

VoiceLive MIDI System Exclusive Version 1.2

Hexadecimal Notation

Many values in this document are presented in hexadecimal notation. Hexadecimal numbers will be prefixed with "0x".

Example:

Hexadecimal 0x123 = Decimal 291

Decimal 123 = Hexadecimal 0x7B

VoiceLive SYSEX message format:

0xF0	MIDI System exclusive message start
0x00	3 byte manufacturers ID for TC-Helicon
0x01	...
0x38	...
<Device ID>	System exclusive device ID (user parameter)
0x4E	VoiceLive model ID
<Message ID>	VoiceLive message type identifier
<Data>	Start of message data
...	Variable number of data bytes based on message type
0xF7	MIDI System exclusive message terminator

Data Packing (24-bit words to 4x7-bit bytes)

The idea of packing data is to take a 24-bit value (the normal width of parameters in VoiceLive) and represent it as 4 bytes of 7 bits each. This is done because SYSEX data can only be 7 bits in size. The first three bytes hold (in sequence) bits 0-6, 7-13 and 14-20 of the 24-bit value. The fourth byte hold bits 21-23 of the 24-bit value with zeros in the remaining bits.

For example, If the value of a 24-bit parameter is 614 (0x266), it would look like "0x66 0x04 0x00 0x00" in a SYSEX message.

Byte1 0x66 = binary X1100110 (abcdefg)

Byte2 0x04 = binary X0000100 (hijklmn)

Byte3 0x00 = binary X0000000 (opqrstu)

Byte4 0x00 = binary X0000000 (****vwx)

Final 24-Bit Value:

vwxopqrs tuhijklm abcdefg
Total = 00000000 00000010 01100110
= 0x0 0x2 0x66 = 0x000266

Preset numbers

Preset numbers are represented in SYSEX messages as 2 bytes (combined 14 bit value). The first byte is the 7 least significant bits and the second is the 7 most significant bits. Preset numbers are mapped as follows:

Preset number zero references the current operating preset. Presets numbered 1 through 99 (0x63) reference all stored presets. For example, preset number 67 (0x43) would be translated into bytes 0x43 (LSB) and 0x00 (MSB).

Checksum

Checksums are 1 byte holding the 7 least significant bits of the sum of all bytes contributing to the checksum.

Example: If the byte values used in a checksum calculation were the series 1,2,3,...,126 their sum total would be 8001. Dividing 8001 by 128 leaves a remainder of 65 which becomes the checksum byte.

Message data format

The format of data for each of the different SYSEX messages depends on the type of message. Below are descriptions for each message type explaining their specific data formatting requirements.

SYSEX message type	Identifier
Request Preset	0x45 (69)
Request Parameter	0x47 (71)
Request Shift Map	0x51 (81)
Request Song	0x14 (20)
Request Setup	0x15 (21)
Preset Received Notification	0x34 (52)
Preset Data	0x20 (32)
Parameter Data	0x22 (34)
Shift Map Data	0x31 (49)
Song Data	0x12 (18)
Setup Data	0x13 (19)

VoiceLive Data Request messages

Request Preset - 0x45:

<Data> is 2 bytes representing the number of the preset requested. See above for a description of preset number representation. The data transmitted by VoiceLive upon receiving this message will be formatted as a **Preset Data** message.

Request Parameter - 0x47:

<Data> is 2 bytes. The first byte defines the group to which the parameter belongs and the second byte identifies the parameter within the group. See the **Parameter Grouping and Listing** table for a complete list of all groups and parameters. The data transmitted by VoiceLive

upon receiving this message will be formatted as a **Parameter Data** message (see below for complete description).

Request Shift Map - 0x51:

<Data> is 1 byte. The value of this byte is ignored. The data transmitted by VoiceLive upon receiving this message will be formatted as a **Shift Map Data** message.

Request Song Request - 0x14:

<Data> is 1 byte. It specifies the song number (1 is the first song, 0 is the current song). The data transmitted by VoiceLive upon receiving this message will be formatted as a **Song Data** message.

Request Setup Data - 0x15:

<Data> is 1 byte. The value of this byte is ignored. The data transmitted by VoiceLive upon receiving this message will be formatted as a **Setup Data** message.

VoiceLive Data messages

Preset/Song Receive Notification - 0x34:

<Data> is 1 byte. Sometimes VoiceLive needs to reorganize its internal preset bank after receiving a SYSEX preset. While this is happening, VoiceLive has to ignore incoming preset SYSEX packages. If this happens while you are dumping several presets to the unit, you might lose a preset in transmission without realizing it. This situation can be avoided by waiting for VoiceLive to send this message indicating that the preset was successfully stored before attempting to send the next.

Alternatively, if you plan to dump several or all 99 presets to the unit and do not have the ability to wait for this message between sends, simply clear the user preset bank (restore all factory presets) before initiating the batch send. Doing so will save VoiceLive from having to reorganize midstream, allowing for all 99 presets to be dumped successfully.

Preset Data - 0x20:

Note: VoiceLive is capable of importing VoiceWorks presets automatically. Note that VoiceLive presets are not backward compatible with VoiceWorks.

<Data> is 396 bytes organized as follows (in sequence):

2 bytes	Preset number (see above)
12 bytes	Preset name (as ASCII characters)
1 byte	Number of notes in custom scale
16 bytes (cs)	* Custom correction scale
64 bytes (cs)	** Custom shift map for each voice
300 bytes(cs)	75x24-bit packed parameter values
1 byte	Checksum

Note: The checksum is calculated only on the data marked with **(cs)**.

*** Custom Correction Scale:**

A correction scale is represented internally as 12 x 8 bit values packed into 4 x 24 bit words (see the VoiceLive manual for a detailed description).

Example: Major Scale

Chromatic semitones present: 0, 2, 4, 5, 7, 9, 11 (note count = 7)

12 x 8 bit values: 0, 2, 4, 5, 7, 9, 11, 0, 0, 0, 0, 0 (appended with zeros)

At this point an offset of 0x32 is applied to each value for internal purposes. The values are then grouped into 24-bit words.

(0x32, 0x34, 0x36) (0x37, 0x39, 0x3B) (0x43, 0x00, 0x00) (0x00, 0x00, 0x00)

4 x 24 bit words:

word1: 00110010 00110100 00110110 = 0x323436

word2: 00110111 00111001 00111011 = 0x37393B

word3: 10000011 00000000 00000000 = 0x430000

word4: 00000000 00000000 00000000 = 0x000000

Finally, the SYSEX data is created by packing each word into 4 x 7 bit values as described in the **data packing** description. (This system is used so that in the future software updates, it might be possible to specify scales with more than 16 pitch divisions per octave).

**** Custom Shift maps:**

Shift maps are represented internally as 4 sets of 12 values (see the VoiceLive manual for a detailed description). Each value specifies the shift amount for its position in the chromatic scale. For example, a shift map causing an upward major 3rd interval for all chromatic input notes would be 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3. A unison map would be 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0. Shift entries can also be negative for downward shifts.

For the purpose of storing and dumping, the 12 bytes are packed into 4 x 24-bit values each holding 3 bytes. An offset of (0x32) is applied to each value before grouping them into 4 x 24 bit words. The SYSEX data within a preset dump is finally created by packing these 24-bit words into 7 bit bytes using the **data packing** scheme. Since there are 4 voices on the VoiceLive, there are 4 custom shift maps making for 4x16 bytes of SYSEX data.

Parameter data - 0x22:

<Data> is 4 bytes. The first two bytes identify the parameter (group and parameter ID). The last two bytes determine the value of the parameter represented as a 14 bit 2's complement signed value. If a value exceeds the limits of the parameter, the value will be automatically limited.

Example of 14 bit 2's complement calculations:

The value 169 (decimal) = $1 \times 128 + 41$ is represented as bytes 0x01 (MSB) and 0x29 (LSB)

The value -43 ~ 16384-43 (decimal) = $16341 = 127 \times 128 + 85$ is represented as bytes 0x7F (MSB) and 0x55 (LSB)

Example: Voice 1 bypass state (observable on edit page: CFG2)

```
Off - F0 00 01 38 00 4E 22 00 41 00 00 F7
On  - F0 00 01 38 00 4E 22 00 41 00 01 F7
```

F0 = SYSEX start
00 = Byte 1 of 3 byte manufacturer's ID for TC-Helicon
01 = Byte 2 of 3 byte manufacturer's ID for TC-Helicon
38 = Byte 3 of 3 byte manufacturer's ID for TC-Helicon
00 = SYSEX Device ID (default value of 0)
4E = VoiceLive model ID
22 = VoiceLive Message Type Identifier (Parameter Data Identifier)
00 = Parameter Group ID
41 = Parameter ID for Voice #4 bypass state
00 = Data MSB (Most significant bit)
00 = Data LSB (Least significant bit) (0 for voice off, 1 for voice on)
F7 = SYSEX message end

Shift Map Data - 0x31:

(Note: Shift Map data is represented differently than when it is a part of a preset dump)

<Data> is 48 bytes. Each byte represents the shift mapping for the respective note in the chromatic scale. A value of 0 is equivalent to -24 semitones (down two octaves), 1A (26 in decimal) is equivalent to +2 semitones (up two semitones), 30 (48 in decimal) is equivalent to +24 semitones (up two octaves), and 36 (54 in decimal) is equivalent to N/C (no change). Consult the VoiceLive manual for a complete description of the Shift Map user parameter. If any entry in the shift map is beyond the limits, the message will be ignored. (This data differs from the when included in a preset dump because it's not packed the same way and does not have the 0x32 offset applied. It's easier to read and manipulate in this format). There are 4 voices * 12 semitone map values giving 48 total bytes.

Song Data - 0x12:

<Data> is 142 bytes. The first byte specifies the song number (from 0 to 49). The next 16 bytes specify a 16 character song name. The next 120 bytes represent song data. Each step of the song is represented by a 24-bit word that is packed into 4 7-bit bytes as described in the **data packing** section. 30 steps multiplied by 4 bytes per step gives 120 bytes total. Then there is a 24 bit "direct-mode-steps" word that has been packed into four bytes. The final byte is a checksum that is calculated from the 120 bytes of song data.

24 bit Word Step Format

aaaaaaaa.dddd.bbbb.eecccc

a=preset number, b=root, c=type (chord or scale number, see VoiceLive Manual for details), d=mode (scale=0, chord=1, shift=2, notes=3), e=status *

* status: A song starts with the first step and ends with the first step that has 0x0 for its status. All active song steps must have 0x2 for their status, all unused steps must have 0x0 for their status.

24 bit Direct-Mode-Steps Word

aaaaaa.bbbbbb.cccccc.dddddd

a=Direct Mode Step A, b=Direct Mode Step B, c=Direct Mode Step C, d=Direct Mode Step D

Setup Data - 0x13:

<Data> is 197 bytes. All 49 x 24-bit setup parameters are sent packed into 196 7-bit bytes as described in the **data packing** section. A checksum calculated from all 49 parameters makes up the last byte.

Parameter Grouping and Listing

Numbers in this section are shown in decimal notation.

Group name	Group ID
Preset Parameters	0
System Parameters	1

Preset Parameters (Group 0)

Parameter Name	ID	Min	Max
voic level1	0	0	31
voic voicing1	1	0	**
voic gender1	2	-50	50
voic vibsty1	3	0	11
voic vibamt1	4	0	100
voic pan1	5	0	108
voic level2	6	0	31
voic voicing2	7	0	**
voic gender2	8	-50	50
voic vibsty2	9	0	11
voic vibamt2	10	0	100
voic pan2	11	0	108
voic level3	12	0	31
voic voicing3	13	0	**
voic gender3	14	-50	50
voic vibsty3	15	0	11
voic vibamt3	16	0	100
voic pan3	17	0	108
voic level4	18	0	31
voic voicing4	19	0	**
voic gender4	20	-50	50
voic vibsty4	21	0	11
voic vibamt4	22	0	100
voic pan4	23	0	108
harm mode	24	0	3
harm root	25	0	11
harm type	26	0	
harm level	27	0	31
harm smooth	28	0	100
harm lead	29	0	1
harm style	30	0	7
harm sty amt	31	0	10
harm tuning	32	0	2
harm bend	33	0	1
harm porta	34	0	200

harm latch	35	0	1
harm notesatt	36	0	100
harm notesrel	37	0	100
thic level	38	0	31
thic detune	39	0	25
thic spread	40	0	100
effe level	41	0	31
effe revdlymix	42	0	100
effe leadrevsend	43	-20	31
effe harmrevsend	44	-20	31
effe auxrevsend	45	-20	31
effe leaddlysend	46	-20	31
effe harmdlysend	47	-20	31
effe auxdlysend	48	-20	31
effe dly2revsend	49	-20	31
effe revtype	50	0	13
effe revpredlylev	51	0	100
effe revdecaytime	52	0	200
effe revcolorl	53	0	6
effe revcolorh	54	0	6
effe dlytype	55	0	2
effe dlytime	56	0	1800
effe dlytempo	57	-21	1
effe dlyfeedback	58	0	99
effe dlyhfdamp	59	10	23
cor root	60	0	11
cor scale	61	0	5
cor win	62	0	200
cor att	63	0	99
cor amt	64	0	99
voice1 bypass	65	0	1
voice2 bypass	66	0	1
voice3 bypass	67	0	1
voice4 bypass	68	0	1
harm bypass	69	0	1
thic bypass	70	0	1
effe bypass	71	0	1
cor bypass	72	0	1
Xped Library	73	0	16
Ubtn Library	74	0	13

** For Harmony Mode dependant parameter ranges, see the VoiceLive Manual for details.

Setup Parameters (Group 1)

Parameter Name	ID	Min	Max	Notes
leadpan	0	0	108	
lowcut	1	0	3	
dynamics	2	0	3	
compthresh	3	-60	0	
compratio	4	0	13	
gate	5	-71	0	
outrange	6	0	3	
output	7	0	1	
samplerate	8	0	2	
input	9	0	1	
globaleff	10	0	100	
tuning	11	0	80	
midichan	12	0	16	
midifilt	13	0	3	
ccctrl	14	0	1	
globalchord	15	0	1	
keysplit	16	24	127	
keydir	17	0	1	
vibctrl	18	0	1	
notestrans	19	-4	4	
bendrange	20	0	12	
notes4chan	21	0	1	
delaycomp	22	0	1	
bypass_mode	23	0	1	
reserved	24			reserved
reserved	25			reserved
taptempo	26	0	1800	
xped_default	27	0	15	
ubtn_default	28	0	12	
dlead_onoff	29	0	1	
dinst_onoff	30	0	1	
line_level	31	0	24	
eqroute	32	0	3	
lsfreq	33	0	22	
lcboost	34	-13	12	
hsfreq	35	0	22	
hcboost	36	-13	12	
midfreq	37	0	22	
mcboost	38	-12	12	
eq_q	39	0	16	
lead_level	40	0	31	

harm_level	41	0	31	
aux_level	42	0	61	
out_level	43	-100	0	
aux_pan	44	0	108	
reserved	45			reserved
bypass_all	46	0	1	
direct_a	47	1	100	Configures the four direct mode presets
direct_b	48	1	100	" "
direct_c	49	1	100	" "
direct_d	50	1	100	" "
reserved	51			reserved
pedcalib	52	0	1	Expression pedal calibration results
pedmin	53	-512	512	" "
pedmax	54	-525	512	" "