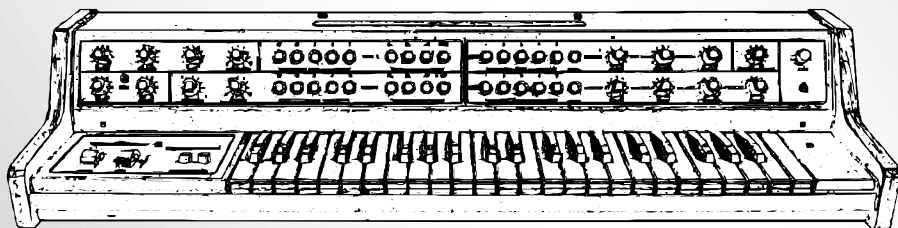


VS-MIDI

MIDI Interface for Vermona Synthesizer

Model 8-434
ver. 1.0



SYSTEM EXCLUSIVE COMMUNICATION



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1. SYSTEM EXCLUSIVE COMMUNICATION

VS-MIDI interface disposes of system of System Exclusive communication which enables to receive and to transmit a SysEx Messages for changes of all parameters in memory banks of the interface. Also, it is possible to list actual memory banks content. These data can be archived in PC for example.

Some system and testing functions can be launched via SysEx commands too.

Software generator for simple creation of SysEx messages necessary for control of VS-MIDI is available on supplemental CD-ROM. The generator is based on Java scripts. Any message for the interface setting described below can be created with help of this generator.

2. SYSEX MESSAGES STRUCTURE

VS-MIDI receives own specific messages for changes of parameters setting etc. with this structure:

F0h	Start SysEx
00h 20h 21h	Manufacturer ID
ii	Device ID
58h	Model ID
cc	Command
aa	Address
dd...dd	Datablock
xx	Checksum
F7h	End SysEx

2.1. "DEVICE ID" BYTE

Device ID byte identifies MIDI device exactly. Device ID is equal to number of just active MIDI channel (00h for channel Nr. 1, 01h for channel Nr. 2 etc.). Next possible value of Device ID is 7Fh - it is universal Device ID which the interface recognizes whenever independently on just active MIDI channel number.

For all others values of Device ID (from 10h to 7Eh), the message is evaluated as invalid and it is ignored by the interface.

2.2. "COMMAND" BYTE

Command "**cc**" specifies interface function type after whole SysEx Msg is received.

2.3. "ADDRESS" BYTE

Address "**aa**" specifies memory area or selects system function in dependence on type of SysEx Msg – see below.

2.4. "DATA" BYTE(S)

Block of databytes "**dd...dd**" contents values of parameters or functions of given SysEx Msg. Number of bytes in datablock "**dd...dd**" is different in dependence on type of SysEx message. There can be from 1 to 15 databytes. Some SysEx messages doesn't use databytes at all.



2.5. "CHECKSUM" BYTE

Checksum byte "**xx**" confirms validity of System Exclusive message. It must be calculated so that seven-bit sum of bytes from "Model ID" to "Checksum" is equal to zero. If checksum byte is invalid, whole message is invalid too and it is ignored by the interface.

3. COMMAND TYPES OVERVIEW

Command "**cc**" gives VS-MIDI activity after whole message is received. Valid values of "**cc**" are :

- "**cc**"=10h - **Bulk Dump Data Request** - inquiry for content of user memory bank in internal interface's memory
- "**cc**"=20h - **Bulk Dump Data Save / Load** - response to "Bulk Dump Data Request" or change of content of user memory bank in internal interface's memory
- "**cc**"=30h - **System Functions** – launching of a system function, exact procedure is specified by values of "Address" and "Data" bytes.
- "**cc**"=40h - **Test** - launching of testing functions for interface's hardware checking

3.1. "BULK DUMP DATA REQUEST" COMMAND

Form : **F0 00 20 21 ii 58 10 aa xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**xx**" = Checksum)

With help of "Bulk Dump Data Request" command, it is possible to launch listing of data from preset or system memory banks stored in user memory.

If address "**aa**" is from 00h to 1Fh, the message is inquiry for content of a preset memory bank. It corresponds to number from 1 to 32 of requested preset in that case. If address "**aa**" is 20h, the message is inquiry for content of system memory bank. For address "**aa**" in range from 21h to 7Fh, the message is evaluated as invalid and it is ignored by the interface.

Databyte "**dd**" is not used in this type of SysEx message at all.

Immediately after "Bulk Dump Data Request" message receiving, the interface sends "Bulk Dump Data Save / Load" message as reply. All data of parameters of requested memory bank are included in that message.

3.2. "BULK DUMP DATA SAVE / LOAD" COMMAND

Form : **F0 00 20 21 ii 58 20 aa dd...dd xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**dd...dd**" = datablock, "**xx**" = checksum)

By transmitting of "Bulk Dump Data Save / Load" message to VS-MIDI, it is allowed to change content of a memory bank saved in user interface's memory. Also, this SysEx Msg message is sent from VS-MIDI as reply to "Bulk Dump Data Request" message.

If address "**aa**" is from 00h to 1Fh, content of a preset memory bank (values of parameters) is included in the message. Address "**aa**" corresponds to number from 1 to 32 of requested preset in that case. If address "**aa**" is 20h, the message includes content of system memory bank (values of system parameters). For address "**aa**" in range from 21h to 7Fh, the message is evaluated as invalid and it is ignored by the interface.

Datablock "**dd ... dd**" contains 8 bytes or 15 bytes in this case. Databytes represent values of requested parameters.



3.2.1. DATA FOR SYSTEM PARAMETERS

Datablock "**dd...dd**" of system parameters contain always 8 bytes with this meaning:

- 1st byte: **MIDI CHANNEL**, valid range is from 00h to 0Fh
- 2nd byte: **VCF CONTROLLER Nr.**, valid range is from 00h to 77h
- 3rd byte: **VCA CONTROLLER Nr.**, valid range is from 00h to 77h
- 4th byte: **BREAK PULSE LENGTH**, valid range is from 00h to 3Ch
- 5th byte: **VCO CALIBRATION**, valid range is from 00h to 7Fh
- 6th to 8th byte: reserve, values of these bytes must be always 00h

Detailed description of meaning of system parameters is in user manual of the device.

3.2.2. DATA FOR PRESET PARAMETERS

Datablock "**dd...dd**" of system parameters contain always 15 bytes with this meaning:

- 1st byte: **VCO KEY SHIFT**, valid range is from 00h to 54h
- 2nd byte: **VCO PITCH BEND RANGE**, valid range is from 00h to 0Ch
- 3rd byte: **VCF MODE**, valid range is from 00h to 02h
- 4th byte: **VCF KEY FOLLOW**, valid range is from 00h to 7Fh
- 5th byte: **VCF VELOCITY AMOUNT**, valid range is from 00h to 7Fh
- 6th byte: **VCF CHNL AFTERTOUCH AMOUNT**, valid range is from 00h to 7Fh
- 7th byte: **VCA MODE**, valid range is from 00h to 02h
- 8th byte: **VCA KEY FOLLOW**, valid range is from 00h to 7Fh
- 9th byte: **VCA VELOCITY AMOUNT**, valid range is from 00h to 7Fh
- 10th byte: **VCA CHNL AFTERTOUCH AMOUNT**, valid range is from 00h to 7Fh
- 11th byte: **EG RETRIGGER MODE**, valid range is from 00h to 02h
- 12th byte: **EG RETRIGGER RATE**, valid range is from 00h to 7Fh
- 13th byte: **LED INDICATOR MODE**, valid range is from 00h to 03h
- 14th and 15th byte: reserve, values of these bytes must be always 00h

Detailed description of meaning of preset parameters is in user manual of the device.

3.3. "SYSTEM FUNCTION" COMMANDS

Form: **F0 00 20 21 ii 58 30 aa dd xx F7 [hex]**

(where "**ii**" = Device ID, "**aa**" = Address, "**dd**" = databyte, "**xx**" = checksum)

Commands "System Function" ("**cc**"=30h) are direct commands for execution of a system function. Type of function is given by address "**aa**". Datablock "**dd**" always contents only one databyte which specifies activity of system function exactly.

3.3.1. PRESET CHANGE

If address "**aa**" is equal to 00h, the SysEx Msg is command for change of preset or it is inquiry for number of actual preset. Value of databyte "**dd**" can be from 00h to 7Fh.

If value of databyte "**dd**" is from 00h to 1Fh, actual preset is changed after the command receiving. Databyte "**dd**" specifies number of newly selected preset (1 to 32). This command is equivalent for channel MIDI command "Program Change".

If value of databyte "**dd**" is from 20h to 7Fh, the message is inquiry for number of actual preset. In this case, preset is not changed and interface only transmits info about actual preset number to MIDI output. Form of transmitted SysEx message is:

**F0 00 20 21 ii 58 30 00 dd xx F7 [hex],**

where "ii" is Device ID, databyte "dd" is number from 00h to 1Fh which defines number of actual preset (1 to 32) and "xx" is checksum. No preset is selected after interface's reset - databyte "dd" is 7Fh in that case.

3.3.2. SAVING OF PRESET DATA INTO MEMORY BANK IN USER MEMORY

If address "aa" is equal to 01h, the SysEx Msg is command for saving of preset data from edit buffer to memory bank in user memory.

Value of databyte "dd" can be from 00h to 1Fh. This value specifies number of preset bank (1 to 32) to which the data will be stored.

For "dd" from 20h to 7Fh, the message is evaluated as invalid and it is ignored by the interface.

3.3.3. RESET OF INTERFACE

If address "aa" is equal to 02h, the SysEx Msg is command for execution of reset of the interface. Value of databyte "dd" can be only 00h or 7Fh. For all others values, the message is evaluated as invalid and it is ignored by the interface.

If value of databyte "dd" is 00h, hardware reset of the interface is executed. The interface is set to the same status as after the instrument is switched on – control of the instruments from its own keyboard is allowed.

If value of databyte "dd" is 7Fh, complete "Factory Rreset" is executed. The interface is initialized to factory status (all parameters are set to default values). **WARNING - All data stored by user in internal memory are erased during command execution.** It is recommended to make a back up of all user data by "BULK DUMP DATA REQUEST" and "BULK DUMP DATA SAVE / LOAD" messages before "Factory Reset".

3.3.4. LISTING OF INSTALLED SOFTWARE VERSION NUMBER

If address "aa" is equal to 02h, the SysEx Msg is inquiry for number of version of installed operational system. Value of databyte "dd" can be only 00h. For all others values, the message is evaluated as invalid and it is ignored by the interface.

Immediately after the inquiry receiving, the interface transmits SysEx message:

F0 00 20 21 ii 58 30 03 dd dd xx F7 [hex],

where "ii" is Device ID, databytes "dd...dd" are data identifying SW version and "xx" is checksum.

Two databytes "dd...dd" specifies numbers of installed SW version and revision directly. For example - bytes 01h 00h denote version 1.0.

3.4. "TEST" COMMANDS**Form : F0 00 20 21 ii 58 40 aa dd xx F7 [hex]**

(where "ii" = Device ID, "aa" = Address, "dd" = databyte, "xx" = Checksum)

Commands "Test" ("cc"=40h) are assigned only for debugging in production and for service procedures of the interface. Their usage is not assumed in normal working.



4. EXAMPLE OF SYSEX MESSAGE CREATION

Task:

Set system parameters of the interface to these values:

- MIDI CHANNEL : 0Fh
- VCF CONTROLLER Nr. : 76h
- VCA CONTROLLER Nr. : 77h
- BREAK PULSE LENGTH : 06h
- VCO CALIBRATION : 40h

Solution:

- We don't know what number of MIDI channel is just active so universal Device ID (7Fh) will be used,
- Necessary command is "**Bulk Dump Data Save / Load**", Command byte will be **20h**
- Data will be stored to system memory bank, Address byte will be **20h**

Start of SysEx Msg will be then :

Start SysEx : **F0h**
Mfr ID : **00h 20h 21h**
Device ID : **7Fh**
Model ID : **58h**
Command : **20h**
Address : **20h**

- First five bytes of datablock is given by task. It is necessary to fill in the datablock to requested length (eight databyte) with 00h bytes

Data : **0Fh 76h 77h 06h 40h 00h 00h 00h**

- Now, checksum must be calculated as 7-bit complement of sum of bytes from Model ID to Data, i.e.:

$$00h - (58h + 20h + 20h + 0Fh + 76h + 77h + 06h + 40h + 00h + 00h + 00h) = 26h$$

- Form of whole required System Exclusive message is after checksum refilling:

F0h 00h 20h 21h 7Fh 58h 20h 20h 0Fh 76h 77h 06h 40h 00h 00h 00h 26h F7h

After that message is received, values of all system parameters in system memory bank will be set according to the SysEx message data. But the interface will start working with newly stored data till next reset.

