

SYSEX COMMANDS FOR BEHRINGER ULTRA CURVE PRO DSP 8024

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Note:

The information below I obtained by dumping the communication between DSP8024 and my computer. Discovering one by one, and figuring out how they work. Some at bit level.

As you know, Behringer original manual does not have any information about SYSEX, and BEHRINGER support does not provide this information too.

All commands work fine, but some are missing. The most important for me that are missing: the reset of HOLD Curve of RTA, and, switch between LEFT and RIGHT on EQ display.

The reset of RTA can easily be simulated by switching the input to MICRO and then back to L+R. If no Microphone, it zeroes the Hold. Switching the Decay Time also resets the Hold curve.

Others missing commands that should be very useful are switch to the LEVEL METER and to FEED BACK DESTROYER (or Parametric EQ). They probably it will never work because, unfortunately, inside these screens, the SYSEX receive is disable, so nothing change when you send SYSEX commands, and you can't send a command to return to the EQ main screen also. Only changing the Operating System can make it possible (it means write and change EPPROMs, etc.).

Special thank's for Florian Bömers (www.bome.com) for the tool SendSX.

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SEND DATA

GENERAL OPTIONS

Analyze IN/OUT 02h

(IN = BYPASS)

xx = 00h IN

xx = 01h OUT

F0 00 20 32 00 0E 02 xx F7

Switch Equalizer/RTA 08h

xx = 00h Equalizer

xx= 01h RTA

F0 00 20 32 00 0E 08 xx F7

EQUALIZER OPTIONS

Graphic Equalizer

Frequency level 10h

sr = 00h to 1Eh for left channel/frequency

sr = 20h to 3Eh for right channel/frequency

sr will be 00h = 20 Hz, 01h = 25Hz 1Eh = 10 kHz for left channel

sr will be 20h = 20 Hz, 21h = 25Hz 3Eh = 10 kHz for right channel

xx = 0 to 64 - level

sr will be 00h = 20 Hz, 01h = 25Hz 1Eh = 10 kHz for left channel

sr will be 20h = 20 Hz, 21h = 25Hz 3Eh = 10 kHz for right channel

F0 00 20 32 00 0E 10 sr xx F7

Master Volume 11h

s = channel, 0 = Left, 2 = Right

xx = 0 to 64 (-16 to + 16 dB, inc .05)

F0 00 20 32 00 0E 11 s0 xx F7

EQ Limiter Threshold 12h

xx = 0 OFF

xx = 1 to 37 dB

F0 00 20 32 00 0E 12 xx F7

EQ Limiter Release 14h

xx = 0 to 18, each means inc of .5 seconds

F0 00 20 32 00 0E 14 xx F7

EQ Noise Gate 15h (Both channels)

xx = 0 OFF

xx = 1 to 47 (-96 dB to -44 dB)

F0 00 20 32 00 0E 15 xx F7

Delay 19h

xx = 0 OFF

xx = 1 ON

F0 00 20 32 00 0E 19 xx F7

DELAY time/distance 1Ah

s = channel, 0 = Left, 2 = Right

3 bytes counter, zz less significant

F0 00 20 32 00 0E 1A s0 xx yy zz F7

Parametric Equalizer (PE)

PE Mode 1Eh

s = channel, 0 = Left, 2 = Right

b = 0 - 1st band
b = 1 - 2nd band
b = 2 - 3rd band

xx = 0 OFF
xx = 1 PAR
xx = 2 AUT
xx = 3 SGL

F0 00 20 32 00 0E 1E sb xx F7

PE Frequency 1Fh

s = channel, 0 = Left, 2 = Right

b = 0 - 1st band
b = 1 - 2nd band
b = 2 - 3rd band

yy = 00 - 20 to 87 Hz
yy = 01 - 88Hz to 378.75Hz
yy = 02 - 383.00 Hz to 1.66 kHz
yy = 03 - 1.68 kHz to 7.235 kHz
yy = 04 - 7.32 kHz to 20 kHz (here xx max = 58H)

xx = 0 to 127 (not that the real variation is not linear)

F0 00 20 32 00 0E 1F sb yy xx F7

PE Octave 20h

s = channel, 0 = Left, 2 = Right

b = 0 - 1st band
b = 1 - 2nd band
b = 2 - 3rd band

xx = 0 to 120 (1/60 to 120/60)

F0 00 20 32 00 0E 20 sb xx F7

PE GAIN 21h

s = channel, 0 = Left, 2 = Right

b = 0 - 1st band
b = 1 - 2nd band
b = 2 - 3rd band

xx = 0 to 127 (- 48 to + 16 dB, inc .5)

F0 00 20 32 00 0E 21 sb 00 xx F7

Cross fade time 23h (Both channels)

xx = 0 to 15 (sec)

F0 00 20 32 00 0E 23 xx F7

Shelving Slope 24h

xx = 0 to 10 (each = 3dB/Oct)

F0 00 20 32 00 0E 24 xx F7

RTA OPTIONS

RTA Sampling 25h

xx = 2 - Analog 44.1 kHz
xx = 3 - Analog 48.0 kHz

F0 00 20 32 00 0E 25 xx F7

RTA INPUT 28h

xx = 0 MICRO
xx = 1 Left
xx = 2 Right
xx = 3 Left + Right

F0 00 20 32 00 0E 28 xx F7

RTA Hold 29h

xx = 0 OFF
xx = 1 ON

F0 00 20 32 00 0E 29 xx F7

RTA Resolution 2Ah

xx = 0 - 1 dB/pix
xx = 1 - 0.5 dB/pix

F0 00 20 32 00 0E 2A xx F7

RTA Auto Gain 2Bh

xx = 0 OFF (Manual)
xx = 1 ON

F0 00 20 32 00 0E 2B xx F7

RTA LINE Gain 2Ch

xx = 0 to 16 (0 to 60 dB, inc de 4 dB)

F0 00 20 32 00 0E 2C xx F7
*

RTA MIC Gain 2Dh

xx = 0 to 16 (0 to 60 dB, inc de 4 dB)

F0 00 20 32 00 0E 2D xx F7

RTA MIC Correction 2Eh

yy xx, two byte counter 0 to 200, 100 options for each channel.

F0 00 20 32 00 0E 2E yy xx F7

RTA MODE 2Fh

xx = 0 RMS

xx = 1 Peak

F0 00 20 32 00 0E 2F xx F7

RTA DECAY 30h

xx = 0 - 15 ms

xx = 1 - 65 ms

xx = 2 - 250 ms

xx = 3 - 1.0 s

F0 00 20 32 00 0E 30 xx F7

RTA Q-Curve 31h

xx = 0 Flat

xx = 1 to 100 - 100 curves

F0 00 20 32 00 0E 31 xx F7

RTA OUTPUT 32h

xx = 0 OFF

xx = 1 Input

xx = 2 Sine

xx = 3 White

xx = 4 Pink

F0 00 20 32 00 0E 32 xx F7

RTA Sine Frequency 33h

yy xx, two byte counter

F0 00 20 32 00 0E 33 yy xx F7

RTA Level of noise generator 34h

xx = 0 to 48

F0 00 20 32 00 0E 34 xx F7

MEMORY OPTIONS

Write to a EQ memory slot 46h mmh

This function writes into a memory slot of the EQ all its settings. It is composed by a header that have the memory slot number, followed for all settings. At the end it have the name you give as a remark for this slot.

F0 00 20 32 00 0E 46 mm - header, where mm is the slot number (0 to 63h)

then

2 times Delay Time (one for each channel)
62 times Frequency Level
2 times Master Volume
6 times PE Mode
6 times PE Frequency
6 times PE Octave
6 times PE GAIN

and then the name or remark for the slot 3Ch

3C aa aa aa aa aa aa aa aa aa aa aa

where aa will be the index of the following table:

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
ÇüéääââçêëèïïÄÅ
È==ôòòùùÿÖÛ=====

Obs: The first char and after ~ there is a space char. Where you see =, is because I can't generate that char.

then

F7 finish the string

Ex: it should be something like this:

F0 00 20 32 00 0E 46 02 1A 00 00 00 03 1A 20 00 00 00 10 00 2B 10 01 2D 10 02 20 10 03 20 10 04 20 10
05 20 10 06 20 10 07 20 10 08 20 10 09 20 10 0A 20 10 0B 20 10 0C 20 10 0D 20 10 0E 20 10 0F 20 10 10
20 10 11 20 10 12 20 10 13 20 10 14 20 10 15 20 10 16 20 10 17 20 10 18 20 10 19 20 10 1A 20 10 1B 20
10 1C 20 10 1D 20 10 1E 20 10 20 20 10 21 20 10 22 20 10 23 20 10 24 20 10 25 20 10 26 20 10 27 20 10
28 20 10 29 20 10 2A 20 10 2B 20 10 2C 20 10 2D 20 10 2E 20 10 2F 20 10 30 20 10 31 20 10 32 20 10 33
20 10 34 20 10 35 20 10 36 20 10 37 20 10 38 20 10 39 20 10 3A 20 10 3B 20 10 3C 20 10 3D 20 10 3E 20
11 00 20 11 20 20 1E 00 01 1E 01 01 1E 02 01 1E 20 01 1E 21 01 1E 22 01 1F 00 01 48 1F 01 03 18 1F 02
04 10 1F 20 01 48 1F 21 03 18 1F 22 04 01 20 00 14 20 01 14 20 02 14 20 20 14 20 21 14 20 22 14 21 00
00 60 21 01 00 60 21 02 00 60 21 20 00 60 21 21 00 60 21 22 00 5E 3C 21 24 32 33 54 55 44 49 4F 00 00
00 F7

Write EQ and RTA working or temp memory 46h 7Fh

This function works the same way as the above, but include a few more parameters.

F0 00 20 32 00 0E 46 7F - header

then

Limiter Threshold
Limiter Release
Noise Level
2 times Delay Time (one for each channel)
62 times Frequency Level
2 times Master Volume

then the following block repeat 6 times:
(note that here is different from writing into a slot)

PE Mode
PE Frequency
PE Octave
PE Gain

then

RTA Input
RTA Resolution
RTA Hold status
RTA Auto Gain Status
RTA Mode Peak/RMS
RTA Line Gain
RTA Mic Gain
RTA Mic Correction
RTA Decay
RTA Q-Curve
RTA OUTPUT
RTA Sine Frequency
RTA Level of noise generator
EQ Crossfade time
EQ Shelving Slope

and then a name or remark. It use to be the most recent slot loaded.

3C aa aa aa aa aa aa aa aa aa aa aa aa

then F7 finish the string

It should be something like this:

F0 00 20 32 00 0E 12 25 14 00 15 14 1A 00 00 00 03 1A 20 00 00 00 10 00 24 10 01 20 10 02 20 10 03 20
10 04 20 10 05 20 10 06 20 10 07 20 10 08 20 10 09 20 10 0A 20 10 0B 20 10 0C 20 10 0D 20 10 0E 20 10
0F 20 10 10 20 10 11 20 10 12 20 10 13 20 10 14 20 10 15 20 10 16 20 10 17 20 10 18 20 10 19 20 10 1A
20 10 1B 2D 10 1C 20 10 1D 20 10 1E 20 10 20 20 10 21 20 10 22 20 10 23 20 10 24 20 10 25 20 10 26 20
10 27 20 10 28 20 10 29 20 10 2A 20 10 2B 20 10 2C 20 10 2D 20 10 2E 20 10 2F 20 10 30 20 10 31 20 10
32 20 10 33 20 10 34 20 10 35 20 10 36 20 10 37 20 10 38 20 10 39 20 10 3A 20 10 3B 15 10 3C 20 10 3D
20 10 3E 20 11 00 19 11 20 26 1E 00 01 1F 00 01 48 20 00 14 21 00 00 60 1E 01 01 1F 01 03 18 20 01 14
21 01 00 60 1E 02 01 1F 02 04 10 20 02 14 21 02 00 60 1E 20 01 1F 20 01 48 20 20 14 21 20 00 60 1E 21
01 1F 21 03 18 20 21 14 21 21 00 60 1E 22 01 1F 22 04 01 20 22 14 21 22 00 60 28 03 2A 01 29 01 2B 00

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2F 00 2C 09 2D 0F 2E 00 00 30 02 31 00 32 01 33 01 12 34 00 23 00 24 08 3C 21 24 32 33 54 55 44 49 4F
00 00 00 F7

TIPS:

You can combine two or more commands. The string "F0 00 20 32 00 0E" is the header for sending commands to DSP8024. This way you can send one header followed by the strings of the commands you want to send, and put "F7" to finalize the line.

See examples below:

1. Changing EQ master volumes level of both channels at the same time and synchronized (volume command is "11 s0 xx"):

F0 00 20 32 00 0E 11 00 xx 11 20 xx F7 where xx is the desired level.

2. Put all frequencies at level zero (frequency level string is "10 sr xx") :

"F0 00 20 32 00 0E 10 00 20 10 01 20 10 02 20 10 03 20 10 04 20 10 05 20 10 06 20 10 07 20 10 08 20 10 09 20 10 0A 20 10 0B 20 10 0C 20 10 0D 20 10 0E 20 10 0F 20 10 10 20 10 11 20 10 12 20 10 13 20 10 14 20 10 15 20 10 16 20 10 17 20 10 18 20 10 19 20 10 1A 20 10 1B 20 10 1C 20 10 1D 20 10 1E 20 F7"

Note that you can include the string "11 00 20 11 20 20" just before the "F7" so you can zero the master volume at the same time. Remember that 20h is the middle, means zero dB.

REQUEST DATA

The most simple way to request data from DSP 8024 is just send the header "F0 00 20 32 00 0E" or "F0 00 20 32 7F 0E" followed by "70" and by the parameter number you want to request and close the string with "F7".

Ex: To request the level of Noise Threshold just send:

F0 00 20 32 00 0E 70 15 F7 (or F0 00 20 32 7F 0E 70 15 F7)

you will receive the string:

F0 00 20 32 00 0E 15 xx F7 where xx will be the value of Noise Threshold.

Where you have more than one value for a parameter, follow the rule but add the others variable to the string.

Ex: To request the right master level of the Graphic equalizer send:

F0 00 20 32 00 0E 70 11 20 F7

you will receive the string:

F0 00 20 32 00 0E 11 20 26 F7 when the master right level is set to +3 dB (26)

You can also combine more than one request in only one string, with the following string:

F0 00 20 32 00 0E 70 15 70 11 20 F7

you will receive:

F0 00 20 32 00 0E 15 xx 11 20 yy F7 with the Noise Threshold (xx) and right level (yy).

Real Time reading of the EQ METER 64h

F0 00 20 32 7F 0E 70 64 F7

Obs: Works only while in EQ Mode

Real Time reading of the RTA display 65h (read only)

F0 00 20 32 7F 0E 70 65 F7

It returns something like this:

F0 00 20 32 00 0E 65 01 00 02 03 00 00 00 38 00 0B 00 07 00 00 00 00 00 00 00 22 00 15 00 18 00 00 00
00 00 00 00 30 00 2B 00 1D 00
00 00 00 00 00 00 5D F7

Where:

F0 00 20 32 00 0E 65 : Header

followed by:

Line Gain current setting - 1 byte
Mic Gain current setting - 1 byte
Decay Time current setting - 1 byte

8 bits flags (0 or 1)- Status of current Resolution, Hold, Auto Gain, Analyzer, RTA Frozen, RTA in memory/load menu:

xxMFAGHR

R=Resolution -- 1.0 dB=0, 0.5 dB=1
H=Hold -- Hold OFF=0 , Hold ON=1
G=Auto Gain -- Manual=0, Gain Auto=1
A=Analyzer -- RMS=0, PEAK=1
F=1 when RTA display is frozen (just load from memory or pressed right/left)
M=1 when you are in MEMORY/LOADing (display is frozen, F also 1)

31 pair of bytes for each Frequency and one pair for Master Level that represent the relative position on the display. Note that is not the actual level.

The second byte is the position, it vary from 0 to 7F, and 7F is the middle of the display (vertical). When it is over the middle, the first byte is set to 1, and the second start over from 0.

Finally closed with F7.

Obs: Works only while in RTA Mode

Read EQ Memory slot 46h mmh

mm = 0 to 63 - each slot number

F0 00 20 32 00 0E 70 46 mm F7

Obs: The map of this string is the same for writing.

Read EQ and RTA working memory 46h 7Fh (or temp memory)

F0 00 20 32 00 0E 70 46 7F F7

Obs: The map of this string is the same for writing.

System Version (read only) 01h

F0 00 20 32 7F 0E 70 01 F7