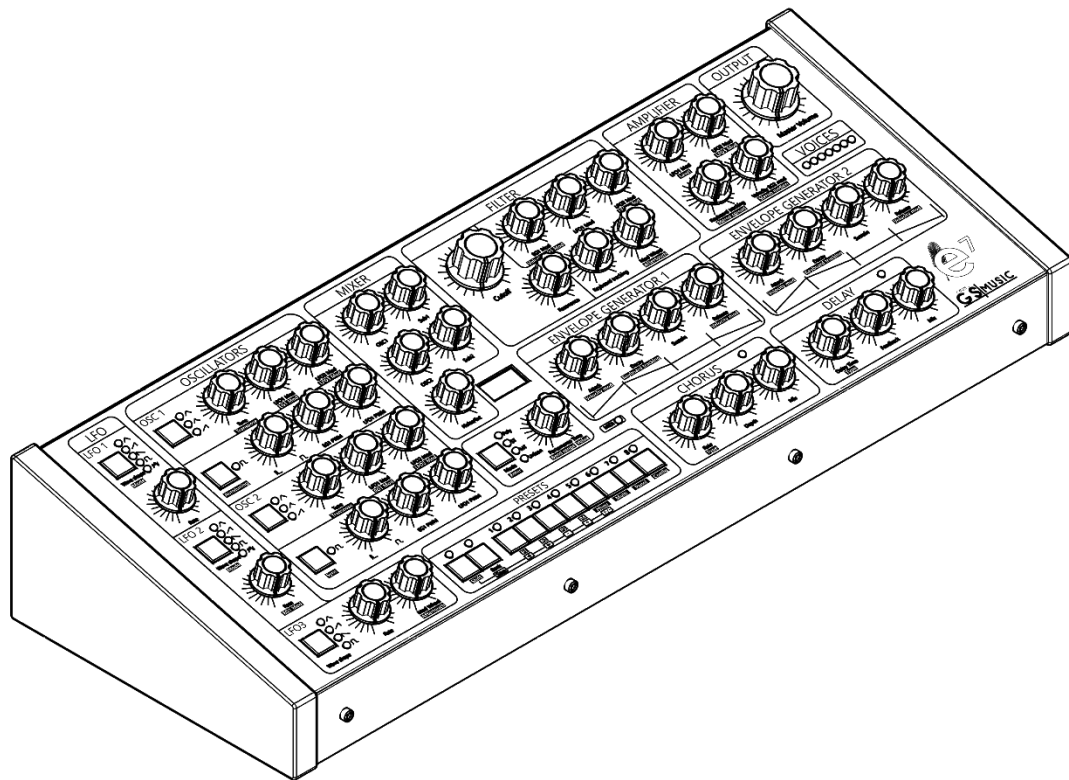


GS MUSIC



MIDI IMPLEMENTATION

Date: 9/22/2022

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INTRODUCTION

The GS-e7 synthesizer features an extensive MIDI implementation, allowing the user to control all the sound parameters, change the current preset, read, and write the internal preset memory, among other possibilities. This document describes the details of this MIDI implementation.

MIDI IMPLEMENTATION CHART

The following table shows a summary of the MIDI implementation.

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
1. Basic Information			
MIDI Channels	1-16	1-16	User selectable
Note numbers	-	20-114	
Program change	No	0-127	
Bank Select response		Yes	
Modes supported			Modes can be changed from the front panel and by MIDI CC.
Mode 1: Omni-On, Poly		Yes	
Mode 2: Omni-On, Mono		Yes	
Mode 3: Omni-Off, Poly		Yes	
Mode 4: Omni-Off, Mono		Yes	
Multi Mode (Yes/No)		Yes	
Note-On Velocity	No	Yes	
Note-Off Velocity	No	No	
Channel Aftertouch	No	Yes	
Poly (Key) Aftertouch	No	No	
Pitch Bend	No	Yes	
Active Sensing	No	No	
System Reset	No	No	
Tune Request	No	Yes	
Universal System Exclusive	No	No	
Manufacturer System Exclusive	Yes	Yes	
NRPNs	No	No	
RPNs			
RPN 00 (Pitch Bend Sensitivity)	No	Yes	
RPN 01 (Channel Fine Tune)	No	No	
RPN 03 (Tuning Program Select)	No	No	
RPN 04 (Tuning Bank Select)	No	No	
RPN 05 (Modulation Depth Range)	No	No	
RPN 06 (MPE configuration)	No	Yes	

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
2. MIDI Timing and Synchronization			
MIDI Clock	No	Yes	
Song Position Pointer	No	No	
Song Select	No	No	
Start	No	Yes	Used for LFO synchronization.
Continue	No	No	
Stop	No	No	
MIDI Time Code	No	No	
MIDI Machine Control	No	No	
MIDI Show Control	No	No	

Table 1: MIDI Implementation Chart

MIDI CONTROL CHANGE

The following table shows the implemented MIDI CC messages and their function.

PARAMETER	CC#	NOTES
General		
Mod Wheel	1	
Expression	11	Controls amplifier level for current preset/part.
Volume	7	Controls master volume.
Hold	64	
Portamento Switch	65	
Portamento time	5	
Pitch Bend Range	50	Range in semitones.
LFO 1		
Shape	53	
Rate	76	
Mode	60	
LFO2		
Shape	61	
Rate	62	
Mode	70	
EG1 Mod	67	
LFO3		
Shape	72	
Rate	73	
Mod Wheel	79	
Aftertouch	78	
OSC 1		
Transpose	3	See transpose section.
Tune	9	See tune section.
Shape	14	See OSC shape section.
LFO 1 Mod	22	
LFO 2 Mod	23	
LFO 3 Mod	24	
EG 1 Mod	25	
Pulse Width	15	
LFO 1 PWM	26	
LFO 2 PWM	27	
LFO 3 PWM	28	
EG 1 PWM	29	
OSC 2		
Transpose	30	See transpose section
Tune	31	See tune section
Shape	34	
LFO 1 Mod	39	

PARAMETER	CC#	NOTES
LFO2 Mod	40	
LFO3 Mod	41	
EG1 Mod	42	
Pulse Width	35	
LFO1 PWM	43	
LFO2 PWM	44	
LFO3 PWM	45	
EG1 PWM	46	
Sync	51	0-63: OFF, 64-127: ON
MIXER		
OSC1 Level	20	
OSC2 Level	36	
Sub1 Level	21	
Sub2 Level	37	
Noise/ext Level	52	
LFO 1		
Shape	53	See LFO shape section
Rate	76	
Mode	60	See LFO mode section
LFO2		
Shape	61	See LFO shape section
Rate	62	
Mode	70	See LFO mode section
EG1 Mod	67	
LFO3		
Shape	72	See LFO shape section
Rate	73	
Mod Wheel	79	
Aftertouch	78	
FILTER		
Cutoff	74	
EG1 Mod	89	
Velocity EG1 Mod	86	
LFO1 Mod	90	
LFO2 Mod	91	
LFO3 Mod	92	
Keyboard Tracking	85	
Mod Wheel	88	
Aftertouch	87	
AMPLIFIER		
Level	11	
LFO1 Mod	103	
LFO2 Mod	104	
LFO3 Mod	105	

PARAMETER	CC#	NOTES
Keyboard Tracking	93	
Velocity EG2 Mod	94	
Stereo Spread	10	
Stereo Motion	119	
EG 1		
Attack	16	
Decay	17	
Sustain	18	
Release	19	
Attack Velocity Mod	106	
Release Velocity Mod	107	
Keyboard tracking	117	
EG2		
Attack	80	
Decay	81	
Sustain	82	
Release	83	
Attack Velocity Mod	108	
Release Velocity Mod	109	
Keyboard tracking	118	
CHORUS		
Type	113	0-63: Basic, 64-127: Ensemble
Rate	114	
Depth	115	
Mix	13	
DELAY		
Type	110	See Delay type section
Delay Time	111	
Feedback	112	
Mix	12	
OTHER		
Mode	116	See Other mode section
Voices	97	See Other voices section

Table 2: MIDI CC

OSCILLATORS

SHAPE

VALUES	SHAPE
0 - 15	Triangle
16 - 31	Saw-Tri
32 - 47	Sawtooth
48 - 63	Off
64 - 79	Triangle + Pulse
80 - 95	Saw-Tri + Pulse
96 - 111	Sawtooth + Pulse
112 - 127	Pulse



If you are familiar with binary numbers, note that the oscillator shape is determined by the upper 3 bits.

TRANSDPOSE

Transdpose CC values respond to the following table.

VALUES	TRANSDPOSE
0 - 1	-24
2 - 3	-23
4 - 6	-22
7 - 9	-21
10 - 11	-20
12 - 14	-19
15 - 17	-18
18 - 19	-17
20 - 22	-16
23 - 25	-15
26 - 27	-14
28 - 30	-13
31 - 33	-12
34 - 35	-11
36 - 38	-10
39 - 41	-9
42 - 43	-8
44 - 46	-7
47 - 48	-6
49 - 51	-5
52 - 54	-4
55 - 56	-3
57 - 59	-2
60 - 61	-1
62 - 65	0

VALUES	TRANSDPOSE
66 - 67	1
68 - 70	2
71 - 72	3
73 - 75	4
76 - 78	5
79 - 80	6
81 - 83	7
84 - 85	8
86 - 88	9
89 - 91	10
92 - 93	11
94 - 96	12
97 - 99	13
100 - 101	14
102 - 104	15
105 - 107	16
108 - 109	17
110 - 112	18
113 - 115	19
116 - 117	20
118 - 120	21
121 - 123	22
124 - 125	23
126 - 127	24

TUNE

Tune responds to the following table. Tune values are in semitones.

VALUE	TUNE	VALUE	TUNE	VALUE	TUNE	VALUE	TUNE
0	-0.500	32	-0.246	64	0.000	96	0.254
1	-0.492	33	-0.238	65	0.008	97	0.262
2	-0.484	34	-0.230	66	0.016	98	0.270
3	-0.477	35	-0.223	67	0.023	99	0.277
4	-0.469	36	-0.215	68	0.031	100	0.285
5	-0.461	37	-0.207	69	0.039	101	0.293
6	-0.453	38	-0.199	70	0.047	102	0.301
7	-0.445	39	-0.191	71	0.055	103	0.309
8	-0.438	40	-0.184	72	0.063	104	0.316
9	-0.430	41	-0.176	73	0.070	105	0.324
10	-0.422	42	-0.164	74	0.078	106	0.332
11	-0.410	43	-0.156	75	0.086	107	0.340
12	-0.402	44	-0.148	76	0.094	108	0.348
13	-0.395	45	-0.141	77	0.102	109	0.355
14	-0.387	46	-0.133	78	0.109	110	0.363
15	-0.379	47	-0.125	79	0.117	111	0.371
16	-0.371	48	-0.117	80	0.125	112	0.379
17	-0.363	49	-0.109	81	0.133	113	0.387
18	-0.355	50	-0.102	82	0.141	114	0.395
19	-0.348	51	-0.094	83	0.148	115	0.402
20	-0.340	52	-0.086	84	0.156	116	0.410
21	-0.332	53	-0.078	85	0.164	117	0.422
22	-0.324	54	-0.070	86	0.176	118	0.430
23	-0.316	55	-0.063	87	0.184	119	0.438
24	-0.309	56	-0.055	88	0.191	120	0.445
25	-0.301	57	-0.047	89	0.199	121	0.453
26	-0.293	58	-0.039	90	0.207	122	0.461
27	-0.285	59	-0.031	91	0.215	123	0.469
28	-0.277	60	-0.023	92	0.223	124	0.477
29	-0.270	61	-0.016	93	0.230	125	0.484
30	-0.262	62	-0.008	94	0.238	126	0.492
31	-0.254	63	0.000	95	0.246	127	0.500

LFO

SHAPE (LFO1 / LFO2)

VALUES	SHAPE
0 - 15	Triangle
16 - 31	Ramp up
32 - 47	Ramp down
48 - 63	Square
64 - 79	Noise / Sample & Hold
80 - 127	Noise / Sample & Hold (LED off)

MODE (LFO1 / LFO2)

VALUES	SHAPE
0 - 15	Monophonic
16 - 31	Polyphonic
32 - 47	Keyboard Tracking
48 - 63	Keyboard Sync
64 - 79	Clock Sync
80 - 127	Keyboard + Clock Sync

SHAPE (LFO3)

VALUES	SHAPE
0 - 31	Triangle
32 - 63	Ramp up
64 - 95	Ramp down
96 - 127	Square

DELAY

TYPE

VALUES	MODE
0 - 31	Stereo
32 - 63	Ping Pong
64 - 95	Stereo Sync
96 - 127	Ping Pong + Sync

OTHER

MODE

VALUES	MODE
0 - 15	Polyphonic
16 - 31	Monophonic, Single Trigger
32 - 47	Monophonic, Multi Trigger
48 - 63	Unison, Single Trigger
64 - 79	Unison, Multi Trigger
80 - 127	Reserved

VOICES

CC Value is determined by the following formula:

$$CC \text{ Value} = 16 \times V1 + V2$$

Values greater than 71 are reserved and may cause an unpredictable behavior.

V1 and V2 are determined by the following tables

V1	MODE (POLY)
0	All
1	Even
2	Odd
3	1->7
4	7->1

V2	MODE (MONO)
0	Free
1	1
2	2
3	3
4	4
5	5
6	6
7	7

MIDI PROGRAM CHANGE

The GS-e7 synthesizer receives program change commands. To access all the 640 presets, bank change messages must be used too.

BANK MSB	BANK LSB	PROGRAM CHANGE	PRESET/MULTI	LOCATION
0	0	0	Preset	1.1.1
0	0	1	Preset	1.1.2
...
0	0	126	Preset	2.8.7
0	0	127	Preset	2.8.8
0	1	0	Preset	3.1.1
0	1	1	Preset	3.1.2
...
0	3	126	Preset	8.8.7
0	3	127	Preset	8.8.8
1	-	0	Multi	1.1.1
1	-	1	Multi	1.1.2
...
1	-	126	Multi	2.8.7
1	-	127	Multi	2.8.8

Using a single program change message, 128 consecutive presets can be selected. If Bank LSB is 0, presets 1.1.1 to 2.8.8 can be selected. If Bank LSB is 1, presets 3.1.1 to 4.8.8 can be selected and so on.

When Bank MSB is 0, the preset mode is selected. In contrast, if Bank MSB is set to 1, multitimbral mode is selected. When multitimbral mode is selected, Bank LSB is ignored.

SYSTEM EXCLUSIVE

The GS-e7 synthesizer supports system exclusive messages that can grant access to the internal memory among other things.

SYSEX ID

PARAMETER	VALUE (HEXADECIMAL)
Manufacturer ID*	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10

*Manufacturer ID is provided by The MIDI Association.

SYSEX MESSAGE FORMAT

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	1 byte
Data	0 to 40 bytes
SysEx End	0xF7

ALL LEDS ON

Turns on all LEDs from the front panel, except the voices LEDs. Sending the command again restores normal operation.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x13
SysEx End	0xF7

EXAMPLE

F0 00 21 62 01 10 13 F7

READ SERIAL NUMBER

Reads the Serial Number. Serial number is protected and cannot be changed.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x20
SysEx End	0xF7

RESPONSE

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Data	Serial number, Lower 7 bits Serial number, Higher 7 bits
SysEx End	0xF7

EXAMPLE

Read from address 0x00:

F0 00 21 62 01 10 **20** F7

Response:

F0 **49 00** F7

Serial number: 0073 (decimal)

READ MEMORY

Reads a 16-byte memory block starting from the specified address. Data bytes are returned split in 4 bits per byte.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0E
Address	Lower 7 bits Middle 7 bits Higher 7 bits
SysEx End	0xF7

RESPONSE

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Data	Byte #0, Lower 4 bits Byte #0, Higher 4 bits ... Byte #15, Lower 4 bits Byte #15, Higher 4 bits
SysEx End	0xF7

EXAMPLE

Read from address 0x00:

F0 00 21 62 01 10 **0E 00 00 00** F7

Response:

F0 **0F 04 00 07 05 06 0E 06 09 06 0E 06 07 06 00 02 00 02 00 02**
00 05 01 06 04 06 00 02 00 02 00 02 F7

WRITE MEMORY

Write a memory block starting from the specified address.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0F
Address	Lower 7 bits Middle 7 bits Higher 7 bits
Data	Byte #0, Lower 4 bits Byte #0, Higher 4 bits Byte #1, Lower 4 bits Byte #1, Higher 4 bits ...
SysEx End	0xF7

RESPONSE

The same bytes sent are sent back to check for correct communication.

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Data	Byte #0, Lower 4 bits Byte #0, Higher 4 bits Byte #1, Lower 4 bits Byte #1, Higher 4 bits ...
SysEx End	0xF7

EXAMPLE

Write from address 0x00:

FO 00 21 62 01 10 0F 00 00 00 0F 04 00 07 05 06 0E 06 09 06 0E
06 07 06 00 02 00 02 00 02 00 05 01 06 04 06 00 02 00 02 00 02
F7

Response:

FO 0F 04 00 07 05 06 0E 06 09 06 0E 06 07 06 00 02 00 02 00 02
00 05 01 06 04 06 00 02 00 02 00 02 F7

UNLOCK PRESET

To unlock a preset, a 0 must be written to the preset address plus 127.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0F
Address (preset address + 127)	Lower 7 bits Middle 7 bits Higher 7 bits
Data	0x00 0x00
SysEx End	0xF7

RESPONSE

The same bytes sent are sent back to check for correct communication.

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Data	0x00 0x00
SysEx End	0xF7

EXAMPLE

Lock preset 1.1.1:

F0 00 21 62 01 10 **0F 7F 00 00 00 00 F7**

Response:

F0 **00 00 F7**

LOCK PRESET

To lock a preset, a 1 must be written to the preset address plus 127.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0F
Address (preset address + 127)	Lower 7 bits Middle 7 bits Higher 7 bits
Data	0x01 0x00
SysEx End	0xF7

RESPONSE

The same bytes sent are sent back to check for correct communication.

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Data	0x01 0x00
SysEx End	0xF7

EXAMPLE

Unlock preset 1.1.1:

F0 00 21 62 01 10 **0F 7F 00 00 01 00 F7**

Response:

F0 **01 00** F7

FACTORY RESET

Restores the synthesizer to its factory state.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x14
SysEx End	0xF7

EXAMPLE

F0 00 21 62 01 10 **14** F7



After performing a factory reset, all unlocked presets will be replaced by a default preset.

The synthesizer may become unresponsive for a few seconds after receiving this command.

READ CONFIGURATION

Write configuration bytes.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0C
SysEx End	0xF7

RESPONSE

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Config	MIDI Receive Channel MIDI Transmit Channel Filter Mode Soft Thru Mode
SysEx End	0xF7

EXAMPLE

Read configuration:

F0 00 21 62 01 10 **0C** F7

Response:

F0 **00 00 07 00** F7

WRITE CONFIGURATION

Write configuration bytes.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0D
Config	MIDI Receive Channel MIDI Transmit Channel Filter Mode Soft Thru Mode Clock Source MPE Enable 0x00
SysEx End	0xF7

EXAMPLE

Set configuration:

- MIDI Receive channel: 1
- MIDI Transmit channel: 1
- Filter Mode: 7 (All messages accepted)
- Soft Thru Mode: 0 (No soft thru)
- Clock Source: 0 (MIDI)
- MPE Enable: 0

F0 00 21 62 01 10 **0D** 00 00 07 00 00 00 00 F7

INITIALIZE PRESET

Turns off multitimbral mode and initializes the current preset to the default values. Preset Memory is not affected.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x10
SysEx End	0xF7

EXAMPLE

F0 00 21 62 01 10 **10** F7

READ AUTOTUNING STATUS

Reads Autotuning status.

COMMAND

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Manufacturer ID	0x00 0x21 0x62
Device ID	0x01
Model ID	0x10
Command	0x0A
SysEx End	0xF7

RESPONSE

PARAMETER	VALUE (HEXADECIMAL)
SysEx Start	0xF0
Autotuning On/Off	Autotuning On: 1, Autotuning Off: 0
Autotuning Status	Autotuning Status for Voice 1 Autotuning Status for Voice 2 Autotuning Status for Voice 3 Autotuning Status for Voice 4 Autotuning Status for Voice 5 Autotuning Status for Voice 6 Autotuning Status for Voice 7
SysEx End	0xF7

Autotuning status shows the autotuning progress, from 0x00 to 0x0F.

EXAMPLE

Read Autotuning Status:

F0 00 21 62 01 10 **0A** F7

Response:

F0 00 0F 0F 0F 0F 0F 0F 0F F7

MIDI POLYPHONIC EXPRESSION (MPE)

The GS-e7 supports MIDI Polyphonic expression. MPE is not available in multitimbral mode.

There are two ways to enable MPE:

- From the configuration menu
- Receiving an MPE configuration message

Only the lower zone is supported.

MPE CONFIGURATION MESSAGE (MCM)

MPE is enabled or disabled upon receiving an MCM.

PARAMETER	VALUE (HEXADECIMAL)
RPN MSB = 0x00	0xB0
	0x65
	0x00
RPN LSB = 0x06	0xB0
	0x64
	0x06
Data Entry	0xB0
	0x06
	Number of channels (0 to disable)

After receiving an MCM, all controllers are automatically reset.

Example (Enable MPE with 15 channels):

B0 65 00 B0 64 06 B0 06 0F

Example (Disable MPE):

B0 65 00 B0 64 06 B0 06 00

MEMORY ORGANIZATION

The internal memory of the GS-e7 can be accessed through the system exclusive messages. The memory contains three sections. The first one is the preset memory, which holds the presets data (including multitimbral presets). The second section is the configuration memory which holds the configuration settings loaded at startup. The last section is the volatile memory, which holds the current preset being edited, some configuration variables and some temporary variables. To avoid any malfunction, the volatile memory cannot be modified by system exclusive messages.

MEMORY MAPPING

ADDRESS (HEXADECIMAL)	MEMORY
0x000000 - 0x01FFFF	Preset memory (Flash)
0x020000 - 0x0203FF	Configuration memory (EEPROM)
0x030000 - 0x030FFF	Volatile memory (RAM)*

*For testing purposes only

PRESET MEMORY

The preset memory holds the preset data. The first half holds the single presets data while the second half holds the multitimbral presets data. Each single preset has 128 bytes, while each multitimbral preset has 512 bytes.

ADDRESS	CONTENT
0x000000 - 0x00007F	Preset 1.1.1
0x000080 - 0x0000FF	Preset 1.1.2
...	
0x00FF80 - 0x00FFFF	Preset 8.8.8
0x010000 - 0x0101FF	Multi 1.1.1
0x010200 - 0x0103FF	Multi 1.1.2
...	
0x01FD00 - 0x01FFFF	Multi 2.8.8

To calculate the initial address of a preset A.B.C, you can use the following formula:

$$\text{Address} = ((A-1) \times 64 + (B-1) \times 8 + (C-1)) \times 128$$

To calculate the initial address of a multitimbral preset A.B.C, you can use the following formula:

$$\text{Address} = 65536 + ((A-1) \times 64 + (B-1) \times 8 + (C-1)) \times 512$$

PRESET STRUCTURE

BYTE #	PARAMETER	BYTE #	PARAMETER	BYTE #	PARAMETER
0 - 19	Name**	60	LFO2 Rate	96	EG2 Attack
20	OSC1 Transpose	61	-		Velocity Mod
21	OSC1 Tune	62	-	97	EG2 Release
22	OSC1 Shape	63	-		Velocity Mod
23	OSC1 Pulse Width	64	LFO2 Mode	98	EG2 Keyboard
24	MIXER OSC1 Level	65	LFO3 Shape		Tracking
25	MIXER Sub1 Level	66	LFO3 Rate	99	Mode
26	OSC1 LFO1 Mod	67	LFO3 Aftertouch Mod	100	-
27	OSC1 LFO2 Mod	68	LFO3 Mod Wheel Mod	101	-
28	OSC1 LFO3 Mod	69	-	102	-
29	OSC1 EG1 Mod	70	FILTER Cutoff	103	-
30	OSC1 LFO1 PWM	71	FILTER Resonance	104	-
31	OSC1 LFO2 PWM	72	FILTER Keyboard Tracking	105	Transpose
32	OSC1 LFO3 PWM	73	FILTER Velocity EG1 Mod	106	Mono Voice
33	OSC1 EG1 PWM	74	FILTER Aftertouch Mod	107	Poly Voice
34	OSC2 Transpose	75	FILTER Mod Wheel Mod	108	AMPLIFIER Level
35	OSC2 Tune	76	FILTER EG1 Mod	109	Keyboard Zone Lower Limit*
36	OSC2 Shape	77	FILTER LFO1 Mod	110	Keyboard Zone Upper Limit*
37	OSC2 Pulse Width	78	FILTER LFO2 Mod	111	Velocity Zone Lower Limit*
38	MIXER OSC2 Level	79	FILTER LFO3 Mod	112	Velocity Zone Upper Limit*
39	MIXER Sub2 Level	80	AMPLIFIER Keyboard Tracking	113	MIDI Channel*
40	OSC2 LFO1 Mod	81	AMPLIFIER Velocity Mod	114	MIDI Filter*
41	OSC2 LFO2 Mod	82	AMPLIFIER LFO1 Mod	115	Delay Type**
42	OSC2 LFO3 Mod	83	AMPLIFIER LFO2 Mod	116	Delay Time**
43	OSC2 EG1 Mod	84	AMPLIFIER LFO3 Mod	117	Delay Feedback**
44	OSC2 LFO1 PWM	85	EG1 Attack	118	Delay Mix**
45	OSC2 LFO2 PWM	86	EG1 Decay	119	Chorus Type**
46	OSC2 LFO3 PWM	87	EG1 Sustain	120	Chorus Rate**
47	OSC2 EG1 PWM	88	EG1 Release	121	Chorus Depth**
48	Portamento On	89	EG1 Attack Velocity Mod	122	Chorus Mix**
49	Portamento Time	90	EG1 Release Velocity Mod	123	Stereo Spread**
50	Pitch Bend Range	91	EG1 Keyboard Tracking	124	Stereo Motion**
51	OSC2 Sync	92	EG2 Attack	125	-
52	NOISE Level	93	EG2 Decay	126	-
53	LFO1 Shape	94	EG2 Sustain	127	Lock**
54	LFO1 Rate	95	EG2 Release		

*Only used when the preset is part of a multi.

**When preset is part of a multi, only the values of part 1 are used.

MULTITIMBRAL PRESET STRUCTURE

Each multitimbral preset contains 4 single presets. Each one is one of the multitimbral parts.

The following parameters are only affected by part 1 contents:

- Name
- Keyboard Zone
- Velocity Zone
- MIDI Channel
- MIDI Filter
- Delay
- Chorus
- Lock

BYTE #	CONTENT
0 - 127	Part 1
128 - 255	Part 2
256 - 383	Part 3
384 - 512	Part 4

PRESET LOCK

Each Preset has a lock byte, which is the byte #127 (considering #0 as the first byte). If the value is 1, the preset is locked and cannot be overwritten from the panel. If the value is not 1, the preset is unlocked and can be overwritten from the panel. This is valid for single and multitimbral presets.

By default, the factory presets are locked. They can be unlocked by writing 0 to the byte #127 of each of the factory presets.

The lock byte does not prevent any write operation using system exclusive messages.

When a factory restore is performed from the panel, the locked presets are not modified, while the unlocked presets are written with a default basic preset.



After unlocking the factory presets, if a factory restore is performed, they will be overwritten with a default basic preset.

CONFIGURATION MEMORY

Configuration memory holds the global configuration variables.

ADDRESS	CONTENT
0x020000	MIDI Receive Channel
0x020001	MIDI Transmit Channel
0x020002	MIDI Filter
0x020003	MIDI Soft thru
0x020004	MIDI Clock Source (0: MIDI, 1: USB)

MIDI RECEIVE CHANNEL

VALUE	MODE
0 - 15	Channel 1 - 16
16	Omni
17 - 255	Invalid

MIDI TRANSMIT CHANNEL

VALUE	MODE
0 - 15	Channel 1 - 16
16	Off
17 - 255	Invalid

MIDI FILTER

VALUE	CONTROL CHANGE	PROGRAM CHANGE	PITCH BEND
0	No	No	No
1	No	No	Yes
2	No	Yes	No
3	No	Yes	Yes
4	Yes	No	No
5	Yes	No	Yes
6	Yes	Yes	No
7	Yes	Yes	Yes
8 - 255	Invalid		

MIDI SOFT THRU

VALUE	MIDI TO MIDI	MIDI TO USB	USB TO MIDI	USB TO USB
0	No	No	No	No
1	No	No	No	Yes
2	No	No	Yes	No
3	No	No	Yes	Yes
4	No	Yes	No	No
5	No	Yes	No	Yes
6	No	Yes	Yes	No
7	No	Yes	Yes	Yes
8	Yes	No	No	No
9	Yes	No	No	Yes
10	Yes	No	Yes	No
11	Yes	No	Yes	Yes
12	Yes	Yes	No	No
13	Yes	Yes	No	Yes
14	Yes	Yes	Yes	No
15	Yes	Yes	Yes	Yes
16 - 255	Invalid			

VOLATILE MEMORY

Configuration memory holds the variables being edited.

ADDRESS	CONTENT
0x030800 - 0x03087F	Current Preset
0x030A00 - 0x030BFF	Current Multi

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