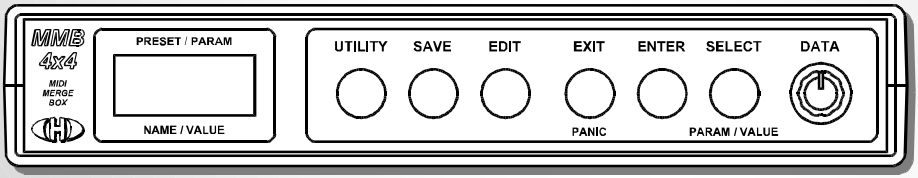
MMB 4x4

MIDI

Merge Box

Model 8-255
ver. 1.0



MIDI SYSTEM EXCLUSIVE COMMUNICATION

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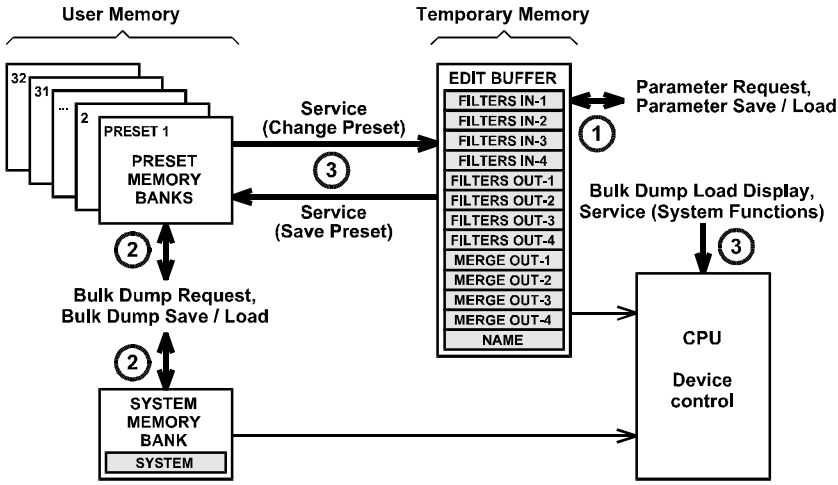
1. SYSTEM EXCLUSIVE COMMUNICATION

MMB 4x4 disposes of a system of System Exclusive communication which enables to receive and to transmit a SysEx Messages for the changes of all parameters in edit buffer and in memory banks of the device. Also, it is possible to work with whole memory banks (to store content of edit buffer into memory bank, to change presets, to launch some system functions).

Software generator for the simple creation of the SysEx messages necessary for MMB 4x4 control is available on the supplemental CD-ROM. The generator is based on Java scripts. Any message for the device setting described below can be created with a help of this generator.

Pic. 1 – Control of MMB 4x4 via SysEx Msg



2. SYSEX MESSAGES STRUCTURE

MMB 4x4 receives own specific messages with this structure:

F0h	Start SysEx
00h 20h 21h	Manufacturer ID
ii	Device ID
37h	Model ID
cc	Command
aa	Address
dd…dd	Data
xx	Checksum
F7h	End SysEx

2.1. „DEVICE ID“ BYTE

The device ID byte identifies the MIDI device exactly. It is given by system parameter “Device ID”. It can be in range from 00h to 3Fh. Next possible value of the Device ID is 7Fh – this is the universal Device ID always accepted by the device regardless on “Device ID” parameter setting.

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For all other values of the Device ID (from 40h to 7Eh), the message is evaluated as invalid and it is ignored by the device.

2.2. „COMMAND“ BYTE

The command "**cc**" specifies the interface function type after the whole SysEx Msg is received. It can be operation with single parameter or with whole memory banks or system functions.

2.3. „ADDRESS“ BYTE

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

2.4. „DATA“ BYTE

The block of databytes “**dd…dd**“ contains the values of a parameters or functions given by the SysEx Msg type. The number of bytes in datablock “**dd…dd**“ is a different in dependence on a type of the SysEx message. There can be 1, 16 or 79 databytes. Some SysEx messages don’t use the databytes at all.

2.5. „CHECKSUM“ BYTE

The checksum byte "**xx**" confirms the validity of System Exclusive message. It must be calculated so that seven-bit sum of bytes from the “Model ID” to “Checksum” is equal to zero (i.e. it must be calculated as 7-bit complement of the sum of bytes from ‘Model ID’ to ‘Data’). If the checksum byte is invalid the whole message is invalid too and it is ignored by the interface.

3. COMMAND TYPES OVERVIEW

The command "**cc**" gives the device activity after the whole message is received. The valid values of "**cc**" are :

"**cc**"=10h - **Parameter Request** - inquiry for value of a preset parameter in edit buffer
"**cc**"=20h - **Parameter Save / Load** – temporary change of value of a preset parameter in edit buffer
"**cc**"=30h - **Bulk Dump Request** - inquiry for a content of a memory bank in the device’s memory.
"**cc**"=40h - **Bulk Dump Save / Load** – change of content of a memory bank in the device’s memory
"**cc**"=50h - **Service** – system functions for operation with presets and control of hardware

For all other values of "**cc**", the message is evaluated as invalid and it is ignored by the device.

4. "PARAMETER REQUEST" COMMAND

Form : **F0 00 20 21 ii 37 10 aa xx F7 [hex]**
(where “**ii**“ = Device ID, “**aa**“ = Address,“**xx**“ = Checksum)

Actual values of parameters in temporary edit buffer can be checked by "Parameter Request" command ("**cc**"=10h). Requested parameter number are given by "**aa**" (Address) byte (see [1] on pic. 1). Valid range of "**aa**" is from 00h to 4Eh. For "**aa**" = 4Fh to 7Fh, the message is evaluated as invalid and it is ignored by the device.

"**dd**" databyte is not used in this type of SysEx Msg.

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Table 1 – Preset parameters				
Address / byte	Parameter	Valid range	Form	Meaning
00h	In 1 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	a = chnl 1, 0=off / 1=on b = chnl 2, 0=off / 1=on c = chnl 3, 0=off / 1=on d = chnl 4, 0=off / 1=on
01h	In 1 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	a = chnl 5, 0=off / 1=on b = chnl 6, 0=off / 1=on c = chnl 7, 0=off / 1=on d = chnl 8, 0=off / 1=on
02h	In 1 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	a = chnl 9, 0=off / 1=on b = chnl 10, 0=off / 1=on c = chnl 11, 0=off / 1=on d = chnl 12, 0=off / 1=on
03h	In 1 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	a = chnl 13, 0=off / 1=on b = chnl 14, 0=off / 1=on c = chnl 15, 0=off / 1=on d = chnl 16, 0=off / 1=on
04h	In 1 Filters "Channel"	00h ~ 3Fh	00fedcba	a = Note On/Off → 0=off / 1=on b = Key + Chnl Aftertouch → 0=off / 1=on c = Pitch Bend → 0=off / 1=on d = Pgm Chng + CC Bank Slct → 0=off / 1=on e = CC RPN + NRPN → 0=off / 1=on f = Other CC → 0=off / 1=on
05h	In 1 Filters "System"	00h ~ 1Fh	000edcba	a = MIDI Clock → 0=off / 1=on b = Start + Continue + Stop → 0=off / 1=on c = MTC Qtr. Frame → 0=off / 1=on d = Song Pos Ptr + Song Slct → 0=off / 1=on e = Other Common Sys Msg → 0=off / 1=on
06h	In 1 Filters "Sys Ex"	00h ~ 07h	00000cba	a = Real Time SysEx Msg → 0=off / 1=on b = Non Real Time SysEx Msg → 0=off / 1=on c = Other SysEx Msg → 0=off / 1=on
07h	In 2 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
08h	In 2 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
09h	In 2 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
0Ah	In 2 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
0Bh	In 2 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
0Ch	In 2 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
0Dh	In 2 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
0Eh	In 3 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
0Fh	In 3 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
10h	In 3 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
11h	In 3 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
12h	In 3 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
13h	In 3 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
14h	In 3 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
15h	In 4 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
16h	In 4 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
17h	In 4 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
18h	In 4 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
19h	In 4 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
1Ah	In 4 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
1Bh	In 5 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"

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Table 1 – Preset parameters (continue)				
Address / byte	Parameter	Valid range	Form	Meaning
1Ch	Out 1 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
1Dh	Out 1 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
1Eh	Out 1 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
1Fh	Out 1 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
20h	Out 1 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
21h	Out 1 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
22h	Out 1 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
23h	Out 2 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
24h	Out 2 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
25h	Out 2 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
26h	Out 2 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
27h	Out 2 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
28h	Out 2 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
29h	Out 2 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
2Ah	Out 3 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
2Bh	Out 3 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
2Ch	Out 3 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
2Dh	Out 3 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
2Eh	Out 3 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
2Fh	Out 3 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
30h	Out 3 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
31h	Out 4 Whole Chnl 1-4	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 1-4
32h	Out 4 Whole Chnl 5-8	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 5-8
33h	Out 4 Whole Chnl 9-12	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 9-12
34h	Out 4 Whole Chnl 13-16	00h ~ 0Fh	0000dcba	the same as In 1 - Whole Chnl 13-16
35h	Out 4 Filters "Channel"	00h ~ 3Fh	00fedcba	the same as In 1 - Filters "Channel"
36h	Out 4 Filters "System"	00h ~ 1Fh	000edcba	the same as In 1 - Filters "System"
37h	Out 5 Filters "Sys Ex"	00h ~ 07h	00000cba	the same as In 1 - Filters "Sys Ex"
38h	Out 1 Merge From	00h ~ 0Fh	0000dcba	a = in 1, 0=off / 1=on b = in 2, 0=off / 1=on c = in 3, 0=off / 1=on d = in 4, 0=off / 1=on
39h	Out 2 Merge From	00h ~ 0Fh	0000dcba	the same as Out 1 - Merge From
3Ah	Out 3 Merge From	00h ~ 0Fh	0000dcba	the same as Out 1 - Merge From
3Bh	Out 4 Merge From	00h ~ 0Fh	0000dcba	the same as Out 1 - Merge From
3Ch ~ 43h	Name	20h ~ 7Dh	-	Characters on position from 1 to 8
44h ~ 4Eh	nepoužito	00h ~ 7Fh	-	rezerva

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Table 2 – System parameters				
Order of databyte	Parameter	Valid range	Form	Meaning
00h	Locks	00h ~ 07h	00000cba	a = Memory Protection → 0=off / 1=on b = Auto Reset → 0=off / 1=on c = Panic Full Msg → 0=off / 1=on
01h	MIDI Clk Indicator - In	00h ~ 0Fh	0000dcba	a = Input 1 → 0=disable / 1=enable b = Input 2 → 0=disable / 1=enable c = Input 3 → 0=disable / 1=enable d = Input 4 → 0=disable / 1=enable
02h	MIDI Clk Indicator - Out	00h ~ 0Fh	0000dcba	a = Output 1 → 0=disable / 1=enable b = Output 2 → 0=disable / 1=enable c = Output 3 → 0=disable / 1=enable d = Output 4 → 0=disable / 1=enable
03h	SysEx Data Pause In 1	04h ~ 7Fh	-	20 ~ 635 ms
04h	SysEx Data Pause In 2	04h ~ 7Fh	-	20 ~ 635 ms
05h	SysEx Data Pause In 3	04h ~ 7Fh	-	20 ~ 635 ms
06h	SysEx Data Pause In 4	04h ~ 7Fh	-	20 ~ 635 ms
07h	LCD Contrast	00h ~ 7Fh	-	0 = minimum … 127 = maximum
08h	SysEx Device ID	00h ~ 3Fh	-	ID for next SysEx communication
09h ~ 0Fh	not used	00h ~ 7Fh	-	reserve

. Immediately after this message is received, the device transmits "Parameter Save / Load" message. Value of requested parameter is included in that message. The response is transmitted to all of four device's MIDI outputs.

Attention –"Parameter Request" command is ignored during the device is working in edit mode.

5. "PARAMETER SAVE / LOAD" COMMANDS

Form : **F0 00 20 21 ii 37 20 aa dd xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**dd**" = Databyte, "**xx**" = Checksum)

With help of " Parameter Save / Load " command ("**cc**"=20h), it is possible to change temporarily value of individual parameter in edit buffer (see [1] on pic. 1). This message is also transmitted by the device as response to " Parameter Request " SysEx message.

Address "**aa**" defines parameter which value will be changed (see table 1). Valid range of addresses is from 00h to 4Eh. For "**aa**" = 4Fh to 7Fh, the SysEx Msg is evaluated as invalid and it is ignored by the device.

Only one databyte "**dd**" contents new value of parameter chosen by address "**aa**". This value will be stored into edit buffer. Value of databyte "**dd**" must be in valid range (see table 1). In other case, wrong value is automatically corrected to nearest possible valid value.

The device will start working with new data in edit buffer immediately after the command receiving. All changes are temporarily only – they are valid only till another preset is activated.

Attention – "Bulk Dump Data Request" command for system memory bank is ignored during the device is in edit working mode.

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6. "BULK DUMP DATA REQUEST" COMMANDS

Form : **F0 00 20 21 ii 37 30 aa xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address,"**xx**" = Checksum)

With help of "Bulk Dump Data Request" command ("**cc**"=30h), it is possible to read content of any memory bank in internal memory of MMB 4x4 (see [2] on pic. 1).

Address "**aa**" specifies memory bank which content is requested. Valid range of addresses is from 00h to 20h (00h to 1Fh for preset banks and 20h for system bank). For "**aa**" = 21h to 7Fh, the SysEx Msg is evaluated as invalid and it is ignored by the device.

This type of SysEx message doesn't use databyte(s) "**dd**" at all.

Immediately after this message is received, the device responses by SysEx Msg "Bulk Dump Data Save / Load" which contents values of all parameters stored in requested memory bank. The response is transmitted to all of four outputs of the device.

Attention – "Bulk Dump Data Request" command for system memory bank is ignored during the device is in edit working mode.

7. "BULK DUMP DATA SAVE / LOAD" COMMANDS

Form : **F0 00 20 21 ii 37 40 aa dd…dd xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**dd…dd**" = datablock, "**xx**" = Checksum)

With help of "Bulk Dump Data Load" command ("**cc**"=40h), it is possible to change content of memory banks in internal memory of MMB 4x4 (see [2] on pic. 1). This command also enables to control device's display (see [3] on pic. 1).

Address "**aa**" defines number of parameter bank which content will be changed. Valid range of addresses is from 00h to 21h (00h to 1Fh for preset banks, 20h for system bank and 21h for memory of display). For "**aa**" = 22h to 7Fh, the SysEx Msg is evaluated as invalid and it is ignored by the device.

Datablock "**dd…dd**" contents 79 or 16 databytes in dependence on memory bank type selected by address "**aa**".

7.1. "BULK DUMP SAVE / LOAD" FOR PRESET MEMORY BANK

Form : **F0 00 20 21 ii 37 40 aa dd…dd xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**dd…dd**" = datablock, "**xx**" = Checksum)

If address "**aa**" is in range from 00h to 1Fh, the message is command for storage of new values of preset parameters to a preset memory bank. Address "**aa**" defines number of parameter bank to which new values will be stored (00h for preset Nr.. 1, 01h for preset Nr. 2, etc. up to 1Fh for preset Nr. 32).

In this message, datablock "**dd…dd**" always contents 79 databytes which define new values of all parameters stored in preset bank. Order of parameters (values) shows table 1. All values must be in valid range (see table 1). In other case, wrong values are automatically corrected to nearest possible valid values.

The device will start working with newly stored data after preset which data were changed is activated.

This message is also transmitted by the device as response to "Bulk Dump Data request" SysEx message.

Attention – Writing data to system memory bank is impossible if the device is in edit working mode or if memory protection is active (see system parameter "Memory Protection"). In that case, "Bulk Dump Load - Preset" command is ignored.

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7.2. "BULK DUMP SAVE / LOAD" FOR SYSTEM MEMORY BANK

Form : **F0 00 20 21 ii 37 40 20 dd…dd xx F7 [hex]**
(where "**ii**" = Device ID, "**dd…dd**" = datablock, "**xx**" = Checksum)

If address "**aa**" = 20h, the message is command for storage of new values of system parameters to system memory bank.

Datablock "**dd…dd**" always contents 16 databyte which define new values of system parameters. Order of parameters (values) shows table 2. All values must be in valid range (see table 2). In other case, wrong values are automatically corrected to nearest possible valid values.

The device will start working with newly stored data immediately after the command receiving.

This message is also transmitted by the device as response to "Bulk Dump Data request" SysEx message.

Attention – Writing data to system memory bank is impossible if the device is in edit working mode or if memory protection is active (see system parameter "Memory Protection"). In that case, "Bulk Dump Load - System" command is ignored.

7.3. "BULK DUMP DATA LOAD" FOR DISPLAY

Form : **F0 00 20 21 ii 37 40 21 dd…dd xx F7 [hex]**
(where "**ii**" = Device ID,"**dd…dd**" = datablock, "**xx**" = Checksum)

This SysEx Msg allows to control device's display by user – it is possible to show own text.. Datablock "**dd…dd**" contents always 16 databytes which define characters on partial positions of the display. Order is: upper row from left to right (8 databytes) and then lower row from left to right (8 databytes). All values must be in valid range (i.e. 20h to 7Dh - see table 3). Values out of this range are automatically corrected to nearest possible values.

Table 3 – Characters for display (ASCII)

Data	Char.	Data	Char.	Data	Char.	Data	Char.	Data	Char.	Data	Char.
20h	space	30h	0	40h	@	50h	P	20h	‘	70h	p
21h	!	31h	1	41h	A	51h	Q	61h	a	71h	q
22h	“	32h	2	42h	B	52h	R	62h	b	72h	r
23h	#	33h	3	43h	C	53h	S	63h	c	73h	s
24h	$	34h	4	44h	D	54h	T	64h	d	74h	t
25h	%	35h	5	45h	E	55h	U	65h	e	75h	u
26h	&	36h	6	46h	F	56h	V	66h	f	76h	v
27h	‘	37h	7	47h	G	57h	W	67h	g	77h	w
28h	(	38h	8	48h	H	58h	X	68h	h	78h	x
29h	)	39h	9	49h	I	59h	Y	69h	i	79h	y
2Ah	*	3Ah	:	4Ah	J	5Ah	Z	6Ah	j	7Ah	z
2Bh	+	3Bh	;	4Bh	K	5Bh	[	6Bh	k	7Bh	{
2Ch	,	3Ch	=	4Ch	L	5Ch	\	6Ch	l	7Ch	|
2Dh	-	3Dh	<	4Dh	M	5Dh	]	6Dh	m	7Dh	}
2Eh	.	3Eh	>	4Eh	N	5Eh	^	6Eh	n		
2Fh	/	3Fh	?	4Fh	O	5Fh	_	6Fh	o		

Attention – Writing data to display is possible only if the device is in normal working mode. "Bulk Dump Load - Display" command is ignored in all other cases.

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8. "SERVICE " COMMANDS

Form : **F0 00 20 21 ii 37 50 aa dd xx F7 [hex]**
(where "**ii**" = Device ID, "**aa**" = Address, "**dd**" = databyte, "**xx**" = Checksum)

"Service" ("**cc**"=50h) commands allows work with preset memory banks (it is possible to change actual preset, to store data from edit buffer to preset memory banks), selection of working mode of the device (Monitor, Meter) and launching of some system functions. Activity of the device after the command receiving gives address "**aa**". Datablok "**dd**" always contents only one databyte which specifies the operation more exactly.

8.1. CHANGE PRESET

Form : **F0 00 20 21 ii 37 50 00 dd xx F7 [hex]**
(where "**ii**" = Device ID, "**dd**" = databyte, "**xx**" = Checksum)

"Change Preset" ("**aa**"=00h) commands allow remote changes of presets, I.e. selection of actual preset whose parameters will control the device.

Databyte "**dd**" determines number of newly activated preset. Valid range is from 00h to 1Fh. It corresponds to prest number from 1 to 32. If the value of databyte "**dd**" is from 20h to 7Fh, it is corrected to nearest possible value (i.e. 1Fh).

Switching over new preset is executed imme diately after the command receiving.

Attention – Remote changes of preset are possible only if MMB 4x4 is in normal working mode. In all other cases, "Change Preset" command is ignored.

8.2. SAVE PRESET

Form : **F0 00 20 21 ii 37 50 01 dd xx F7 [hex]**
(where "**ii**" = Device ID, "**dd**" = databyte, "**xx**" = Checksum)

"Preset Save" ("**aa**"=01h) commands enable storage of data in edit buffer to a preset memory bank.

Databyte "**dd**" gives number of preset memory bank to which the data will be written. Valid range is from 00h to 1Fh – it corresponds to numbers of preset banks from 1 to 32. If the databyte "**dd**" is from 20h to 7Fh, it is corrected to nearest possible value (i.e. 1Fh).

Original content of edit buffer stays the same without any changes.

Attention – the message will not be accepted by the device if the device works in edit mode or if memory protection is active (see system parameter "Memory Protection"). In that case, "Save Preset" command is ignored.

8.3. GO TO MONITOR

Form : **F0 00 20 21 ii 37 50 02 dd xx F7 [hex]**
(where "**ii**" = Device ID, "**dd**" = databyte, "**xx**" = Checksum)

This command turns the device to working mode "Monitor" and back to normal working mode.

Databyte "**dd**" can be only 00h or 01h. If "**dd**" = 00h, working mode "Monitor" is activated and for "**dd**" = 01h, working mode "Monitor" is switched off.

Attention – remote activation of "Monitor" is possible only if the device is in normal working mode. "Go To Monitor" command is ignored in all other cases.

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8.4. GO TO METER

Form : **F0 00 20 21 ii 37 50 03 dd xx F7 [hex]**
(where "**ii**" = Device ID, "**dd**" = databyte, "**xx**" = Checksum)

This command turns the device to working mode "Meter" and back to normal working mode.

Databyte "**dd**" can be from 00h to 08h. If "**dd**" is from 00h to 07h, working mode "Meter" is activated and for "**dd**" = 08h, working mode "Meter" is switched off. Values of "**dd**" from 00h to 07h define what input or output will be indicated:

dd = 00h → Input 1
dd = 01h → Input 2
dd = 02h → Input 3
dd = 03h → Input 4
dd = 04h → Output 1
dd = 05h → Output 2
dd = 06h → Output 3
dd = 07h → Output 4

Attention – remote activation of "Meter" is possible only if the device is in normal working mode. "Go To Meter" command is ignored in all other cases. If a change of indicated input / output is necessary in "Meter" mode, "meter" mode must be deactivated first ("**dd**" = 08h) and then activated for newly requested input / output ("**dd**" = 00 to 07h).

8.5. PANIC

Form : **F0 00 20 21 ii 37 50 04 00 75 F7 [hex]**
(where "**ii**" = Device ID)

Immediately after "Panic" command is received, sequence of MIDI commands for reset of all next MIDI devices is transmitted to all of MMB 4x4's outputs. "Panic" sequence is transmitted in short or in full form in dependence on setting of system parameter "Panic – Full Message". After "Panic" sequence is finished, MMB 4x4 returns to normal working mode.

8.6. RESTART

Form : **F0 00 20 21 ii 37 50 04 01 74 F7 [hex]**
(where "**ii**" = Device ID)

"Restart" command executes hardware reset of MMB 4x4. Immediately after the command is received, work of MMB 4x4 is stopped and the device is set to the same status as after it is switched on

8.7. FACTORY RESET

Form : **F0 00 20 21 ii 37 50 04 02 73 F7 [hex]**
(where "**ii**" = Device ID)

After this command receiving, complete initialization of the device is executed. MMB 4x4 is set to "factory reset" status

Attention - all data stored by user in memory are erased during command execution !

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