

Editing a Matrix-1000 parameter via MIDI

With the V1.20/V1.211 firmware, there are two ways to change a single parameter via MIDI:

- **Via Sysex: Send the sequence**

```
0xF0h (initiate Sysex)
0x10h (Oberheim ID)
0x06h (Matrix ID)
0x06h (Command: Edit parameter)
PARM
VAL
0xF7h (End Sysex)
```

where PARM is the number of the parameter you would like to control, and VAL the value you want to send. Unfortunately, most MIDI controllers are unable to generate Sysex; a few devices like the Behringer BCF-2000, Novation's SLII/SLIII controllers can.

- **Via NRPN: Send the Sequence**

```
0x63h / 99 (NRPN Controller number, MSB)
0x00h
0x63h / 98 (NRPN Controller number, LSB)
PARM
0x06h / 06 (NRPN: Sending controller value, MSB)
VAL
```

NRPN is a special way to use more MIDI CC controllers, and with finer control. Many of the 128 CC numbers in the MIDI standard have predefined meanings, so the Matrix engineers left them alone: **There is no way to control Matrix parameters via direct CC control unless you use the mod matrix.**

NRPN uses the predefined CC controllers 99 and 98 (to send the parameter) and 6 and 38 (to send the value) – you could, in theory, send two-byte controller numbers and values, but in fact only one byte is used; in the Matrix as well as in most controllers. (This means that if your controller gives you an option of „coarse“/“fine“ for NRPN, like Arturia's Beatstep, take the „Coarse“ setting.) So the sequence transmits a two-byte controller number first, always starting with zero, followed by the number of the parameter, and then the value for it.

Please note: All parameters except VCF control use an offset of 64, meaning that, for example, if you assign a full-range controller to resonance, you will have to turn it to more than half to send actual resonance values. This is due to the fact that MIDI wasn't made for negative values but the Matrix has many parameters that can be either positive or negative; without the offset, the values would jump from the end of the positive range to the negative range.

Modulation Matrix control

You have to use Sysex to set a slot in the mod matrix – there is no way to use NRPN here. The sequence is:

```
0xF0h 0x10h 0x06h 0x0Bh SLOT SOURCE VAL DEST 0xF7h
```

where SLOT is the number of the mod matrix slot (0-9), SOURCE and DEST are modulation matrix sources and destinations (see tables 2 and 3), and value is a sign-extended 7-bit modulation amount (e.g. it can be positive or negative).

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#	hex	bits	range	NRPN	Parameter
0	00h	6	0..63	64..127	DC01 Frequency in semitones
1	01h	7(signed)	-63..63	1..127	DC01 Mod by LF01
2	02h	2	0..3	64..67	DC0 Sync mode: 0=NO, 1=SOFT, 2=MEDIUM, 3=HARD SYNC
3	03h	6	0..63	64..127	DC01 PW
4	04h	7(signed)	-63..63	1..127	DC01 PW Mod by LF02
5	05h	6	0..31	64..95	DC01 Waveshape: 0=Sawtooth, 31=Triangle
6	06h	2	0..3	64..67	DC01 Waveform: 0=off, 1=Pulse, 2=Saw, 3=Pulse+Saw
7	07h	2	0..3	64..67	DC01 Fixed Modulations: Bit0=Pitch Bend, Bit1=Vibrato
8	08h	2	0..3	64..67	DC01 Fixed Kbd Mod: Bit0=Portamento, Bit1=Not used
9	09h	1	0..1	64..65	DC01 Click off/on
10	0ah	6	0..63	64-127	DC02 Frequency in semitones
11	0bh	7(signed)	-63..63	1..127	DC02 Mod by LF01
12	0ch	6(signed)	-31..31	33..95	DC02 Detune
13	0dh	6	0..63	64..127	DC02 PW
14	0eh	7(signed)	-63..63	65..127	DC02 PW Mod by LF02
15	0fh	6	0..31	64..95	DC02 Waveshape: 0=Sawtooth, 31=Triangle
16	10h	3	0..7	64..71	DC02 Waveform: Bit0=Pulse, Bit1=Saw, Bit2=Noise
17	11h	2	0..3	64..67	DC02 Fixed Modulations: Bit0=Pitch Bend, Bit1=Vibrato
18	12h	2	0..3	64..67	DC02 Fixed Kbd Mod: Bit0=Portamento, Bit1=Keyboard
19	13h	1	0..1	64..65	DC02 Click off/on
20	14h	6	0..63	64..127	Mix: 0=DC01, 63=DC02
21	15h	7	0..127	0..127	VCF Cutoff Frequency in semitones
22	16h	7(signed)	-63..63	1..127	VCF Env1 Mod
23	17h	7(signed)	-63..63	1..127	VCF Mod by Aftertouch
24	18h	6	0..63	64..127	VCF Resonance
25	19h	2	0..3	64..67	VCF Fixed Modulations: Bit0=Pitch Bend, Bit1=Vibrato
26	1ah	2	0..3	64..67	VCF Fixed Kbd Mod: Bit0=Portamento, Bit1=Track Keyboard
27	1bh	6	0..63	64..127	VCA1 (exponential)
28	1ch	7(signed)	-63..63	65..127	VCA1 Velocity Mod
29	1dh	7(signed)	-63..63	65..127	VCA2 Env2 Mod
30	1eh	6	0..63	64..127	VCF FM
31	1fh	7(signed)	-63..63	1..127	VCF FM Env3 Mod
32	20h	7(signed)	-63..63	1..127	VCF FM Aftertouch Mod
33	21h	5	1..20	65..84	Tracking Generator Input (*)

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#	hex	bits	range	NRPN	Parameter
34	22h	6	0..63	64..127	Tracking Point 1
35	23h	6	0..63	64..127	Tracking Point
36	24h	6	0..63	64..127	Tracking Point
37	25h	6	0..63	64..127	Tracking Point
38	26h	6	0..63	64..127	Tracking Point 5
39	Unused				39 Unused
40	28h	6	0..63	64..127	Ramp1 Speed
41	29h	2	0..2	64..66	Ramp1 Trig Mode: 0=Single, 1=Multi, 2=Ext
42	2ah	6	0..63	64..127	Ramp2 Speed
43	2bh	2	0..2	64..66	Ramp2 Trig Mode: 0=Single, 1=Multi, 2=Ext
44	2ch	6	0..63	64..127	Portamento
45	2dh	7(signed)	-63..63	1..127	Portamento Velocity Mod
46	2eh	2	0..3	64..67	Portamento Mode: 0=Constant Speed, 1=Constant Time, 2=Exponential
47	2fh	1	0..1	64..65	Portamento Legato off/on
48	30h	2	0..3	64..67	Voice assign: 0=Reassign, 1=Rotate, 2=Unison, 3=Rob
49	Unused				49 Unused
50	32h	6	0..63	64..127	Env1 (Filter Env) Delay
51	33h	6	0..63	64..127	Env1 (Filter Env)
52	34h	6	0..63	64..127	Env1 (Filter Env)
53	35h	6	0..63	64..127	Env1 (Filter Env)
54	36h	6	0..63	64..127	Env1 (Filter Env)
55	37h	6	0..63	64..127	Env1 (Filter Env) Amplitude
56	38h	7(signed)	-63..63	1..127	Env1 (Filter Env) Amp Velocity Mod
57	39h	2	0..3	64..67	Env1 Trigger Mode: 0=off, 1=Reset, 2=Multi, 3=both
58	3ah	2	0..3	64..67	Env1 Mode: 0=normal, 1=DADR, 2=Freerun, 3=both
59	3bh	2	0..3	64..67	Env1 Trigger Mode: 0=off, 1=Gated, 2=LF0 Trig, 3=Both
60	3ch	6	0..63	64..127	Env2 (Amp Env) Delay
61	3dh	6	0..63	64..127	Env2 (Amp Env) Attack
62	3eh	6	0..63	64..127	Env2 (Amp Env) Sustain
63	3fh	6	0..63	64..127	Env2 (Amp Env) Decay
64	40h	6	0..63	64..127	Env2 (Amp Env) Release
65	41h	6	0..63	64..127	Env2 (Amp Env) Amplitude
66	42h	7(signed)	-63..63	1..127	Env2 (Amp Env) Amp Velocity Mod
67	43h	2	0..3	64..67	Env2 (Amp Env) Trigger Mode: 0=off, 1=Reset, 2=Multi Trigger, 3=both
68	44h	2	0..3	64..67	Env2 (Amp Env) Mode: 0=normal, 1=DADR

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#	hex	bits	range	NRPN	Parameter
					Mode, 2=Freerun, 3=both
69	45h	2	0..3	64..67	Env2 (Amp Env) LFO Trigger Mode: 0=off, 1=Gated, 2=LFO Trig, 3=Both
70	46h	6	0..63	64..127	Env3 (FM/Aux) Delay
71	45h	6	0..63	64..127	Env3 (FM/Aux) Attack
72	48h	6	0..63	64..127	Env3 (FM/Aux) Decay
73	49h	6	0..63	64..127	Env3 (FM/Aux) Sustain
74	4ah	6	0..63	64..127	Env3 (FM/Aux) Release
75	4bh	6	0..63	64..127	Env3 (FM/Aux) Amplitude
76	4ch	7(signed)	-63..63	1..127	Env3 (FM/Aux) Amp Velocity Mod
77	4dh	2	0..3	64..67	Env3 Trigger Mode: 0=off, 1=Reset, 2=Multi Trigger, 3=both
78	4eh	2	0..3	64..67	Env3 LFO Mode: 0=normal, 1=DADR Mode, 2=Freerun, 3=both
79	4fh	2	0..3	64..67	Env3 Trigger Mode: 0=off, 1=Gated, 2=LFO Trig, 3=Both
80	50h	6	0..63	64..127	LF01 Speed
81	51h	7(signed)	-63..63	1..127	LF01 Aftertouch Mod
82	52h	3	0..7	64..71	LF01 Wave: 0=Tri, 1=Saw Up, 2=Saw Dn, 3=Sqr, 4=Random, 5=Noise,
83	53h	5	0..31	64..95	LF01 Retrigger point
84	54h	6	0..63	64..127	LF01 Amplitude
85	55h	7(signed)	-63..63	1..127	LF01 Amplitude Ramp1 Mod
86	56h	2	0..2	64..66	LF01 Trigger: 0=freerun, 1=Single Trigger, 2=Multi Trigger
87	57h	1	0..1	64..65	LF01 Lag off/on
88	58h	5	1..20	65..84	LF01 S&H Sample Source (*)
90	5ah	6	0..63	64..127	LF02 Speed
91	5bh	7(signed)	-63..63	1..127	LF02 Kbd Mod
92	5ch	3	0..7	64..71	LF02 Wave: 0=Tri, 1=Saw Up, 2=Saw Dn, 3=Sqr, 4=Random, 5=Noise,
93	5dh	5	0..31	64..95	LF02 Retrigger point
94	5eh	6	0..63	64..127	LF02 Amplitude
95	5fh	7(signed)	-63..63	1..127	LF02 Amplitude Ramp2 Mod
96	60h	2	0..2	64..66	LF02 Trigger: 0=freerun, 1=Single Trigger, 2=Multi Trigger
97	61h	1	0..1	64..65	LF0 2 Lag off/on
98	62h	5	1..20	65..84	LF02 S&H Source (*)

Table 2: Modulation Sources

#	(HEX)	Modulation Source
0		UNUSED
1	0x01	Env1
2	0x02	Env2
3	0x03	Env3
4	0x04	LF01
5	0x05	LF02
6	0x06	Vibrato
7	0x07	Ramp1
8	0x08	Ramp2
9	0x09	Kbd
10	0x0A	Portamento speed
11	0x0B	Tracking Generator
12	0x0C	Keyboard Gate
13	0x0D	Velocity
14	0x0E	Release Velocity
15	0x0F	Aftertouch
16	0x10	Switch1 (default: Sustain, CC#64)
17	0x11	Switch2 (default: Sostenuto, CC#65)
18	0x12	Pitch Wheel
19	0x13	Mod Wheel
20	0x14	Lever3 (default: Breath, CC#02)

Table 3: Modulation Targets

#	(HEX)	Modulation Target
0	0x00	Unused Modulation
1	0x01	1 = DCO 1 Frequency
2	0x02	2 = DCO 1 Pulse Width
3	0x03	3 = DCO 1 Waveshape
4	0x04	4 = DCO 2 Frequency
5	0x05	5 = DCO 2 Pulse Width
6	0x06	6 = DCO 2 Waveshape
7	0x07	7 = Mix Level
8	0x08	8 = VCF FM Amount
9	0x09	9 = VCF Frequency
0	0x0A	1 0 = VCF Resonance
11	0x0B	1 1 = VCA 1 Level
12	0x0C	1 2 = VCA 2 Level
13	0x0D	1 3 = Envelope 1 Delay

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14	0x0E	1 4 = Envelope 1 Attack
15	0x0F	1 5 = Envelope 1 Decay
16	0x10	1 6 = Envelope 1 Release
17	0x11	1 7 = Envelope 1 Amplitude
18	0x12	1 8 = Envelope 2 Delay
19	0x13	1 9 = Envelope 2 Attack
20	0x14	20 = Envelope 2 Decay
21	0x15	21 = Envelope 2 Release
22	0x16	22 = Envelope 2 Amplitude
23	0x17	23 = Envelope 3 Delay
24	0x18	24 = Envelope 3 Attack
25	0x19	25 = Envelope 3 Decay
26	0x1A	26 = Envelope 3 Release
27	0x1B	27 = Envelope 3 Amplitude
28	0x1C	28 = LFO 1 Speed
29	0x1D	29 = LFO 1 Amplitude
30	0x1E	30 = LFO 2 Speed
31	0x1F	31 = LFO 2 Amplitude
32	0x20	32 = Portamento Time