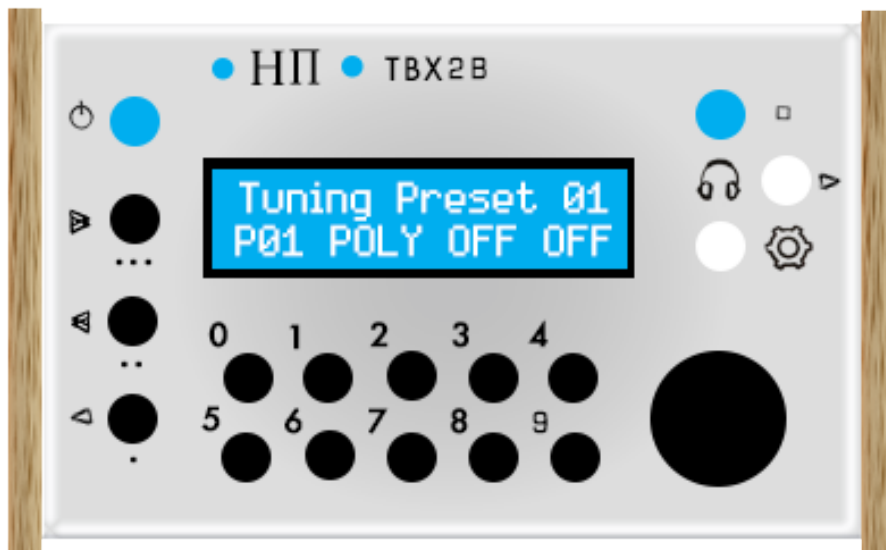


TBX2b

MIDI Reference



Hπ INSTRUMENTS

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Introduction

TBX2b is an advanced MIDI processing device which receives input from a MIDI controller and sends output to a MIDI synthesizer. This document describes what MIDI messages are sent from TBX2b under which conditions, and how the unit responds to incoming (non-sysex) MIDI messages. A detailed description of sysex messages which can be used to program the device is also given. This is a supplemental document. For more information please consult the principal documentation.

1. MIDI Output Behaviour

The output behaviour of TBX2b varies according to the MODE of the currently active preset. In the text below, MIDI OUT refers to both the MIDI DIN OUT port (which is unidirectional) and the USB Host Port (which is bidirectional).

Common Messages

When a preset is selected (regardless of MODE), the following messages are sent to MIDI OUT on (all) the selected output channel(s) assigned to the preset. (POLY presets may have multiple output channels assigned, and all other modes have only one output channel).

1. Bank Select (unless it has been set to OFF for the preset), according to the Global Settings Bank Format selection:

| Global Settings Bank Format options | | | |
|-------------------------------------|------|-----------|-----------|
| CC0 | CC32 | CC0, CC32 | CC32, CC0 |

| Status Name | Hexidecimal | Decimal | Data Byte 1 (Hex., Dec.) | Data Byte 2 (Hex., Dec.) |
|----------------|-------------|------------|-----------------------------------|------------------------------|
| Control Change | hB0 .. hBF | 176 .. 191 | Bank Select (h00 or h20, 0 or 32) | value (h00 .. h7F, 0 .. 127) |

2. Program Change (unless it has been set to OFF for the preset):

| Status Name | Hexidecimal | Decimal | Data Byte (Hex., Dec.) |
|----------------|-------------|------------|------------------------------|
| Program Change | hC0 .. hCF | 192 .. 207 | value (h00 .. h7F, 0 .. 127) |

POLY & MONO Presets

When a POLY or MONO preset is selected, the following messages are sent after the common messages to MIDI OUT to the selected output channel(s) assigned to the preset.

3. Pitch Bend Range setting RPN and Data Entry messages:

| Status Name | Hexidecimal | Decimal | Data Byte 1 (Hex., Dec.) | Data Byte 2 (Hex., Dec.) |
|----------------|-------------|------------|--|-----------------------------|
| Control Change | hB0 .. hBF | 176 .. 191 | Registered Parameter Number (h64, 100) | value (h00, 0) |
| Control Change | hB0 .. hBF | 176 .. 191 | Registered Parameter Number (h63, 99) | value (h00, 0) |
| Control Change | hB0 .. hBF | 176 .. 191 | Data Entry MSB (h06, 6) | value (h01 .. h18, 1 .. 24) |
| Control Change | hB0 .. hBF | 176 .. 191 | Data Entry LSB (h26, 38) | value (h00, 0) |

For POLY presets, microtonal output is sent on multiple MIDI channels according to the selected Output Channels enabled or disabled for the preset by the user. For MONO presets, output is sent on one selected Output Channel. In each case a single microtonal note ON consists of two messages:

| Status Name | Hexidecimal | Decimal | Data Byte 1 (Hex., Dec.) | Data Byte 2 (Hex., Dec.) |
|-------------|-------------|------------|------------------------------------|---------------------------------|
| Pitch Bend | hE0 .. hEF | 224 .. 239 | Bend LSB (h00 .. h7F, 0 .. 127) | Bend MSB (h00 .. h7F, 0 .. 127) |
| Note ON | h90 .. h9F | 144 .. 159 | Note Number (h00 .. h7F, 0 .. 127) | Velocity (h00 .. h7F, 0 .. 127) |

Depending on the Global Parameters Pitch Bend Timing setting, there may optionally be a gap of 5ms or 30ms between the above messages.

Every microtonal note OFF consists of one message:

| Status Name | Hexidecimal | Decimal | Data Byte 1 (Hex., Dec.) | Data Byte 2 (Hex., Dec.) |
|-------------|-------------|------------|------------------------------------|--------------------------|
| Note OFF | h80 .. h8F | 128 .. 143 | Note Number (h00 .. h7F, 0 .. 127) | Velocity (h00, 0) |

MTS Presets

When an MTS preset is selected, the following sysex is sent after the common messages to MIDI OUT on the selected output channel assigned to the preset.

| Description | Hex. | Dec. | Comments |
|--------------|------------|----------|--|
| Sysex Begin | hF0 | 240 | |
| Device ID | h00 .. h7F | 0 .. 127 | This byte is set by the Global Parameter: <i>MTS Device ID</i> |
| sub-ID 1 | h08 | 8 | First ID: MIDI Tuning Standard |
| sub-ID 2 | h01 | 1 | Second ID: Bulk Tuning Dump |
| tt | h00 .. h7F | 0 .. 127 | Tuning Program Number |
| [cc .. cc] | h00 .. h7F | 0 .. 127 | 16 ASCII Bytes, Tuning Name |
| [xx yy zz] | h00 .. h7F | 0 .. 127 | 3 Bytes Frequency Data × 128 notes |
| Checksum | h00 | 0 | Normally this byte is ignored by the destination |
| Sysex End | hF7 | 247 | |

Note ON and Note OFF messages are passed unmodified through the unit to the destination.

USR Presets

When a USR presets is selected, a sysex is sent after the common messages to MIDI OUT on the selected output channel assigned to the preset. The structure of this message changes according to how each USR Data bank is programmed by the user.

| Description | Hex. | Dec. | Comments |
|--------------------|------------|----------|--|
| Sysex Begin | hF0 | 240 | |
| [header bytes] | h08 | 8 | 0 to 32 Bytes assigned by the user |
| [program number] | h01 | 1 | Tuning Program Number |
| [tuning name] | h00 .. h7F | 0 .. 127 | 16 ASCII Bytes, Tuning Name |
| [notes data] | h00 .. h7F | 0 .. 127 | Number of bytes and number of notes varies according to user programming |
| [checksum] | h00 .. h7F | 0 .. 127 | Normally this byte is ignored by the destination |
| sysex end | h00 | 0 | |

Note ON and Note OFF messages are passed unmodified through the unit to the destination.

2. MIDI Input Behaviour

The behaviour of received (non-sysex) MIDI messages varies according to the *MODE* of the currently active preset.

Note ON

POLY, MONO – lookup microtonal note assigned for the input note and output bend and note
MTS, USR – pass note on messages through

Note OFF

POLY, MONO – lookup microtonal note assigned for the input note and turn it off
MTS, USR – pass note off messages through

Realtime Messages

POLY – ignore realtime messages
MONO, MTS, USR – pass realtime messages through

Program Change

POLY – retransmit program changes on all active channels
MONO, MTS, USR – pass program changes through

Control Change

POLY – retransmit CCs on all active channels, or only on the channel received, according to
Global Parameter *CC Retransmission*
MONO, MTS, USR – pass CC through

Pitch Bend

MTS, USR – pass pitch bend through
Pitch Bend - POLY, MONO – received value is combined with current value on active
channel(s) so that notes can smoothly bend up or down from their tuned position.

Polyphonic Aftertouch

POLY, MONO – polyphonic aftertouch is converted to channel aftertouch per active channel(s)
(output data is thinned to avoid MIDI bottleneck)
MTS, USR – pass polyphonic aftertouch through

Channel Aftertouch

POLY, MONO – channel aftertouch is retransmitted on all active channels, or only on the
channel received, according to Global Parameter *CC Retransmission*
MTS, USR – pass channel aftertouch through

3. Sysex Messages

The following MIDI sysex messages can be used to program TBX2b. The astute reader may notice the absence of a *Block 3*. This *Global Parameters* message block was removed by necessity to provide TBX2b with more available memory space for firmware compared to its predecessor, TBX2. All parameters can still be programmed directly at the device.

Common Message Header

Sysex message length varies with message ID. All messages have a common header which is 7 bytes long, where the fifth byte is the message ID:

F0 - SysEx start

00 - First ID

21 - Second ID

7F - Third ID

1F - Device ID

xx - *Message ID*

mm - *Message Options Byte: 0xxxxxxL*

NOTE: Only bit L of the Message Options Byte is currently assigned, as LCD User Feedback (0 = Display User Feedback, 1 = Suppress User Feedback)

Messages are grouped into message Blocks of 16 possible messages each, with undefined message IDs for future use.

Messages are listed in order by Block and ID below.

BLOCK 0: Tuning Table Messages**ID 00: Program Tuning Table Name & All Data**

(7+2+16+384+1 = 410 bytes)

[Header bytes for ID 00]

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

cc - ASCII table name char 1

...

cc - ASCII table name char 16

nn - MIDI note OUT (0..127 / h00..7F) for note in 0

pp - Pitch Bend MSB OUT (0..127 / h00..7F) for note in 0

pp - Pitch Bend LSB OUT (0..127 / h00..7F) for note in 0

...

nn - MIDI note OUT (0..127 / h00..7F) for note in 127

pp - Pitch Bend MSB OUT (0..127 / h00..7F) for note in 127

pp - Pitch Bend LSB OUT (0..127 / h00..7F) for note in 127

[F7 - SysEx end]

A tuning table has 128 notes, numbered 0-127, with default pitch bend MSB and LSB of values 64 and 0. The following is a sysex message for a default tuning table:

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 00 | 00 | 00 | 00 | 54 | 55 | 4E | 49 | 4E | 47 | 20 | 54 | 41 | 42 | 4C | 45 | 30 | 30 | 30 | 30 | 00 | 40 | 00 | 01 | 40 |
| 00 | 02 | 40 | 00 | 03 | 40 | 00 | 04 | 40 | 00 | 05 | 40 | 00 | 06 | 40 | 00 | 07 | 40 | 00 | 08 | 40 | 00 | 09 | 40 | 00 | 0A | 40 | 00 | 0B | 40 |
| 00 | 0C | 40 | 00 | 0D | 40 | 00 | 0E | 40 | 00 | 0F | 40 | 00 | 10 | 40 | 00 | 11 | 40 | 00 | 12 | 40 | 00 | 13 | 40 | 00 | 14 | 40 | 00 | 15 | 40 |
| 00 | 16 | 40 | 00 | 17 | 40 | 00 | 18 | 40 | 00 | 19 | 40 | 00 | 1A | 40 | 00 | 1B | 40 | 00 | 1C | 40 | 00 | 1D | 40 | 00 | 1E | 40 | 00 | 1F | 40 |
| 00 | 20 | 40 | 00 | 21 | 40 | 00 | 22 | 40 | 00 | 23 | 40 | 00 | 24 | 40 | 00 | 25 | 40 | 00 | 26 | 40 | 00 | 27 | 40 | 00 | 28 | 40 | 00 | 29 | 40 |
| 00 | 2A | 40 | 00 | 2B | 40 | 00 | 2C | 40 | 00 | 2D | 40 | 00 | 2E | 40 | 00 | 2F | 40 | 00 | 30 | 40 | 00 | 31 | 40 | 00 | 32 | 40 | 00 | 33 | 40 |
| 00 | 34 | 40 | 00 | 35 | 40 | 00 | 36 | 40 | 00 | 37 | 40 | 00 | 38 | 40 | 00 | 39 | 40 | 00 | 3A | 40 | 00 | 3B | 40 | 00 | 3C | 40 | 00 | 3D | 40 |
| 00 | 3E | 40 | 00 | 3F | 40 | 00 | 40 | 40 | 00 | 41 | 40 | 00 | 42 | 40 | 00 | 43 | 40 | 00 | 44 | 40 | 00 | 45 | 40 | 00 | 46 | 40 | 00 | 47 | 40 |
| 00 | 48 | 40 | 00 | 49 | 40 | 00 | 4A | 40 | 00 | 4B | 40 | 00 | 4C | 40 | 00 | 4D | 40 | 00 | 4E | 40 | 00 | 4F | 40 | 00 | 50 | 40 | 00 | 51 | 40 |
| 00 | 52 | 40 | 00 | 53 | 40 | 00 | 54 | 40 | 00 | 55 | 40 | 00 | 56 | 40 | 00 | 57 | 40 | 00 | 58 | 40 | 00 | 59 | 40 | 00 | 5A | 40 | 00 | 5B | 40 |
| 00 | 5C | 40 | 00 | 5D | 40 | 00 | 5E | 40 | 00 | 5F | 40 | 00 | 60 | 40 | 00 | 61 | 40 | 00 | 62 | 40 | 00 | 63 | 40 | 00 | 64 | 40 | 00 | 65 | 40 |
| 00 | 66 | 40 | 00 | 67 | 40 | 00 | 68 | 40 | 00 | 69 | 40 | 00 | 6A | 40 | 00 | 6B | 40 | 00 | 6C | 40 | 00 | 6D | 40 | 00 | 6E | 40 | 00 | 6F | 40 |
| 00 | 70 | 40 | 00 | 71 | 40 | 00 | 72 | 40 | 00 | 73 | 40 | 00 | 74 | 40 | 00 | 75 | 40 | 00 | 76 | 40 | 00 | 77 | 40 | 00 | 78 | 40 | 00 | 79 | 40 |
| 00 | 7A | 40 | 00 | 7B | 40 | 00 | 7C | 40 | 00 | 7D | 40 | 00 | 7E | 40 | 00 | 7F | 40 | 00 | F7 | | | | | | | | | | |

ID 01: Program One Note in a Tuning Table

(7+2+4+1 = 14 bytes)

[Header bytes for ID 01]

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

kk - key number IN (0..127 / h00..7F)

nn - MIDI note OUT (0..127 / h00..7F)

pp - Pitch Bend MSB OUT (0..127 / h00..7F)

pp - Pitch Bend LSB OUT (0..127 / h00..7F)

[F7 - SysEx end]

ID 02: Program Tuning Table 16-Character ASCII Name

(7+2+16+1 = 26 bytes)

[Header bytes for ID 02]

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

cc - ASCII char 1

...

cc - ASCII char 16

[F7 - SysEx end]

BLOCK 1: Preset Messages

Patch and Bank values are initially set to OFF for all presets.

NOTE: If the currently selected preset is programmed, that preset should be immediately reloaded after it is programmed.***ID 10: Program POLY Preset [name & data]***

(7+1+16+1+1+1+1+32+16+1 = 77 bytes)

[Header bytes for ID 10]

pp - Preset ID (0..39)

cc - ASCII Preset Name, char 1

...

cc - ASCII Preset Name, char 16

bo - bank ON / OFF (0=OFF, any other value=ON)

bb - bank number (0..127 / h00..80)

po - patch ON / OFF (0=OFF, any other value=ON)

pp - patch number (0..127 / h00..80)

tt - tuning table number MSB (0..127 / h00..7F) for input channel 0

tt - tuning table number LSB (0..127 / h00..7F) for input channel 0

...
 tt - tuning table number MSB (0..127 / h00..7F) for input channel 15
 tt - tuning table number LSB (0..127 / h00..7F) for input channel 15
 vv - channel ON or OFF (0..nn / h00..nn) (0=OFF, any other value=ON) for channel 0
 ...
 vv - channel ON or OFF (0..nn / h00..nn) (0=OFF, any other value=ON) for channel 15

[F7 - SysEx end]

NOTE: If all channel ON/OFF message are sent as OFF, the unit turns ON channel 0 by default

| | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 10 | 00 | 00 | 54 | 55 | 4E | 49 | 4E | 47 | 20 | 50 | 52 | 45 | 53 | 45 | 54 |
| 20 | 30 | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 40 | 40 | 40 |
| 40 | 40 | 40 | 40 | 40 | 40 | 00 | 40 | 40 | 40 | 40 | 40 | 40 | F7 | | | | | | | |

ID 11: Program MONO Preset [name & data]

(7+1+16+1+1+1+1+32+16+1 = 77 bytes)

[Header bytes for ID 11]

pp - Preset ID (0..39)
 cc - ASCII Preset Name, char 1
 ...
 cc - ASCII Preset Name, char 16
 bo - bank ON / OFF (0=OFF, any other value=ON)
 bb - bank number (0..127 / h00..80)
 po - patch ON / OFF (0=OFF, any other value=ON)
 pp - patch number (0..127 / h00..80)
 tt - tuning table number MSB (0..127 / h00..7F) for input channel 0
 tt - tuning table number LSB (0..127 / h00..7F) for input channel 0
 ...
 tt - tuning table number MSB (0..127 / h00..7F) for input channel 15
 tt - tuning table number LSB (0..127 / h00..7F) for input channel 15
 vv - channel ON or OFF (0..nn / h00..nn) (0=OFF, any other value=ON) for channel 0
 ...
 vv - channel ON or OFF (0..nn / h00..nn) (0=OFF, any other value=ON) for channel 15

[F7 - SysEx end]

NOTE: If all channel ON/OFF message are sent as OFF, the unit turns ON channel 0 by default.

| | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 11 | 00 | 00 | 54 | 55 | 4E | 49 | 4E | 20 | 50 | 52 | 45 | 53 | 45 | 54 | 20 |
| 30 | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | F7 | | | | | | | |

ID 12: Program MTS Preset [name & data]

(7+1+16+1+1+1+1+1+2+1 = 32 bytes)

[Header bytes for ID 12]

pp - Preset ID (0..39)

cc - ASCII Preset Name, char 1

...

cc - ASCII Preset Name, char 16

bo - bank ON / OFF (0=OFF, any other value=ON)

bb - bank number (0..127 / h00..80)

po - patch ON / OFF (0=OFF, any other value=ON)

pp - patch number (0..127 / h00..80)

rr - program number (0..127 / h00..80)

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

[F7 - SysEx end]

| | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 12 | 00 | 00 | 54 | 55 | 4F | 49 | 4F | 47 | 20 | 50 | 52 | 45 | 53 | 45 | 54 |
| 20 | 30 | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | F7 | | | | | | | | | | |

ID 13: Program USRx Preset [name & data]

(7+1+1+16+1+1+1+1+1+2+1 = 33 bytes)

[Header bytes for ID 13]

xx - USR number (0..9) [there are 10 different sets of USRx sysex options]

pp - Preset ID (0..39)

cc - ASCII Preset Name, char 1

...

cc - ASCII Preset Name, char 16

bo - bank ON / OFF (0=OFF, any other value=ON)

bb - bank number (0..127 / h00..80)

po - patch ON / OFF (0=OFF, any other value=ON)

pp - patch number (0..127 / h00..80)

rr - program number (0..127 / h00..80)

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

[F7 - SysEx end]

The following is a sysex message to program a default preset for USR1:

| | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 13 | 00 | 01 | 00 | 54 | 55 | 4E | 49 | 4E | 47 | 20 | 50 | 52 | 45 | 53 | 45 |
| 54 | 20 | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | F7 | | | | | | | | | | |

BLOCK 2: USRx Data Programming Messages

ID 20: Program USRx Header Bytes

(7+1+1+32+1 = 42 bytes)

[Header bytes for ID 20]

xx - USR number (0..9)

hh - count of header bytes: (0..32)

vv - header byte value 0

...

vv - header byte value hh

vv - remaining bytes, so that vv is always 32 bytes long

[F7 - SysEx end]

NOTE: USRx header bytes vv may not contain any value greater than 127

The following is the default sysex message to set the global header bytes for USR1:

| | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 20 | 00 | 01 | 07 | 7E | 7F | 08 | 08 | 03 | 7F | 7F | 00 | 00 | 00 | 00 | 00 | |
| 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | F7 |

ID 21: Program USRx Sysex Message Options

(7+1+2+1+1+1 = 13 bytes)

[Header bytes for ID 21]

xx - USR number (0..9)

oo - options byte 1: 0ptmbbb

p - include program number?: (0 = no, 1 = yes)

t - include tuning table name? (0 = no, 1 = yes)

m - include checksum byte? (0 = no, 1 = yes)

bbb - byte formula: (0..3)

0: 1 byte ± cents offset per note (same as MTS 1-byte data form)

1: 2 bytes pitch bend BendMSB and BendLSB (same as MTS 2-byte data form)

2: 3 bytes MTS data per note (MTS 3-byte frequency data)

3: 3 bytes pitch bend data per note (Note, BendMSB, BendLSB)

4: do not send any note data (useful for sending misc. sysex)

(other options may be added with firmware updates)

oo - options byte 2: 0 (for future use)

ss - tuning table start key: (0..127) [default = h3C]

ee - tuning table end key: (0..127) [default = h47]

[F7 - SysEx end]

The following is the default sysex message to set global options for USR1:

| | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 21 | 00 | 00 | 01 | 00 | 00 | 3C | 47 | F7 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

There are 10 memory spaces for 10 different sets of USRx sysex headers and options. When the user selects USR0 as the mode for a preset, then the sysex header and options are looked up from memory stored for USR0. When the user selects USR1, sysex header and options are looked up from memory stored for USR1, and so on.

BLOCK 4: Query Messages

These messages are used by software to get current data from the device.

ID 40: Query USRx Header Bytes and Options Data

(7+1+1 = 9 bytes)

[Header bytes for ID 40]

xx - USR number (0..9)

[F7 - SysEx end]

The following is a query of data for USR0.

| | | | | | | | | |
|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 40 | 00 | 00 | F7 |
|----|----|----|----|----|----|----|----|----|

ID 41: Query Tuning Table Name

(7+2+1 = 10 bytes)

[Header bytes for ID 41]

tt - tuning table number MSB (0..127 / h00..7F)

tt - tuning table number LSB (0..127 / h00..7F)

[F7 - SysEx end]

The following is a query of data for Tuning Table 0000.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 41 | 00 | 00 | 00 | F7 |
|----|----|----|----|----|----|----|----|----|----|

ID 42: Query FLASH Data Segment

(7+2+1 = 10 bytes)

[Header bytes for ID 42]

ss - segment number MSB (0..127 / h00..7F)

ss - segment number LSB (0..127 / h00..7F)

[F7 - SysEx end]

The following is a query of FLASH Data Segment 0000.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 42 | 00 | 00 | 00 | F7 |
|----|----|----|----|----|----|----|----|----|----|

ID 43: Query Firmware Version String

(7+1 = 8 bytes)

[Header bytes for ID 43]

[F7 - SysEx end]

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| F0 | 00 | 21 | 7F | 1F | 43 | 00 | F7 |
|----|----|----|----|----|----|----|----|

BLOCK 5: Response Messages

These messages are sent from the device in response to query messages (Block 4).

ID 50: Return USRx Header Bytes and Options Data

(7+1+32+4+1 = 45 bytes)

[Header bytes for ID 50]

hh - count of header bytes: (0..32)

vv - header byte value 0

...

vv - header byte value hh

vv - remaining bytes, so that vv is always 32 bytes long

oo - options byte 1

oo - options byte 2

ss - tuning table start key

ee - tuning table end key

[F7 - SysEx end]

ID 51: Return Tuning Table Name

(7+16+1 = 24 bytes)

[Header bytes for ID 51]

cc - ASCII table name char 1

...

cc - ASCII table name char 16

[F7 - SysEx end]

ID 52: Return FLASH Data Segment

(7+512+1 = 520 bytes)

[Header bytes for ID 52]

... [512 bytes FLASH Data Segment (some bytes encoded)]

[F7 - SysEx end]

ID 53: Return Firmware Version String

(7+4+1 = 12 bytes)

[Header bytes for ID 53]

... [4 ASCII bytes]

[F7 - SysEx end]

Credits

TBX2 designed by Aaron Andrew Hunt, PCB & firmware by Jordan Dimitrov Petkov.

This documentation is written by Aaron Andrew Hunt, using Apple [Pages](#).

Thank you for supporting H-Pi Instruments and TBX2b. Special thanks to everyone who pre-ordered TBX2b.

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