ULTRACURVE PRO DEQ2496

MIDI SysEx Implementation

ENGLISH

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BEHRINGER DEQ2496 MIDI Implementation for V 1.4

Function	Transmitted	Received	Remarks
Midi Channel	1-16	1-16	
Mode	No	No	
Note Number	No	No	
Velocity	No	No	
After Touch	No	No	
Pitch Bender	No	No	
Control Change (NRPN)			NRPN mode
6	Yes	Yes	Data Entry MSB (module nr)
38	Yes	Yes	Data Entry LSB (offset)
96	Yes	Yes	Data Increment
97	Yes	Yes	Data Decrement
98	Yes	Yes	Non Registered Parameter LSB
99	Yes	Yes	Non Registered Parameter MSB
Control Change (DIRECT)			DIRECT mode
1-31	Yes (Range: 0-60)	Yes (Range: 0-60)	GEQ Left (20Hz…20kHz)
33-63	Yes (Range: 0-60)	Yes (Range: 0-60)	GEQ Right (20Hz…20kHz)
Program Change	Yes (Range: 0-64)	Yes (Range: 0-64)	Presets (1-64) and Initial Data (0)
System Exclusive	Yes	Yes	see SysEx Documentation
System Common	No	No	
System Real Time	No	No	
Running Status	Yes (2s Timeout)	Yes	

General BEHRINGER SysEx Format:

0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, Commands & Data, ..., 0xF7

(0xaa denotes a hexadecimal value)

The BEHRINGER **CompanyID** is **0x00, 0x20, 0x32**.
The **DeviceID** acts like a MIDI channel number but allows the use of up to 127 identical Devices. The **DeviceID 0x7F** (127 decimal) is used as a broadcast ID (i.e. every device accepts this DeviceID).
The **ModelID** is used to identify the product. E.g. the DEQ2496 **ModelID** is **0x12** (18 decimal). Again the **ModelID 0x7F** will be accepted by every BEHRINGER product. **ModelID 0x00** is used to expand the ModelID to two or more bytes.

Commands & Data:

0x01: identify device

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x01, 0xF7**
Response: **0xF0, 0x00, 0x20, 0x32, 0x00, 0x12, 0x02, asciidata*, 0xF7**
asciidata*: n ascii characters identifying the product and software version

0x20: write (single) preset or temporary edit buffer

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x20, presetnr, len MSB, len LSB, data*, 0xF7**
presetnr: number of preset (1-64) to write or temporary edit buffer (0)
len MSB: size of data* (high 7 bits)
len LSB: size of data* (low 7 bits)
data*: single preset data block
Comment: Write preset is only accepted if preset isn't protected

0x21: write module presets

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x21, presetnr, modnr, len, data*, 0xF7**
presetnr: number of preset (1-64) to write
modnr: number of module (0-7)
len: size of data*
data*: module preset data block
Comment: Write module preset is only accepted if preset isn't protected or empty

0x22: write single value (see table)

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x22, modnr, lrmode, offset, len, data*, 0xF7**
modnr: number of module (0-12)
lrmode: channel mode: dual mono or stereo (0,1)
offset: offset to first value
len: size of data* (1 or 2)
data*: value

0x24: set MIDI channel

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x24, MidiCh, 0xF7**
MidiCh: MIDI channel (0-15)

0x34/0x35: transfer flash data block

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x34, blockdata[259+37], 0xF7**
blockdata: 7/8 coded: **blockno_h**, **blockno_l**, **crc**, **data[256]**.
crc: crc8 checksum of **blockno_h, blockno_l, data[256]**
blockno: transferred 256 byte data block number (bits 21..15, 14..8 of flash offset); blocks 0-0x1f: boot loader; blocks 0x20..0x5ef: application; blocks 0x5f0-0x5ff: startup screen; blocks 0x600-0x67f: presets; blocks 0x680-0x69f: temporary buffers; blocks 0x6a0-0x7ff: hw configuration; block no 0xff00 shows text message data[0..52] on screen
data: data block

Response: **0xF0, 0x00, 0x20, 0x32, 0x00, 0x12, 0x35, blockno_h**, **blockno_l**, **status, 0xF7**
blockno: transferred 256 byte data block number (bits 21..15, 14..8 of flash offset)
status: 0: flash write executed ok, 1: missing sub block, 2: flash erase failed, 3: flash write failed

Comment: Response is sent only after receiving sub block 15.

0x60: request single preset or temporary edit buffer

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x60, presetnr, 0xF7**
presetnr: number of requested preset (1-64) or temporary edit buffer (0)

Response: command 0x20

0x61: request module preset

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x61, presetnr, modnr, 0xF7**
presetnr: number of requested preset (1-64)
modnr: number of module (0-7)

Response: command 0x21

0x76: request screen dump

Format: **0xF0, 0x00, 0x20, 0x32, DeviceID, ModelID, 0x76, 0xF7**

Response: **0xF0, 0x00, 0x20, 0x32, 0x00, 0x12, 0x36, screendata[80*46], 0xF7**

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modnr / NRPN MSB	lrmode	offset / NRPN LSB	len	data	value	remarks
GEQ						
0	0	0	1	0,1	left, right	channel (DUAL MONO)
0	0,1	1	1	0,1	uncorrected, TRUE RESP.	GEQ mode
0	0,1	2	1	0…30	20Hz … 20000Hz(+1/3 Oct.)	frequency
0	0,1	3…33	1	0…60	+15…-15 dB (-0.5 dB)	gain left
0	0,1	34…64	1	0…60	+15…-15 dB (-0.5 dB)	gain right
0	0,1	65	1	0…60	+15…-15 dB (-0.5 dB)	gain offset left
0	0,1	66	1	0…60	+15…-15 dB (-0.5 dB)	gain offset right
0	0,1	67	1		sw release no	e.g. 13 for V 1.3
0		68	1	no	spare	for future use!
PEQ						
1	0,1	0	1	1,2	page1…page2	page
1	0	1	1	0,1	left, right	channel (DUAL MONO)
1	0,1	2	1	0…19	left #1… #10, right #1…#10	PEQ number
1	0,1	3…12	1	0…30	1/60…10Oct.,L6,L12,H6,H12,LC,HC	bandwidth left
1	0,1	13…22	1	0…30	1/60…10Oct.,L6,L12,H6,H12,LC,HC	bandwidth right
1	0,1	23…41 (+2)	2	0…600	20Hz … 20000Hz(+1/60 Oct.)	frequency left
1	0,1	43…61 (+2)	2	0…600	20Hz … 20000Hz(+1/60 Oct.)	frequency right
1	0,1	63…72	1	0…105	+15…-60 dB (-0.5/-1 dB)	gain left
1	0,1	73…82	1	0…105	+15…-60 dB (-0.5/-1 dB)	gain right
1	0,1	83…92	1	0…4	OFF, PARAM, AUTO, SNGL, LOCK	filter mode left
1	0,1	93…102	1	0…4	OFF, PARAM, AUTO, SNGL, LOCK	filter mode right
1		103..106	1	no	spare	for future use!
DEQ						
2	0,1	0	1	1…3	page1…page3	page
2	0	1	1	0,1	left, right	channel (DUAL MONO)
2	0,1	2	1	0…5	left #1… #3, right #1…#3	DEQ number
2	0,1	3…5	1	0…60	+15…-15 dB (+0.5 dB)	m-gain left
2	0,1	6…8	1	0…60	+15…-15 dB (+0.5 dB)	m-gain right
2	0,1	9…11	1	0…60	0 …-60 dB (-1 dB)	threshold left
2	0,1	12…14	1	0…60	0 …-60 dB (-1 dB)	threshold right
2	0,1	15…17	1	0…10	1:2.0…1:100	ratio left
2	0,1	18…20	1	0…10	1:2.0…1:100	ratio right
2	0,1	21…25 (+2)	2	0…200	0…200 msec. (log.)	attack time left
2	0,1	27…31 (+2)	2	0…200	0…200 msec. (log.)	attack time right
2	0,1	33…37 (+2)	2	0…255	20…4000 msec. (log.)	release time left
2	0,1	39…43 (+2)	2	0…255	20…4000 msec. (log.)	release time right
2	0,1	45…47	1	0…4	L6, L12, H6, H12, BP	filter mode left
2	0,1	48…50	1	0…4	L6, L12, H6, H12, BP	filter mode right
2	0,1	51…55 (+2)	2	0…600	20Hz … 20000Hz(+1/60 Oct.)	frequency left
2	0,1	57…61 (+2)	2	0…600	20Hz … 20000Hz(+1/60 Oct.)	frequency right
2	0,1	63…65	1	0…19	1/60…10 Oct.	bandwidth left
2	0,1	66…68	1	0…19	1/60…10 Oct.	bandwidth right
2		69…72	1	no	spare	for future use!
WIDTH						
3	0,1	0	1	1,2	page1…page2	page
3	0,1	2	2	0…180	-90°…+90° (+1°)	asymmetry
3	0,1	4	1	0…30	0.0…3.0 (+0.1)	stereowidth
3	0,1	5	1	0…90	-45°…+45° (+1°)	rotation
3	0,1	6	1	24…36	-3.0…+3.0 dB (+0.5 dB)	basstrim
3	0,1	7	1	0…105	350…1400 Hz (+10 Hz)	frequency
3	0,1	8	1	10…30	1.0…3.0 (+0.1)	shuffle

3		9…12	1	no	spare	for future use!
DYN						
4	0,1	0	1	1…3	page1…page3	page
4	0	1	1	0,1	left, right	channel (DUAL MONO)
4	0	2	1	0,1	left, right	channel
4	0,1	3	1	0,1	EXPA., COMP.	mode left
4	0,1	4	1	0,1	EXPA., COMP.	mode right
4	0,1	5	1	0…60	+15…-15 dB (-0.5 dB)	m-gain left
4	0,1	6	1	0…60	+15…-15 dB (-0.5 dB)	m-gain right
4	0,1	7	1	0…60	0 …-60 dB (-1 dB)	threshold left
4	0,1	8	1	0…60	0 …-60 dB (-1 dB)	threshold right
4	0,1	9	1	0…15	1:1.1…1:100	ratio left
4	0,1	10	1	0…15	1:1.1…1:100	ratio right
4	0,1	11	2	0…200	0…200 msec. (log.)	attack time left
4	0,1	13	2	0…200	0…200 msec. (log.)	attack time right
4	0,1	15	2	0…255	20…4000 msec. (log.)	release time left
4	0,1	17	2	0…255	20…4000 msec. (log.)	release time right
4	0,1	19	1	0…30	0 …30 dB (+1 dB)	delta knee left (COMP.)
4	0,1	20	1	0…30	0 …30 dB (+1 dB)	delta knee right (COMP.)
4	0,1	21	2	0…200	0…1000 msec. (log.)	limiter hold time left
4	0,1	23	2	0…200	0…1000 msec. (log.)	limiter hold time right
4	0,1	25	2	0…240	0 …-24 dB (-0.1 dB)	limiter threshold left
4	0,1	27	2	0…240	0 …-24 dB (-0.1 dB)	limiter threshold right
4	0,1	29	2	0…255	20…4000 msec. (log.)	limiter release time left
4	0,1	31	2	0…255	20…4000 msec. (log.)	limiter release time right
4		32..35	1	no	spare	for future use!
I/O						
5	0,1	0	1	1…4	page1…page4	page
5	0,1	1	1	0…3	MAIN IN… DIG. IN XLR	I/O1 INPUT
5	0,1	2	1	0…3	INPUT… BEHIND WIDTH	I/O2 AUX/DIG. OUT
5	0,1	3	1	0…3	INPUT… RTA/MIC	I/O3 RTA INPUT
5	0,1	4	1	0…6	44.1 kHz…OPTIN	clock (samplerate)
5	0,1	5	1	0…60	+15dB…-15dB (-0.5 dB)	gain offset (EQ)
5	0,1	6	1	0,1	S/PDIF, AES3 (AES/EBU)	digital protocol
5	0,1	7	1	0,1	OFF,ON	noiseshaper
5	0,1	8	1	0…3	OFF, 24 bit, 20 bit, 16bit	dither mode
5	0,1	9	1	0,1	MAIN, AUX	delay path
5	0,1	10	1	0…2	MSEC, FEET, METER	delay unit
5	0,1	11	2	0...15000	0..300 ms / 103.08m / 338.2ft	delay left
5	0,1	13	2	0...15000	0..300 ms / 103.08m / 338.2ft	delay right
5	0,1	15	2	0…400	0°C/32°F…40°C/104°F(+0.1°C)	temperature (c0=343.6m/s)
5	0,1	17	1	60…0	-60…0 dB	noise gain
5		18..21	1	No	spare	for future use!
FBD						
6	0,1	0	1	1…3	page1…page3	page
6	0,1	1	1	0…19	left #1… #10, right #1…#10	FBD number
6	0,1	2	1	63…105	-18…-60 db (+1 dB)	max. depth
6	0,1	3	1	30…90	-3.0…-9.0 dB (-0.1 dB)	sensitivity
6	0,1	4	1	30…85	0 …-40 dB (-1/-0.5 dB)	threshold
6	0,1	5	1	0,1	OFF, ON	active left
6	0,1	6	1	0,1	OFF, ON	active right
6		7…10	1	No	spare	for future use!

The following values are global variables:

modnr / NRPN MSB	lrmode	offset / NRPN LSB	len	data	value	remarks
BYP						
7	0,1	0	1	0…5	GEQ…LIMIT	module
7	0,1	1…6	1	0,1	BYPASS LEFT OFF, ON	bypass module left
7	0,1	7…12	1	0,1	BYPASS RIGHT OFF, ON	bypass module right
7		13..16	1	no	spare	for future use!
7	0,1	17	1	0,1	RELAY LEFT OFF, ON	bypass relay left
7	0,1	18	1	0,1	RELAY RIGHT OFF, ON	bypass relay right
UTIL						
8	0,1	0	1	1…2	page1…page2	page
8	0,1	1	1	0…15	dark…bright	contrast
8	0,1	2	1	0,1	MESSAGEBOX OFF, ON	show messagebox
8	0,1	3	1	0,1	MIDI OFF, ON	midi
8	0,1	4	1	0…15	CHANNEL 1…16	midi channel
8	0,1	5	1	0,1	MIDI OFF, ON	midi send control change
8	0,1	6	1	0,1	MIDI OFF, ON	midi send program change
8	0,1	7	1	0,1	MIDI OFF, ON	midi send system exclusive
8	0,1	8	1	0,1	MIDI OFF, ON	midi receive control change
8	0,1	9	1	0,1	MIDI OFF, ON	midi receive program change
8	0,1	10	1	0,1	MIDI OFF, ON	midi receive sysex
8	0,1	11	1	0;1	DIRECT, NRPN	midi control change mode
RTA						
9	0,1	0	1	1…3	page1…page3	page
9	0,1	1	1	0…2	left, right, left+right	RTA channel
9	0,1	2	1	0…12	0…-60 dB (-5 dB)	upper level (MAX.)
9	0,1	3	1	0…12	0…-60 dB (-5 dB)	upper level for RTA/MIC
9	0,1	4	1	0…3	15, 30, 60, 90 dB	range
9	0,1	5	1	0…60	20Hz … 20000Hz(+1/6 Oct.)	frequency
9	0,1	6	1	0,1	OFF, ON	noisecorrection
9	0,1	7	1	0,1	LINE level, MIC level	INPUT sensitivity
9	0,1	8	1	0,1	OFF, ON	auto level
9	0,1	9	1	0…3	FAST, MID, SLOW, AVRG	rate
9	0,1	10	1	0…4	OFF,FAST,MID,SLOW,HOLD	peak
9	0,1	11	1	0…72	-14.0…+22.0 dBu(+0.5 dB)	LINE sensitivity
9	0,1	12	1	0…72	-42.0…-6.0 dBV/Pa(+0.5 dB)	MIC sensitivity
9	0,1	13	1	0,1	OFF, ON	RTA-MIC, phantom power
9	0,1	127	1	0,1	OFF, ON	send rta values over MIDI
MEM						
11	0,1	0	1	1…2	page1…page2	page
11	0,1	1	1	0…2	left, right, stereo	source for new channel mode
11	0,1	2	1	0…64	INITIAL DATA…preset 64	preset number
11	0,1	3	1	0…5	GEQ,PEQ,DEQ,WIDTH,DYN,IO	module
11	0,1	4	1	0,1	OFF, ON	compare module
11	0,1	5	1	0,1	OFF, ON	compare all
11	0,1	6	1	0…2	COPY, ADD, SUB	GEQ recall mode
METER						
12	0,1	0	1	1…3	page1…page3	page
12	0,1	1	1	0…2	INPUT, OUTPUT, DIGOUT	source
12	0,1	2	1	0…2	OFF, dB(A), dB(C)	SPL weight
(OTHERS)						
12	0,1	127	1	0,1	OFF, ON	send meter values over MIDI
2(DEQ)	0,1	127	1	0,1	OFF, ON	send deq level values

4(DYN)	0,1	127	1	0,1	OFF, ON	send dyn level values
5(IO)	0,1	127	1	0,1	OFF, ON	send samplerate over MIDI
MENU						
127	0,1	0	1	0…12	GEQ…METER	select menu (module)