Profiler MIDI Parameter Documentation

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Introduction

This document reflects the state of the Profiler firmware version 4.2.1 or higher.

The Kemper Profiler features more than 800 parameters. Of course, you can't address them all with a standard MIDI controller message, where only 128 parameters can be reached.

Therefore, the Kemper Profiler supports the NRPN (Non-Registered Parameter Numbers) protocol additionally to the proprietary SYSEX protocol.

Though, there are also MIDI commands at the standard controller range for commonly used functionality.

MIDI Commands

The Kemper Profiler supports several simple MIDI commands that can be sent from 3rd-Party MIDI-Devices that control effects of the current Rig and performance mode.

CC	Value	Remarks
16	Any	Toggles all Stomps between On and Off setting. Select Type "Empty" to disable a slot completely.
17	Any	Toggles Stomp A between On and Off setting.
18	Any	Toggles Stomp B between On and Off setting.
19	Any	Toggles Stomp C between On and Off setting.
20	Any	Toggles Stomp D between On and Off setting.
22	Any	Toggles Stomp X between On and Off setting.
24	Any	Toggles Stomp MOD between On and Off setting.
26	Any	Toggles Stomp DELAY between On and Off setting.
27	Any	Toggles Stomp DELAY between On and Off setting with tail.
28	Any	Toggles Reverb between On and Off setting.
29	Any	Toggles Reverb between On and Off setting with tail.
30	1/0	Sets Tempo Tap If your floorboard supports separate events on "pressing" and "releasing" a button, send 1 when "pressed" and 0 when "released". If the floorboard can only send one event, use value 0. When value 1 has been sent and no value 0 for 3 seconds, the Beat Scanner[1] is being activated.
31	1/0	1: Show Tuner 0: Hide Tuner
33	0/1	0: Rotary Speaker slow 1: Rotary Speaker fast
34[2]	0/1	0: Delay Feedback Infinity off 1: Delay Feedback infinity on
35[3]	0/1	0: Delay Hold off 1: Delay Hold on
47	[0,124]	**(Performance Mode only)** Preselected performance index[4]. Can be set directly or scrolled via CC48/CC49. The performance will be loaded when a slot selection is

[1] Available in firmware 2.3.0 or later

[2] Available in firmware 3.3.0 or later

[3] Available in firmware 3.3.0 or later

[4] Available in firmware 2.3.0 or later

		being sent (CC50-54). If no slot is selected, the “preselection mode” is being disabled after a few seconds. If the “preselection mode” is disabled, the active performance number will be sent plus a Slot message (CC50-54)
48	1/0	**Performance Mode** Increases performance index. Value triggers two different modes: • Value 0, increase performance n to n+1 • Value 1 initially increases performance by 1, after a timeout the Kemper Profiler starts to scroll performances upwards. Value 0 stops scrolling. **Browse Mode** Value 0 selects the next Rig (current filter/sort applies), similar to “Rig Right”
49	1/0	**Performance Mode** Decrease performance index. Value triggers two different modes: • Value 0, increase performance n to n-1 • Value 1 initially decreases performance index by 1, after a timeout the Kemper Profiler starts to scroll performances downwards. Value 0 stops scrolling. **Browse Mode** Value 0 selects the previous Rig (current filter/sort applies), similar to “Rig Left”
50	1	**Performance Mode** Select Slot 1 of current performance. **Browse Mode** Select 1st out of current 5 rigs in list
51	1	**Performance Mode** Select Slot 2 of current performance. **Browse Mode** Select 2nd out of current 5 rigs in list
52	1	**Performance Mode** Select Slot 3 of current performance. **Browse Mode** Select 3rd out of current 5 rigs in list
53	1	**Performance Mode** Select Slot 4 of current performance. **Browse Mode only** Select 4th out of current 5 rigs in list
54	1	**Performance Mode** Select Slot 5 of current performance. **Browse Mode** Select 5th out of current 5 rigs in list
68	x	Sets Delay Mix to x
69	x	Sets Delay Feedback to x
70	x	Sets Reverb Mix to x
71	x	Sets Reverb Time to x
72	x	Sets Amplifier Gain to x
73	X	Sets Global Monitor Output Volume

Table 1: MIDI commands

Responses

With firmware 2.3.0, the profiler, if in performance mode, will send back the current performance number via CC47 and the appropriate slot selection. Example:

Floorboard (or another Client)	Kemper Profiler
B0 2F 03	*Shows preselected performance 4*
B0 31 00	*Shows preselected performance 5*
	B0 2F 04
B0 35 01	*Selects and loads Performance 5, Slot 3*
	B0 35 01

Table 2: Example communication for performance mode Preselection

NRPN Definition

NRPN supports 128 x 128 different parameters (which rounds up to an impressive total of 16384 parameters.) NRPN also supports a parameter resolution of 16384 values (14-bit) compared to only 128 values (7-bit) with regular controller messages.

NRPN messages consist of a set of four controllers being sent in a sequence. These four controllers are:

Decimal	Hex	Remark	
99	$63	MSB* of the parameter number ("address page")	
98	$62	LSB* of the parameter number ("address number")	
06	$06	MSB* of the parameter value	
38	$26	LSB* of the parameter value	
*MSB: most significant byte, the upper 7-bit of the 14-bit number *LSB: least significant byte, the lower 7-bit of the 14-bit number			

Table 3: NRPN controller assignments

The MIDI specification requests that a manufacturer decides if the devices understand 7-bit or 14-bit values. All NRPN controllers in the Kemper Profiler are by definition 14-bit value controllers, so you'll need to send both MSB Control Change (or CC) 06 and CC38 in that order to apply a change. The actual value gets set after reception of CC38. The Kemper Profiler keeps the address selection present. So, if a pair of CC98+CC99 has been transmitted, it does not need to be sent again for a further value change on the same parameter.

To support generic, programmable floorboards/controllers that only support 7-bit values, Kemper Profiler Firmware version 2.0.0 introduces CC119 ($77) to send a simple 7-bit value change instead of CC06 and CC38 combo. In this case, the values are mapped internally to the correspondent 14-bit value (e.g. value 127 is internally 16383, 64 is internally 8192).

Examples

"Reverb/Mix" is at NRPN #9603, so MSB ("address page") is 75 ($4B) and LSB ("address number") is 3 ($03).

To send a 14-bit high resolution value to 8192:

```
$B0 $63 $4B
$B0 $62 $03
$B0 $06 $40
$B0 $26 $00
```

So, why $40 and $00? Because 8192 is $2000 and:

a) ($2000 SHR 7) AND $7F = $40 The upper 7 of 14 bits.
b) ($2000 AND $7F) = $00; The lower 7 of 14 bits.

To send a 7-bit low resolution value (64 = $40), so the parameter is actually set at 8192*:

```
$B0 $63 $4B
$B0 $62 $03
$B0 $77 $40
```

* Supported in Firmware 2.0.0 or later

$B0 is the MIDI start byte for controllers at MIDI channel 1. You may use “running status” transmissions.

The Kemper Profiler will listen to the MIDI channel that is set as the “MIDI Global Channel” in the “System Menu”. The standard setting is “OMNI”, saying it responds to every channel[5].

MIDI Channel vs. Instance

The global MIDI reception channel can be set up on the “MIDI Settings” page in the SYSTEM menu. Note, that the MIDI Channel and the instance mentioned in the SYSEX definition are not the same. The instance in the Profiler is always 0, since it has only one part (“mono timbral”). Assuming the global MIDI channel is set to 5, NRPN controller messages are only received on MIDI channel 5, but processed in instance 0.

Parameter Types

There are two types of parameters in the Kemper Profiler and their properties:

Continuous Parameters (e.g. Gain, Volume,)

- Are fractional numbers and will always cover the whole value range.
- Will be smoothed upon reception of multiple continuous values. Thus, high resolution (14-bit) values are not necessary for a smooth parameter movement, only for accurate target values.

Switch or Section Parameters (e.g. Type, On/Off Switches)

- Are integer numbers and will start counting from the least significant bit.
- Values out of range will activate the highest value in the range, but should not be used due to future compatibility
- Switches are "Off" at the value 0 (zero) and "On" at value 1 (one).
- If a 14-bit value is being used to set a controller to “On”,
  then the MSB byte is $00, the LSB byte is $01

Parameter List

Rig (Address Page 4)

0 Rig Tempo
1 Rig Volume
2 Rig Tempo Enable

Input (Address Page 9)

3 Noise Gate Intensity
4 Input Clean Sense
5 Input Distortion Sense

[5] When set to OMNI, make sure the floorboard only sends on one channel. Some floorboards send 16 program changes (one to each channel) which causes 16 real rig switches then which might lag the Kemper Profiler a bit.

Amplifier (Address Page 10)

2 On/Off
4 Gain
6 Definition
7 Clarity
8 Power Sagging
9 Pick
10 Compressor
11 Tube Shape
12 Tube Bias
15 Direct Mix

Equalizer (Address Page 11)

2 On/Off
4 Bass
5 Middle
6 Treble
7 Presence

Cabinet (Address Page 12)

2 On/Off
3 Volume
4 High Shift
5 Low Shift
6 Character
7 Pure Cabinet (Rig)

Stomp A (Address Page 50)

0 Type
3 On/Off
4 Mix
6 Volume
7 Stereo

8 Wah Manual
9 Wah Peak
10 Wah Range
12 Wah Pedal Mode
13 Wah Touch Attack
14 Wah Touch Release
15 Wah Touch Boost

16 Distortion/Shaper Drive
17 Distortion/Booster Tone

18 Compressor/Gate Intensity
19 Compressor Attack

20 Modulation Rate
21 Modulation Depth
22 Modulation Feedback
23 Modulation Crossover
24 Modulation HyperChorus Amount
25 Modulation Manual
26 Modulation Phaser Peak Spread
27 Modulation Phaser Stages

30 Rotary Speed (Slow/Fast)
31 Rotary Distance
32 Rotary Balance

33 Compressor Squash

34 Graphic EQ Band 1
35 Graphic EQ Band 2
36 Graphic EQ Band 3
37 Graphic EQ Band 4
38 Graphic EQ Band 5
39 Graphic EQ Band 6
40 Graphic EQ Band 7
41 Graphic EQ Band 8

42 Parametric EQ Low Gain
43 Parametric EQ Low Frequency
44 Parametric EQ High Gain
45 Parametric EQ High Frequency
46 Parametric EQ Peak Gain
47 Parametric EQ Peak Frequency
48 Parametric EQ Peak Q-Factor
49 Parametric EQ Peak Gain 2
50 Parametric EQ Peak Frequency 2
51 Parametric EQ Peak Q-Factor 2

52 Wah Peak Range
53 Ducking

55 Voice Mix
56 Voice 1 Pitch
57 Voice 2 Pitch
58 Detune

60 Smooth Chords
61 Pure Tuning

64 Key

65 Freeze Formants
66 Formant Offset
67 Low Cut
68 High Cut
69 Delay Mix

70 Delay Mix Pre/Post
71 Delay Time 1
72 Delay Time 2
73 Delay Ratio 2
74 Delay Ratio 3
75 Delay Ratio 4
76 Delay Note Value 1
77 Delay Note Value 2
78 Delay Note Value 3
79 Delay Note Value 4
80 To Tempo
81 Delay Volume 1
82 Delay Volume 2
83 Delay Volume 3
84 Delay Volume 4
85 Delay Panorama 1
86 Delay Panorama 2
87 Delay Panorama 3
88 Delay Panorama 4
89 Voice3 Pitch
90 Voice4 Pitch
91 Voice3 Interval
92 Voice4 Interval
93 Feedback
94 Infinity Feedback
95 Infinity
96 Feedback2
97 Feedback Sync Switch
98 Delay Low Cut
99 Delay High Cut
100 Delay Filter Intensity
101 Delay Modulation
102 Delay Chorus
103 Flutter Intensity
104 Flutter Shape
105 Grit
106 Reverse Mix
107 Swell
108 Smear
109 Ducking Pre/Post

Stomp B (Address Page 51)

Same parameters and Address Numbers as Stomp A

Stomp C (Address Page 52)

Same parameters and Address Numbers as Stomp A

Stomp D (Address Page 53)

Same parameters and Address Numbers as Stomp A

Stomp X (Address Page 56)

Same parameters and Address Numbers as Stomp A

Stomp MOD (Address Page 58)

Same parameters and Address Numbers as Stomp A

Stomp DELAY (Address Page 60)

~~Delay (Address Page 74~~)

With 4.0.0, Delays are part of the stomp types. Addressing them will result in no action.

0 Type
2 On/Off (cuts tail)
3 Mix
4 Volume
5 Time
6 Ratio
7 Clock Left
8 Clock Right
9 Feedback
10 Bandwidth
11 Center Frequency
12 Modulation
13 On/off (keeps tail)
14 Ducking

Reverb (Address Page 75)

0 Type
2 On/off (cuts tail)
3 Mix
4 Volume
5 Del/Rev Balance
6 Time
7 Damping
8 Bandwidth
9 Center Frequency
10 Pre-delay
11 On/off (keeps tail)
12 Ducking

System / Global (Address Page 125)

107 Stomp A Hold
108 Stomp B Hold
109 Stomp C Hold
110 Stomp D Hold
111 Stomp X Hold
113 Stomp MOD Hold
114 Stomp DLY Hold

System / Global (Address Page 127)

0 Main Output Volume
1 Headphone Output Volume
2 Monitor Output Volume
3 Direct Output Volume

11 S/PDIF Input Enable

12 Main Output EQ Bass
13 Main Output EQ Middle
14 Main Output EQ Treble
15 Main Output EQ Presence

17 Monitor Output EQ Bass
18 Monitor Output EQ Middle
19 Monitor Output EQ Treble
20 Monitor Output EQ Presence

52 Looper Volume
53 Looper Location

SYSEX Definition

General Message Layout

The Kemper Profiler can also be addressed via MIDI SYSEX. A Kemper Profiler SYSEX message comprises of the following parts:

$F0	$00 $20 $33	$02	$7F	Message	$F7
SYX	Access/Kemper Manufacturer ID	Product Type $02 = Kemper Profiler	Device ID $7F = OMNI (See System page)	The actual message	EOX

Table 4: structure of a Kemper Profiler SYSEX message

The message itself starts with a function code plus additional bytes depending on the given function code.

Function Code	**Functionality**
$01	Single Parameter Change
$02	Multi Parameter Change
$03	String Parameter
$04	BLOB
$05	*reserved*
$06	Extended Parameter Change
$07	Extended String Parameter Change
$41	Request Single Parameter Value
$42	Request Multi Parameter Values
$43	Request String Parameter
$47	Request Extended String Parameter
$7C	Request Parameter Value as Rendered String
$7E	*reserved*
$7F	*reserved*

Table 5: function codes for Kemper Profiler SYSEX messages

Single Parameter Change

The “message” part for a single parameter change for parameter with 14bit NRPN address:

Function Code	Instance	Controller MSB	Controller LSB	Value MSB	Value LSB
The function code for a single parameter change is $01	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.	The upper 7-bit of the 14-bit value.	The lower 7-bit of the 14-bit value.

Table 6: message part for single parameter change

Example: To set the value of Delay Volume to 50% the controller $4a04 (9476) needs to be set to a value of $4000 (8192):

F0	00	20	33	02	7f	01	00	4A	04	40	00	F7

Multi Parameter Change

To change a whole bunch of parameters you can send multiple values for a whole range of parameters by using function code $02 and repeating the value MSB/LSB bytes in a message:

Function Code	Instance	Controller MSB	Controller LSB	Value MSB	Value LSB	Value MSB*	Value LSB*
The function code for a single parameter change is $02	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.	The upper 7-bit of the 14-bit value.	The lower 7-bit of the 14-bit value.	The upper 7-bit of the 14-bit value of the next NRPN address.	The lower 7-bit of the 14-bit value of the next NRPN address.
						Repeat with Value MSB/LSB for more values (up to 64 values)	

Table 7: message part for a multi parameter change

Example: To set the values for all (numeric) Reverb parameters (starting with $4B00) send:

F0	00	20	33	02	7f	02	00	4B	00	00	03	00	01	00	01	4C	04	..	..	F7

String Parameter Change

A number of parameters do present text (“string”) values. These string parameters do have their own batch of controller numbers. They exist in parallel to the numeric parameters. E.g. there is one numeric controller 6400 (“Stomp 1/Type”) and a string controller 6400 which represents the textual name of a preset loaded in Stomp 1.

The string controllers can be encoded using function code $03 and character bytes using ASCII encoding:

Function Code	Instance	Controller MSB	Controller LSB	Characters…	$00
The function code for text value: $03	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address (string controller)	The lower 7-bit of the 14-bit NRPN address.	A 7-bit value representing an ASCII character. Concatenate as much characters being necessary. Use only valid characters (see Appendix A (valid ASCII characters))	A null byte ($00) terminating the string.

Table 8: message part for a string parameter change

Example: To set the string “Hello” as current rig name (string #0001) send:

F0	00	20	33	02	7f	03	00	00	01	48	65	6C	6C	6F	00	F7

BLOB Parameter Change

A number of parameters do present binary objects (“BLOBs”). These BLOB parameters do have their own batch of controller numbers. They exist in parallel to the numeric and string parameters.

The content of a BLOB is per definition “off hands” and should not be altered.

Function Code	Instance	Controller MSB	Controller LSB	Start MSB	Start LSB	Size MSB	Size LSB	Content
The function code for text value: $04	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address (BLOB controller)	The lower 7-bit of the 14-bit NRPN address.	The upper 7-bit of the 14-bit start offset	The lower 7-bit of the 14-bit start offset	The upper 7-bit of the 14-bit size	The lower 7-bit of the 14-bit size	N times a 7-bit value where N is the number given in the size attribute.

Table 9: message part for a BLOB parameter

Currently, only a start offset of 0 (null) is supported. If the content size is not matching the announced size, the message will be ignored.

Extended Parameter/Extended String Parameter Change

The “extended” function codes $06/$07 are equal to the $02/$03 except that the controller number and value are not encoded in 2 but in 5 bytes to allow an address range of 2^{31} and a value range of 2^{32} for numeric controllers. The encoding is Big Endian, additional bits are ignored. The encoding looks like this:

Given a 32-bit value:

Bits 24-31	Bit 16-23	Bit 8-15	Bit 0-7
MSB			LSB

Figure 1: 32 bit values and their bytes

Will be encoded to 5 bytes:

	MSB							LSB
	7	6	5	4	3	2	1	0
Byte 0:	_	_	_	_	7	6	5	4
Byte 1:	_	3	2	1	0	7	6	5
Byte 2:	_	4	3	2	1	0	7	6
Byte 3:	_	5	4	3	2	1	0	7
Byte 4:	_	6	5	4	3	2	1	0

Figure 2: 32 bit numbers encoded to 5 MIDI data bytes

This way, bit 7 (MSB) is kept clear for MIDI transmission.

Request Single Parameter

The function code $41 can be used to request a single numeric value for an NRPN parameter. The requested value is being send back with function code $01.

Function Code	Instance	Controller MSB	Controller LSB
The function code for a single parameter request is $41	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.

Table 10: message part for a single parameter request

Example: Request the value of Delay Volume $4a04 (9476):

F0	00	20	33	02	7f	41	00	4A	04	F7

If a parameter is being request that does not exist, the request is being ignored and nothing is being sent back.

Request Multi Parameter

The function code $42 can be used to request a number of numeric values for an NRPN parameter block. The requested value is being send back with function code $02. You might notice that there is no size attribute defined. The response does cover all parameter of the requested unit. Expect up to 128 values.

Function Code	Instance	Controller MSB	Controller LSB
The function code for a single parameter request is $42	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.

Table 11: message part for a multi parameter request

Example: Request the current values for the Delay effect (starting with controller 9472[6]).

F0	00	20	33	02	7f	42	00	4A	00	F7

In case the controller does not exist or the request does not address the first controller number in a unit, the request is being ignored. No data is being sent back.

[6] The Kemper Profiler only responds to requests that encode the first controller number of a parameter block. Others might be ignored or the result might cover the whole block. You cannot request "snippets" of a unit.

Request String Parameter

The function code $43 can be used to request a textual value for a string parameter. The requested text value is being send back with function code $03.

Function Code	Instance	Controller MSB	Controller LSB
The function code for a single parameter request is $43	Addresses the instance of the parameter. The Kemper Profiler only supports one instance which is always 0.	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.

Table 12: message part for a string parameter request

Example: Request the current values for the current Rig name:

F0	00	20	33	02	7f	43	00	00	01	F7

Request Extended String Parameter

The function code $47 can be used to request a textual value for a string parameter. The requested text value is being send back with function code $07 or $03[7]. The controller number is being encoded with 5 bytes (instead of 2). Encoding can be found on Page 15.

Request Parameter Value as Rendered String

Function code $7C is a bit special, it allows to retrieve the string representation for a specific value of a parameter. *Caution: This function can be expensive regarding CPU time.*

Function Code	Flags	Controller MSB	Controller LSB	Value MSB	Value LSB
The function code $7C	*reserved*	The upper 7-bit of the 14-bit NRPN address.	The lower 7-bit of the 14-bit NRPN address.	The upper 7-bit of the 14-bit value.	The lower 7-bit of the 14-bit value.

Table 13: message part for a string render request

Example: To request the character string for a value of 8192 for Delay Volume, send:

F0	00	20	33	02	7F	7C	00	4A	04	40	00	F7

The response will look like this:

F0	00	20	33	02	7F	3C	00	4A	04	40	00	3C	30	2E	30	3E	00	F7
												<	0	.	0	>		

Function code of the response is $3C, after the flags, the controller MSB/LSB and value MSB/LSB the actual string is being available, terminated by a zero-byte. In this case, the rendered string is “<0.0>”.

[7] If the encoded controller number is lower than 16384 (the range of 14-bit) the response might use function code $03.

Appendix A (valid ASCII characters)

Valid characters for strings parameters (“tags”). For rig and author names no space shall be followed by another space.

Character	ASCII Code
A-Z	$41-$5A
a-z	$61-$7A
0-9	$30-$39
!	$21
$	$24
&	$26
‘	$27
(SPACE)	$20

Character	ASCII Code
(	$28
)	$29
*	$2A
+	$2B
-	$2D
.	$2E
/	$2F

Character	ASCII Code
\	$5C
=	$3D
:	$3A
;	$3B
_	$5F
#	$23
?	$3F

Table 14: ASCII characters allowed in tags