 204 ms
46 = 224 ms
47 = 246 ms
48 = 269 ms
49 = 295 ms
50 = 322 ms
51 = 352 ms
52 = 384 ms
53 = 419 ms
54 = 456 ms
55 = 496 ms
56 = 540 ms
57 = 586 ms
58 = 636 ms
59 = 690 ms
60 = 748 ms
61 = 810 ms
62 = 876 ms
63 = 947 ms
64 = 1.02 s
65 = 1.10 s
66 = 1.19 s
67 = 1.28 s
68 = 1.38 s
69 = 1.49 s
70 = 1.60 s
71 = 1.72 s
72 = 1.85 s
73 = 1.99 s
74 = 2.13 s
75 = 2.28 s
76 = 2.45 s
77 = 2.62 s
78 = 2.81 s
79 = 3.00 s
80 = 3.21 s
81 = 3.43 s
82 = 3.66 s
83 = 3.91 s
84 = 4.17 s
85 = 4.45 s
86 = 4.74 s
87 = 5.05 s
88 = 5.37 s
89 = 5.72 s
90 = 6.08 s
91 = 6.47 s
92 = 6.87 s
```

```
  93 = 7.30 s
  94 = 7.75 s
  95 = 8.22 s
  96 = 8.72 s
  97 = 9.25 s
  98 = 9.80 s
  99 = 10 s
  100 = 11 s
  101 = 12 s
  102 = 12 s
  103 = 13 s
  104 = 14 s
  105 = 15 s
  106 = 15 s
  107 = 16 s
  108 = 17 s
  109 = 18 s
  110 = 19 s
  111 = 20 s
  112 = 21 s
  113 = 22 s
  114 = 24 s
  115 = 25 s
  116 = 26 s
  117 = 27 s
  118 = 29 s
  119 = 30 s
  120 = 32 s
  121 = 34 s
  122 = 35 s
  123 = 37 s
  124 = 39 s
  125 = 41 s
  126 = 43 s
  127 = 45 s
```

Synth Mod Env Decay

Offset in file: 0x8B (b0) and 0x8C (b7-2)

```
0/127 value = 3.0 ms / 45 s (Sustain)
  0 = 3.0 ms
  1 = 3.5 ms
  2 = 4.0 ms
  3 = 4.6 ms
  4 = 5.3 ms
  5 = 6.0 ms
  6 = 6.9 ms
  7 = 7.9 ms
  8 = 9.0 ms
  9 = 10 ms
  10 = 12 ms
  11 = 13 ms
  12 = 15 ms
  13 = 17 ms
  14 = 19 ms
  15 = 21 ms
  16 = 23 ms
  17 = 26 ms
  18 = 29 ms
  19 = 33 ms
```

```
20 = 36 ms
21 = 41 ms
22 = 45 ms
23 = 50 ms
24 = 55 ms
25 = 61 ms
26 = 68 ms
27 = 75 ms
28 = 82 ms
29 = 91 ms
30 = 100 ms
31 = 110 ms
32 = 120 ms
33 = 132 ms
34 = 144 ms
35 = 158 ms
36 = 173 ms
37 = 188 ms
38 = 206 ms
39 = 224 ms
40 = 244 ms
41 = 265 ms
42 = 288 ms
43 = 313 ms
44 = 340 ms
45 = 368 ms
46 = 399 ms
47 = 432 ms
48 = 467 ms
49 = 505 ms
50 = 545 ms
51 = 588 ms
52 = 634 ms
53 = 683 ms
54 = 736 ms
55 = 792 ms
56 = 851 ms
57 = 915 ms
58 = 983 ms
59 = 1.05 s
60 = 1.13 s
61 = 1.21 s
62 = 1.30 s
63 = 1.39 s
64 = 1.49 s
65 = 1.59 s
66 = 1.70 s
67 = 1.82 s
68 = 1.94 s
69 = 2.07 s
70 = 2.21 s
71 = 2.36 s
72 = 2.51 s
73 = 2.67 s
74 = 2.85 s
75 = 3.03 s
76 = 3.22 s
77 = 3.42 s
78 = 3.64 s
79 = 3.86 s
80 = 4.10 s
```

```
  81 = 4.35 s
  82 = 4.61 s
  83 = 4.89 s
  84 = 5.18 s
  85 = 5.49 s
  86 = 5.81 s
  87 = 6.15 s
  88 = 6.50 s
  89 = 6.88 s
  90 = 7.27 s
  91 = 7.68 s
  92 = 8.11 s
  93 = 8.57 s
  94 = 9.04 s
  95 = 9.54 s
  96 = 10 s
  97 = 11 s
  98 = 11 s
  99 = 12 s
  100 = 12 s
  101 = 13 s
  102 = 14 s
  103 = 14 s
  104 = 15 s
  105 = 16 s
  106 = 17 s
  107 = 18 s
  108 = 19 s
  109 = 20 s
  110 = 20 s
  111 = 22 s
  112 = 23 s
  113 = 24 s
  114 = 25 s
  115 = 26 s
  116 = 27 s
  117 = 29 s
  118 = 30 s
  119 = 31 s
  120 = 33 s
  121 = 34 s
  122 = 36 s
  123 = 38 s
  124 = 39 s
  125 = 41 s
  126 = 43 s
  127 = 45 s
```

Synth Mod Env Release

Offset in file: 0x8C (b1-0) and 0x8D (b7-3)

```
0/127 value = 3.0 ms / 45 s (Inf)
  0 = 3.0 ms
  1 = 3.5 ms
  2 = 4.0 ms
  3 = 4.6 ms
  4 = 5.3 ms
  5 = 6.0 ms
  6 = 6.9 ms
  7 = 7.9 ms
```

```
8 = 9.0 ms
9 = 10 ms
10 = 12 ms
11 = 13 ms
12 = 15 ms
13 = 17 ms
14 = 19 ms
15 = 21 ms
16 = 23 ms
17 = 26 ms
18 = 29 ms
19 = 33 ms
20 = 36 ms
21 = 41 ms
22 = 45 ms
23 = 50 ms
24 = 55 ms
25 = 61 ms
26 = 68 ms
27 = 75 ms
28 = 82 ms
29 = 91 ms
30 = 100 ms
31 = 110 ms
32 = 120 ms
33 = 132 ms
34 = 144 ms
35 = 158 ms
36 = 173 ms
37 = 188 ms
38 = 206 ms
39 = 224 ms
40 = 244 ms
41 = 265 ms
42 = 288 ms
43 = 313 ms
44 = 340 ms
45 = 368 ms
46 = 399 ms
47 = 432 ms
48 = 467 ms
49 = 505 ms
50 = 545 ms
51 = 588 ms
52 = 634 ms
53 = 683 ms
54 = 736 ms
55 = 792 ms
56 = 851 ms
57 = 915 ms
58 = 983 ms
59 = 1.05 s
60 = 1.13 s
61 = 1.21 s
62 = 1.30 s
63 = 1.39 s
64 = 1.49 s
65 = 1.59 s
66 = 1.70 s
67 = 1.82 s
68 = 1.94 s
```

```
69 = 2.07 s
70 = 2.21 s
71 = 2.36 s
72 = 2.51 s
73 = 2.67 s
74 = 2.85 s
75 = 3.03 s
76 = 3.22 s
77 = 3.42 s
78 = 3.64 s
79 = 3.86 s
80 = 4.10 s
81 = 4.35 s
82 = 4.61 s
83 = 4.89 s
84 = 5.18 s
85 = 5.49 s
86 = 5.81 s
87 = 6.15 s
88 = 6.50 s
89 = 6.88 s
90 = 7.27 s
91 = 7.68 s
92 = 8.11 s
93 = 8.57 s
94 = 9.04 s
95 = 9.54 s
96 = 10 s
97 = 11 s
98 = 11 s
99 = 12 s
100 = 12 s
101 = 13 s
102 = 14 s
103 = 14 s
104 = 15 s
105 = 16 s
106 = 17 s
107 = 18 s
108 = 19 s
109 = 20 s
110 = 20 s
111 = 22 s
112 = 23 s
113 = 24 s
114 = 25 s
115 = 26 s
116 = 27 s
117 = 29 s
118 = 30 s
119 = 31 s
120 = 33 s
121 = 34 s
122 = 36 s
123 = 38 s
124 = 39 s
125 = 41 s
126 = 43 s
127 = 45 s
```

Synth Mod Env Velocity

Offset in file: 0x8D (b2)

```
0 = off, 1 = on
```

Synth Amp Env Attack

Offset in file: 0xA5 (b1-0) and 0xA6 (b7-3)

```
0/127 value = 0.5 ms / 45 s
  0 = 0.5 ms
  1 = 0.6 ms
  2 = 0.7 ms
  3 = 0.9 ms
  4 = 1.1 ms
  5 = 1.3 ms
  6 = 1.5 ms
  7 = 1.8 ms
  8 = 2.1 ms
  9 = 2.5 ms
  10 = 3.0 ms
  11 = 3.5 ms
  12 = 4.0 ms
  13 = 4.7 ms
  14 = 5.5 ms
  15 = 6.3 ms
  16 = 7.3 ms
  17 = 8.4 ms
  18 = 9.7 ms
  19 = 11 ms
  20 = 13 ms
  21 = 14 ms
  22 = 16 ms
  23 = 19 ms
  24 = 21 ms
  25 = 24 ms
  26 = 27 ms
  27 = 31 ms
  28 = 34 ms
  29 = 39 ms
  30 = 43 ms
  31 = 49 ms
  32 = 54 ms
  33 = 61 ms
  34 = 68 ms
  35 = 75 ms
  36 = 84 ms
  37 = 93 ms
  38 = 103 ms
  39 = 114 ms
  40 = 126 ms
  41 = 139 ms
  42 = 153 ms
  43 = 169 ms
  44 = 186 ms
  45 = 204 ms
  46 = 224 ms
  47 = 246 ms
  48 = 269 ms
  49 = 295 ms
  50 = 322 ms
```

```
51 = 352 ms
52 = 384 ms
53 = 419 ms
54 = 456 ms
55 = 496 ms
56 = 540 ms
57 = 586 ms
58 = 636 ms
59 = 690 ms
60 = 748 ms
61 = 810 ms
62 = 876 ms
63 = 947 ms
64 = 1.02 s
65 = 1.10 s
66 = 1.19 s
67 = 1.28 s
68 = 1.38 s
69 = 1.49 s
70 = 1.60 s
71 = 1.72 s
72 = 1.85 s
73 = 1.99 s
74 = 2.13 s
75 = 2.28 s
76 = 2.45 s
77 = 2.62 s
78 = 2.81 s
79 = 3.00 s
80 = 3.21 s
81 = 3.43 s
82 = 3.66 s
83 = 3.91 s
84 = 4.17 s
85 = 4.45 s
86 = 4.74 s
87 = 5.05 s
88 = 5.37 s
89 = 5.72 s
90 = 6.08 s
91 = 6.47 s
92 = 6.87 s
93 = 7.30 s
94 = 7.75 s
95 = 8.22 s
96 = 8.72 s
97 = 9.25 s
98 = 9.80 s
99 = 10 s
100 = 11 s
101 = 12 s
102 = 12 s
103 = 13 s
104 = 14 s
105 = 15 s
106 = 15 s
107 = 16 s
108 = 17 s
109 = 18 s
110 = 19 s
111 = 20 s
```

```
  112 = 21 s
  113 = 22 s
  114 = 24 s
  115 = 25 s
  116 = 26 s
  117 = 27 s
  118 = 29 s
  119 = 30 s
  120 = 32 s
  121 = 34 s
  122 = 35 s
  123 = 37 s
  124 = 39 s
  125 = 41 s
  126 = 43 s
  127 = 45 s
```

Synth Amp Env Decay

Offset in file: 0xA6 (b2-0) and 0xA7 (b7-4)

```
0/127 value = 3.0 ms / 45 s (Sustain)
  0 = 3.0 ms
  1 = 3.5 ms
  2 = 4.0 ms
  3 = 4.6 ms
  4 = 5.3 ms
  5 = 6.0 ms
  6 = 6.9 ms
  7 = 7.9 ms
  8 = 9.0 ms
  9 = 10 ms
  10 = 12 ms
  11 = 13 ms
  12 = 15 ms
  13 = 17 ms
  14 = 19 ms
  15 = 21 ms
  16 = 23 ms
  17 = 26 ms
  18 = 29 ms
  19 = 33 ms
  20 = 36 ms
  21 = 41 ms
  22 = 45 ms
  23 = 50 ms
  24 = 55 ms
  25 = 61 ms
  26 = 68 ms
  27 = 75 ms
  28 = 82 ms
  29 = 91 ms
  30 = 100 ms
  31 = 110 ms
  32 = 120 ms
  33 = 132 ms
  34 = 144 ms
  35 = 158 ms
  36 = 173 ms
  37 = 188 ms
  38 = 206 ms
```

```
39 = 224 ms
40 = 244 ms
41 = 265 ms
42 = 288 ms
43 = 313 ms
44 = 340 ms
45 = 368 ms
46 = 399 ms
47 = 432 ms
48 = 467 ms
49 = 505 ms
50 = 545 ms
51 = 588 ms
52 = 634 ms
53 = 683 ms
54 = 736 ms
55 = 792 ms
56 = 851 ms
57 = 915 ms
58 = 983 ms
59 = 1.05 s
60 = 1.13 s
61 = 1.21 s
62 = 1.30 s
63 = 1.39 s
64 = 1.49 s
65 = 1.59 s
66 = 1.70 s
67 = 1.82 s
68 = 1.94 s
69 = 2.07 s
70 = 2.21 s
71 = 2.36 s
72 = 2.51 s
73 = 2.67 s
74 = 2.85 s
75 = 3.03 s
76 = 3.22 s
77 = 3.42 s
78 = 3.64 s
79 = 3.86 s
80 = 4.10 s
81 = 4.35 s
82 = 4.61 s
83 = 4.89 s
84 = 5.18 s
85 = 5.49 s
86 = 5.81 s
87 = 6.15 s
88 = 6.50 s
89 = 6.88 s
90 = 7.27 s
91 = 7.68 s
92 = 8.11 s
93 = 8.57 s
94 = 9.04 s
95 = 9.54 s
96 = 10 s
97 = 11 s
98 = 11 s
99 = 12 s
```

```
  100 = 12 s
  101 = 13 s
  102 = 14 s
  103 = 14 s
  104 = 15 s
  105 = 16 s
  106 = 17 s
  107 = 18 s
  108 = 19 s
  109 = 20 s
  110 = 20 s
  111 = 22 s
  112 = 23 s
  113 = 24 s
  114 = 25 s
  115 = 26 s
  116 = 27 s
  117 = 29 s
  118 = 30 s
  119 = 31 s
  120 = 33 s
  121 = 34 s
  122 = 36 s
  123 = 38 s
  124 = 39 s
  125 = 41 s
  126 = 43 s
  127 = 45 s
```

Synth Amp Env Release

Offset in file: 0xA7 (b3-0) and 0xA8 (b7-5)

```
0/127 value = 3.0 ms / 45 s
  0 = 3.0 ms
  1 = 3.5 ms
  2 = 4.0 ms
  3 = 4.6 ms
  4 = 5.3 ms
  5 = 6.0 ms
  6 = 6.9 ms
  7 = 7.9 ms
  8 = 9.0 ms
  9 = 10 ms
  10 = 12 ms
  11 = 13 ms
  12 = 15 ms
  13 = 17 ms
  14 = 19 ms
  15 = 21 ms
  16 = 23 ms
  17 = 26 ms
  18 = 29 ms
  19 = 33 ms
  20 = 36 ms
  21 = 41 ms
  22 = 45 ms
  23 = 50 ms
  24 = 55 ms
  25 = 61 ms
  26 = 68 ms
```

```
27 = 75 ms
28 = 82 ms
29 = 91 ms
30 = 100 ms
31 = 110 ms
32 = 120 ms
33 = 132 ms
34 = 144 ms
35 = 158 ms
36 = 173 ms
37 = 188 ms
38 = 206 ms
39 = 224 ms
40 = 244 ms
41 = 265 ms
42 = 288 ms
43 = 313 ms
44 = 340 ms
45 = 368 ms
46 = 399 ms
47 = 432 ms
48 = 467 ms
49 = 505 ms
50 = 545 ms
51 = 588 ms
52 = 634 ms
53 = 683 ms
54 = 736 ms
55 = 792 ms
56 = 851 ms
57 = 915 ms
58 = 983 ms
59 = 1.05 s
60 = 1.13 s
61 = 1.21 s
62 = 1.30 s
63 = 1.39 s
64 = 1.49 s
65 = 1.59 s
66 = 1.70 s
67 = 1.82 s
68 = 1.94 s
69 = 2.07 s
70 = 2.21 s
71 = 2.36 s
72 = 2.51 s
73 = 2.67 s
74 = 2.85 s
75 = 3.03 s
76 = 3.22 s
77 = 3.42 s
78 = 3.64 s
79 = 3.86 s
80 = 4.10 s
81 = 4.35 s
82 = 4.61 s
83 = 4.89 s
84 = 5.18 s
85 = 5.49 s
86 = 5.81 s
87 = 6.15 s
```

```
88 = 6.50 s
89 = 6.88 s
90 = 7.27 s
91 = 7.68 s
92 = 8.11 s
93 = 8.57 s
94 = 9.04 s
95 = 9.54 s
96 = 10 s
97 = 11 s
98 = 11 s
99 = 12 s
100 = 12 s
101 = 13 s
102 = 14 s
103 = 14 s
104 = 15 s
105 = 16 s
106 = 17 s
107 = 18 s
108 = 19 s
109 = 20 s
110 = 20 s
111 = 22 s
112 = 23 s
113 = 24 s
114 = 25 s
115 = 26 s
116 = 27 s
117 = 29 s
118 = 30 s
119 = 31 s
120 = 33 s
121 = 34 s
122 = 36 s
123 = 38 s
124 = 39 s
125 = 41 s
126 = 43 s
127 = 45 s
```

Synth Amp Env Velocity

Offset in file: 0xA8 (b4-3)

```
0 = Off
1 = 1
2 = 2
3 = 3
```

Synth Lfo Wave

Offset in file: 0x86 (b2-0)

```
0 = Triangle
1 = Saw
2 = Neg Saw
3 = Square
4 = S/H
```

Synth Lfo Rate

Offset in file: 0x87 (b6-0)

See: Organ Volume for detailed Morph explanation.

```
0/127 value = 0.03 Hz / 523 Hz
  0 = 0.03 Hz
  1 = 0.03 Hz
  2 = 0.03 Hz
  3 = 0.04 Hz
  4 = 0.04 Hz
  5 = 0.04 Hz
  6 = 0.05 Hz
  7 = 0.05 Hz
  8 = 0.05 Hz
  9 = 0.06 Hz
  10 = 0.06 Hz
  11 = 0.07 Hz
  12 = 0.07 Hz
  13 = 0.08 Hz
  14 = 0.09 Hz
  15 = 0.09 Hz
  16 = 0.10 Hz
  17 = 0.11 Hz
  18 = 0.12 Hz
  19 = 0.13 Hz
  20 = 0.14 Hz
  21 = 0.15 Hz
  22 = 0.16 Hz
  23 = 0.17 Hz
  24 = 0.19 Hz
  25 = 0.20 Hz
  26 = 0.22 Hz
  27 = 0.24 Hz
  28 = 0.26 Hz
  29 = 0.28 Hz
  30 = 0.30 Hz
  31 = 0.32 Hz
  32 = 0.35 Hz
  33 = 0.38 Hz
  34 = 0.41 Hz
  35 = 0.44 Hz
  36 = 0.47 Hz
  37 = 0.51 Hz
  38 = 0.55 Hz
  39 = 0.60 Hz
  40 = 0.64 Hz
  41 = 0.70 Hz
  42 = 0.75 Hz
  43 = 0.81 Hz
  44 = 0.88 Hz
  45 = 0.95 Hz
  46 = 1.0 Hz
  47 = 1.1 Hz
  48 = 1.2 Hz
  49 = 1.3 Hz
  50 = 1.4 Hz
  51 = 1.5 Hz
  52 = 1.6 Hz
  53 = 1.8 Hz
  54 = 1.9 Hz
```

```
55 = 2.0 Hz
56 = 2.2 Hz
57 = 2.4 Hz
58 = 2.6 Hz
59 = 2.8 Hz
60 = 3.0 Hz
61 = 3.2 Hz
62 = 3.5 Hz
63 = 3.8 Hz
64 = 4.1 Hz
65 = 4.4 Hz
66 = 4.8 Hz
67 = 5.2 Hz
68 = 5.6 Hz
69 = 6.0 Hz
70 = 6.5 Hz
71 = 7.0 Hz
72 = 7.6 Hz
73 = 8.2 Hz
74 = 8.8 Hz
75 = 9.5 Hz
76 = 10 Hz
77 = 11 Hz
78 = 12 Hz
79 = 13 Hz
80 = 14 Hz
81 = 15 Hz
82 = 16 Hz
83 = 18 Hz
84 = 19 Hz
85 = 21 Hz
86 = 22 Hz
87 = 24 Hz
88 = 26 Hz
89 = 28 Hz
90 = 30 Hz
91 = 33 Hz
92 = 35 Hz
93 = 38 Hz
94 = 41 Hz
95 = 45 Hz
96 = 48 Hz
97 = 52 Hz
98 = 56 Hz
99 = 61 Hz
100 = 65 Hz
101 = 71 Hz
102 = 76 Hz
103 = 82 Hz
104 = 89 Hz
105 = 96 Hz
106 = 104 Hz
107 = 112 Hz
108 = 121 Hz
109 = 131 Hz
110 = 141 Hz
111 = 153 Hz
112 = 165 Hz
113 = 178 Hz
114 = 192 Hz
115 = 208 Hz
```

```
  116 = 224 Hz
  117 = 242 Hz
  118 = 262 Hz
  119 = 283 Hz
  120 = 305 Hz
  121 = 330 Hz
  122 = 356 Hz
  123 = 385 Hz
  124 = 415 Hz
  125 = 449 Hz
  126 = 484 Hz
  127 = 523 Hz


if LFO Master Clock is On, 0/127 value = 4/1 to 1/64 Master Clock Division
  0 = 4/1
  1 = 4/1
  2 = 4/1
  3 = 4/1
  4 = 4/1
  5 = 4/1
  6 = 4/1
  7 = 4/1
  8 = 4/1T
  9 = 4/1T
  10 = 4/1T
  11 = 4/1T
  12 = 4/1T
  13 = 4/1T
  14 = 4/1T
  15 = 4/1T
  16 = 2/1
  17 = 2/1
  18 = 2/1
  19 = 2/1
  20 = 2/1
  21 = 2/1
  22 = 2/1
  23 = 2/1T
  24 = 2/1T
  25 = 2/1T
  26 = 2/1T
  27 = 2/1T
  28 = 2/1T
  29 = 2/1T
  30 = 2/1T
  31 = 1/1
  32 = 1/1
  33 = 1/1
  34 = 1/1
  35 = 1/1
  36 = 1/1
  37 = 1/1
  38 = 1/1T
  39 = 1/1T
  40 = 1/1T
  41 = 1/1T
  42 = 1/1T
  43 = 1/1T
  44 = 1/1T
  45 = 1/1T
```

```
46 = 1/2
47 = 1/2
48 = 1/2
49 = 1/2
50 = 1/2
51 = 1/2
52 = 1/2
53 = 1/2T
54 = 1/2T
55 = 1/2T
56 = 1/2T
57 = 1/2T
58 = 1/2T
59 = 1/2T
60 = 1/2T
61 = 1/4
62 = 1/4
63 = 1/4
64 = 1/4
65 = 1/4
66 = 1/4
67 = 1/4
68 = 1/4T
69 = 1/4T
70 = 1/4T
71 = 1/4T
72 = 1/4T
73 = 1/4T
74 = 1/4T
75 = 1/4T
76 = 1/8
77 = 1/8
78 = 1/8
79 = 1/8
80 = 1/8
81 = 1/8
82 = 1/8
83 = 1/8T
84 = 1/8T
85 = 1/8T
86 = 1/8T
87 = 1/8T
88 = 1/8T
89 = 1/8T
90 = 1/8T
91 = 1/16
92 = 1/16
93 = 1/16
94 = 1/16
95 = 1/16
96 = 1/16
97 = 1/16
98 = 1/16T
99 = 1/16T
100 = 1/16T
101 = 1/16T
102 = 1/16T
103 = 1/16T
104 = 1/16T
105 = 1/16T
106 = 1/32
```

```
  107 = 1/32
  108 = 1/32
  109 = 1/32
  110 = 1/32
  111 = 1/32
  112 = 1/32
  113 = 1/32T
  114 = 1/32T
  115 = 1/32T
  116 = 1/32T
  117 = 1/32T
  118 = 1/32T
  119 = 1/32T
  120 = 1/32T
  121 = 1/64
  122 = 1/64
  123 = 1/64
  124 = 1/64
  125 = 1/64
  126 = 1/64
  127 = 1/64


Morph Wheel:
0x88 (b7): polarity (1 = positive, 0 = negative)
0x88 (b6-b0): 7-bit raw value

Morph After Touch:
0x89 (b7): polarity (1 = positive, 0 = negative)
0x89 (b6-b0): 7-bit raw value

Morph Control Pedal:
0x8A (b7): polarity (1 = positive, 0 = negative)
0x8A (b6-b0): 7-bit raw value
```

Synth Lfo Master Clock

Offset in file: 0x87 (b7)

```
0 = off, 1 = on
```

Synth Arp On

Offset in file: 0x80 (b6)

```
0 = off, 1 = on
```

Synth Arp Rate

Offset in file: 0x81 (b7-1)

See: Organ Volume for detailed Morph explanation.

```
0/127 value = 16 bpm / Fast 5
  0 = 16 bpm
  1 = 16 bpm
  2 = 18 bpm
  3 = 20 bpm
  4 = 24 bpm
  5 = 26 bpm
  6 = 28 bpm
  7 = 30 bpm
  8 = 34 bpm
```

```
9 = 36 bpm
10 = 38 bpm
11 = 42 bpm
12 = 44 bpm
13 = 46 bpm
14 = 48 bpm
15 = 50 bpm
16 = 54 bpm
17 = 56 bpm
18 = 58 bpm
19 = 60 bpm
20 = 62 bpm
21 = 64 bpm
22 = 66 bpm
23 = 68 bpm
24 = 70 bpm
25 = 72 bpm
26 = 74 bpm
27 = 76 bpm
28 = 78 bpm
29 = 78 bpm
30 = 80 bpm
31 = 82 bpm
32 = 84 bpm
33 = 86 bpm
34 = 86 bpm
35 = 88 bpm
36 = 90 bpm
37 = 92 bpm
38 = 94 bpm
39 = 94 bpm
40 = 96 bpm
41 = 98 bpm
42 = 100 bpm
43 = 100 bpm
44 = 102 bpm
45 = 104 bpm
46 = 106 bpm
47 = 108 bpm
48 = 108 bpm
49 = 110 bpm
50 = 112 bpm
51 = 114 bpm
52 = 116 bpm
53 = 118 bpm
54 = 120 bpm
55 = 122 bpm
56 = 124 bpm
57 = 126 bpm
58 = 128 bpm
59 = 130 bpm
60 = 132 bpm
61 = 134 bpm
62 = 138 bpm
63 = 140 bpm
64 = 142 bpm
65 = 146 bpm
66 = 148 bpm
67 = 152 bpm
68 = 154 bpm
69 = 158 bpm
```

```
  70 = 162 bpm
  71 = 166 bpm
  72 = 170 bpm
  73 = 174 bpm
  74 = 178 bpm
  75 = 182 bpm
  76 = 186 bpm
  77 = 190 bpm
  78 = 196 bpm
  79 = 200 bpm
  80 = 204 bpm
  81 = 210 bpm
  82 = 216 bpm
  83 = 220 bpm
  84 = 226 bpm
  85 = 232 bpm
  86 = 238 bpm
  87 = 244 bpm
  88 = 252 bpm
  89 = 258 bpm
  90 = 266 bpm
  91 = 274 bpm
  92 = 282 bpm
  93 = 290 bpm
  94 = 298 bpm
  95 = 308 bpm
  96 = 318 bpm
  97 = 328 bpm
  98 = 338 bpm
  99 = 350 bpm
  100 = 362 bpm
  101 = 376 bpm
  102 = 392 bpm
  103 = 410 bpm
  104 = 428 bpm
  105 = 450 bpm
  106 = 472 bpm
  107 = 494 bpm
  108 = 520 bpm
  109 = 546 bpm
  110 = 574 bpm
  111 = 602 bpm
  112 = 632 bpm
  113 = 662 bpm
  114 = 696 bpm
  115 = 728 bpm
  116 = 762 bpm
  117 = 798 bpm
  118 = 834 bpm
  119 = 872 bpm
  120 = 910 bpm
  121 = 950 bpm
  122 = 990 bpm
  123 = Fast 1
  124 = Fast 2
  125 = Fast 3
  126 = Fast 4
  127 = Fast 5

if Arpeggiator Master Clock is On, 0/127 value = 1/2 to 1/32 Master Clock Division
```

```
0 = 1/2
1 = 1/2
2 = 1/2
3 = 1/2
4 = 1/2
5 = 1/2
6 = 1/2
7 = 1/2
8 = 1/2
9 = 1/2
10 = 1/2
11 = 1/2
12 = 1/2
13 = 1/2
14 = 1/2
15 = 1/2T
16 = 1/2T
17 = 1/2T
18 = 1/2T
19 = 1/2T
20 = 1/2T
21 = 1/2T
22 = 1/2T
23 = 1/2T
24 = 1/2T
25 = 1/2T
26 = 1/2T
27 = 1/2T
28 = 1/2T
29 = 1/4
30 = 1/4
31 = 1/4
32 = 1/4
33 = 1/4
34 = 1/4
35 = 1/4
36 = 1/4
37 = 1/4
38 = 1/4
39 = 1/4
40 = 1/4
41 = 1/4
42 = 1/4
43 = 1/4T
44 = 1/4T
45 = 1/4T
46 = 1/4T
47 = 1/4T
48 = 1/4T
49 = 1/4T
50 = 1/4T
51 = 1/4T
52 = 1/4T
53 = 1/4T
54 = 1/4T
55 = 1/4T
56 = 1/4T
57 = 1/8
58 = 1/8
59 = 1/8
60 = 1/8
```

```
61 = 1/8
62 = 1/8
63 = 1/8
64 = 1/8
65 = 1/8
66 = 1/8
67 = 1/8
68 = 1/8
69 = 1/8
70 = 1/8
71 = 1/8
72 = 1/8T
73 = 1/8T
74 = 1/8T
75 = 1/8T
76 = 1/8T
77 = 1/8T
78 = 1/8T
79 = 1/8T
80 = 1/8T
81 = 1/8T
82 = 1/8T
83 = 1/8T
84 = 1/8T
85 = 1/8T
86 = 1/16
87 = 1/16
88 = 1/16
89 = 1/16
90 = 1/16
91 = 1/16
92 = 1/16
93 = 1/16
94 = 1/16
95 = 1/16
96 = 1/16
97 = 1/16
98 = 1/16
99 = 1/16
100 = 1/16T
101 = 1/16T
102 = 1/16T
103 = 1/16T
104 = 1/16T
105 = 1/16T
106 = 1/16T
107 = 1/16T
108 = 1/16T
109 = 1/16T
110 = 1/16T
111 = 1/16T
112 = 1/16T
113 = 1/16T
114 = 1/32
115 = 1/32
116 = 1/32
117 = 1/32
118 = 1/32
119 = 1/32
120 = 1/32
121 = 1/32
```

```
  122 = 1/32
  123 = 1/32
  124 = 1/32
  125 = 1/32
  126 = 1/32
  127 = 1/32


Morph Wheel:
0x81 (b0): polarity (1 = positive, 0 = negative)
0x82 (b7-b1): 7-bit raw value

Morph After Touch:
0x82 (b0): polarity (1 = positive, 0 = negative)
0x83 (b7-b1): 7-bit raw value

Morph Control Pedal:
0x83 (b0): polarity (1 = positive, 0 = negative)
0x84 (b7-b1): 7-bit raw value
```

Synth Arp Kb Sync

Offset in file: 0x80 (b5)

```
0 = off, 1 = on
```

Synth Arp Master Clock

Offset in file: 0x80 (b0)

```
0 = off, 1 = on
```

Synth Arp Range

Offset in file: 0x80 (b4-3)

```
0 = 1 Octave
1 = 2 Octaves
2 = 3 Octaves
3 = 4 Octaves
```

Synth Arp Pattern

Offset in file: 0x80 (b2-1)

```
0 = Up
1 = Down
2 = Up/Down
3 = Random
```