MA-3 SMF
Outline of Interpretation

Version 1.10.3
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Yamaha Corporation

Note:

For explanation of definition of functions, the following formats are defined for use.

Definition format	Meaning	Definition format	Meaning
UINT8	8 bits without code	SINT8	8 bits with code
UINT16	16 bits without code	SINT16	16 bits with code
UINT32	32 bits without code	SINT32	32 bits with code

Revision

Ver.	Date	Description
1.0	5/8/2001	Initial edition
1.1	5/21/2001	Velocity curve was corrected.
1.2	6/22/2001	MA-3 voices were changed.
1.3	6/28/2001	Contents information designation was changed.
1.4	7/23/2001	Bank=0x78/0x79 support was added.
1.5	7/24/2001	Rhythm metha-event was deleted.
1.5.1	7/31/2001	MonoMode support was changed.
1.5.2	9/10/2001	Clerical error was corrected.
1.5.3	9/19/2001	The initial value of MasterVolume was changed into –9 [dB].
1.5.4	9/25/2001	DVA specification was simplified.
1.6.0	9/25/2001	Format-1 was added.
1.6.1	11/26/2001	The YAMAHA extension was treated as option.
1.6.2	12/25/2001	The item of 4-OP voice registration in 2-OP mode was added. The voice-range expression was corrected.
1.6.3	1/25/2002	The definition of FM fundamental waveform registration message was added. (Non-supporting) The mistake of correspondence bank was corrected.
1.6.4	3/25/2002	Clerical error was correction.
1.6.5	5/15/2002	2 The wrong word in Outline of Conversion was corrected. 3.1 Setting volume The MasterVolume correspondence (Universal SysEx) was added. MasterVolume only for MA-3 is renamed to MaxGain The Change setting of NoteOn Velocity curve is specified. 3.4.4 Special processing of rhythmic tones was changed. A tone is limited to compatibility with GM L1. 3.6 MIDI message to support The change setting of NoteOn Velocity curve is specified The range clerical error of Hold1 is corrected. The MasterVolume correspondence (Universal SysEx) was added. The Pitch bend range was changed into 0..24 from 1..24. MasterVolume only for MA-3 is renamed to MaxGain. The waveform number of WT tone waveform setting was limited to 0..31. GM SystemOn setting clerical error was corrected. The UserEvent clerical error was corrected. 4.1 DEFAULT SOUND SET was changed. The Drum tone was limited to GM L1 specification. 4.3 The wrong word of MIDI Implementation Chart was corrected.

Ver.	Date	Description
1.9.0	7/15/2002	SP-MIDI correspondence. 2.1 The SP-MIDI correspondence was added. 3.4 The corresponding tone bank was changed to GM L2 conformity. 3.6 The supporting MIDI message was updated. The BankSelect setting was changed in line with GM L2. MIP correspondence (SP-MIDI SysEx) was added. GM2 SystemOn was added. GM SystemOff was added. Bank=0x79/0x06, Prog=0x7C has no pronunciation. 3.8.5.1 General-purpose extension MIP initialization was added to GM SystemOn/Off. 4.3 MIDI Implementation Chart was corrected. The setup measure definition was changed 3.5 It was changed so that it may have consistency also in GM Life recommendation. The mode which uses 4-OP tone at the time of 4-OP mode was added. 3.4.1 Description was added to the number of simultaneous pronunciation. Format1 processing explanation was added. 3.6 Multitrack Chapter change 3.7 Format structure Error condition was written clearly. 3.7 The data which becomes error
1.9.1	7/30/2002	The error condition was added. 3.7 The chapter of data which becomes error was moved. 3.8 The data which becomes faulty pronouncing was added. 4.3 MIDI Implementation Chart unnecessary characters were deleted.
1.9.2	12/15/2002	The vibrator setting was changed. 2.1 The vibrator operation was added. The explanation for the non-supported extension message was deleted. 3.10.5.2 Un-installed command was deleted.
1.10.2	1/23/2003	3.10.2 The mistake of interpretation in Metha-events was corrected.
1.10.3	3/14/2003	3.9 The clerical error of Format structure was corrected.

Contents

1 Outline

This document presents the specifications of SMF format that is supported by MA-3. It is guaranteed that SMF that is accepted can interpret message of GM Lite/GM L1 written in format 0/1.
When HW is in 24-Voice mode, it complies with GM Lite, or with GM L1 when in 40-Voice mode. An extension is supported to utilize it for ringing melody or Java as well as standard GM message.

2 Outline of conversion

It is interpreted with the agreement of GM Lite/M L1 as much as possible.
However, only DVA processing more nearly simplex than the DVA mechanism specified by GM Lite for load reduction is supported, and some messages considered to be unnecessary for the mobile phone in GM L1 definition are not supported. Since, the above differences exist, it does not become GM full conformity.

- Interpretation of messages in accordance with provisions of GM Lite
  - Poly-phonic tone generation
  - Generates tones giving precedence to later ones
- Supports GM standard voices. (FM 2-OP voices)
- Defines MaxGain devoted to MA-3 that determines maximum output with a single sound for the purpose of obtaining sufficient sound pressure. (Option)
  Standard: -9dB, Maximum: 0dB
- Corresponds to MIP message of SP-MIDI standard

2.1 SP-MIDI correspondence

SP-MIDI installation described in the following 2 documents is performed

Scalable Polyphony MIDI Specification Ver 1.0 February 20, 2002

SP-MIDI Device 5-24 Note Profile for 3GPP Ver 1.0 February 15, 2002

By the former MMA document, the definition of MIP message which is the core idea of SP-MIDI is given and by the later, the definition of SP-MIDI is given but there are many ambiguous points in the specification.

The SP-MIDI installation has become as follows because of ambiguity of the specification and the convenience of system.

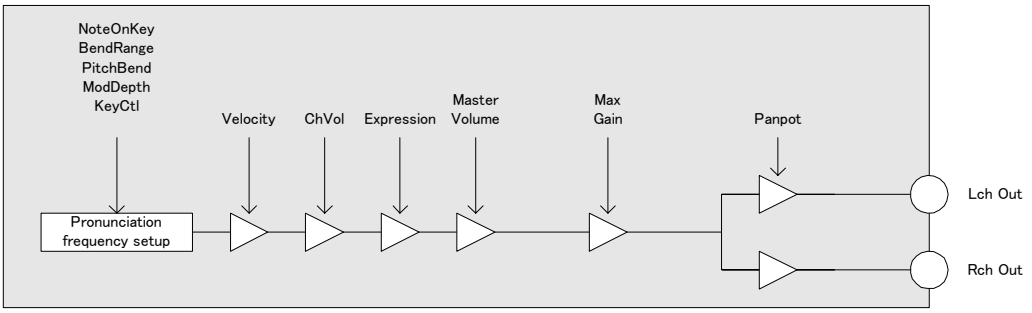
SP-MIDI indispensable item	MA-3	Note
NoteOn/NoteOff	○	-
Program Change	○	-
Bank Select	○	-
Modulation Depth	△	Relative setting to Tone FM-LFO depth setting.
Channel Volume	○	-
Pan	△	Drum tone is only a tone definition panpot.
Expression	○	-
Hold1	○	-
Data Entry	○	-
RPN LSB/MSB	○	-
PitchBend Sensitivity	○	-
RPN NULL	○	-
All Sound Off	○	-
Reset All Controllers	○	-
All Note Off	○	-
Pitch Bend	○	-
Channel Pressure	×	It does not correspond.
MasterVolume (Universal SysEx)	○	-
MIP Message (SysEx)	△	Only the CH mask function. DVA is post-arrival preference completely and does not have CH preference function. FM pronunciation number is treated as whole pronunciation number.
GM System On/Off	○	-
Vibrator Control	△	Bank=0x79:0x06, Prog=0x7C do not generate tone.

3 Data format

Handles only data of SMF format 0/1.
The internal sequence is interpreted assuming that it complies with GM Lite.

3.1 Setting volume

Overall volume is obtained by adding five tone parameters that are set with Channel volume, Expression, NoteOn Velocity, MasterVoleme and MaxGain. NoteOn Velocity is a setting of source code and can be selected from 20Log() and 40Log().



3.2 Setting pitch

Overall pitch setting is obtained from Note numbers and bend information. Musical intervals are determined from keys and pitch bend in the Note message. However, in MA-3, the octave may fall about above 108.

3.3 Assignment of tone generation slot

Operation when the number of tones generated simultaneously is exceeded is as described below. DVA for FM, the one for WT are performed independently.

1) When there are KeyOff tones, tones with later KeyOff are given precedence.
2) When all tones are KeyOn, tones of later KeyOn are given precedence.

3.4 Corresponding voice banks

Melody tones and drum tones are distinguished based on the following conditions. In the designated sections, the tones are generated as GM sound set, and in some sections, users can change the contents. Although results of tone generation are not guaranteed in the banks that are not designated.

Melody

• Bank = 0x00:0x00, Ch# = 0..8,10..15	Default voices (for old GM)
• BankMSB = 0x7C, BankLSB = 0..9	User voices (option)
• BankMSB = 0x79, BankLSB = 0	Default voices

Drum

• Bank = 0x00:0x00, Ch# = 9	Default voices (for old GM)
• BankMSB = 0x7D, Program = 0..9	User voices (option)
• BankMSB = 0x78 , BankLSB = 0, Program = 0	Default voices

3.4.1 Number of simultaneously generated tones

MA-3 is to be made operable in 4-OP FM x 16-Voice + WT x 8-Voice mode. 2-OP FM x 32-Voice + WT x 8-Voice mode also can be operated as option. At 4-OP mode, it changes to built-in ROM tone and also can select 4-OP tone as option.

3.4.2 MIDI channels

Corresponding to MIDI channels 1..16.

3.4.3 Tone generation

To be omni OFF and poly-phonic ON.

3.4.4 Special processing of rhythmic voices

• Only Key#71/72/74 respond to KeyOff.
• Exclusive assignment of three hi-hat tones (Key#42/#44/#46)
• Exclusive assignment of Key#71/#72
• Exclusive assignment of Key#73/#74
• Exclusive assignment of Key#78/#79
• Exclusive assignment of Key#80/#81

3.5 Set up measure

When Beat=1/4 and Tempo=240 at time "0" of SMF, and when Beat and Tempo messages are at time 240, the messages that are in the first one measure are interpreted as the set up data, and thus, all the messages are processed at time "0". As for this, only format-0 is effective and it is not adapted in format-1.

3.6 Multitrack

It is only 1 track chunk in Format-0, but plural track chunks are dealt in Format-1. The maximum track number becomes the number which is shown in MAX_SMF_TRACKS. And tracks beyond that number are ignored. Plural tracks are merged and reproduced in the order of time. Same time event is processed in the order with small number.

3.7 Data which becomes error

The data applicable to the following conditions cannot reproduce.

- Data which reproduction time is 20 or less ms
- Data which have no MIDI message byte (> 0x7F)
- Data which file size is 22 or less byte
- Data whose head is not "MThd"
- Data whose “MThd” chunk size is not 6
- Data whose SMF format number is 2 or more
- Data whose SMF format number is 1 and the track number is 2 or more
- Data whose time resolution is 0
- Data whose time unit is TimeBase
- Data whose chunk exceeds the file size
- Data which have no “MTrk” chunk

3.8 Data which becomes faulty pronouncing

The data which comes under the following condition may not reproduce correctly, even if it does not have problem in synthesizer specification.

- Data which reproduction time is 34 or more min (to be exact, 2^21[ms])
- Data whose track number exceeds the setting value (default is 17)

3.9 Format structure

```
<Header chunk>
        UINT8       ID[4] = “MThd”
        UINT32      Size            // Size of header chunk [bytes] (fixed to 6)
        UINT16      FormatNo        // Format number
        UINT16      NumofTrack      // No. of tracks
        UINT16      TimeUnit        // Time unit (length of quarter notes)
                                    // bit 15:   0: NoteBase, 1 :TimeBase
                                    // (1 is not supported)
                                    // bit 14..0:          resolution
                                    // (Range out of 12..480 is not guaranteed.)
<Tracks>
        UINT8       ID[4] = “MTrk”
        UINT32      Size            // Size of events [byte]
        UINT8       Events[]        // SMF event string
<End>
```

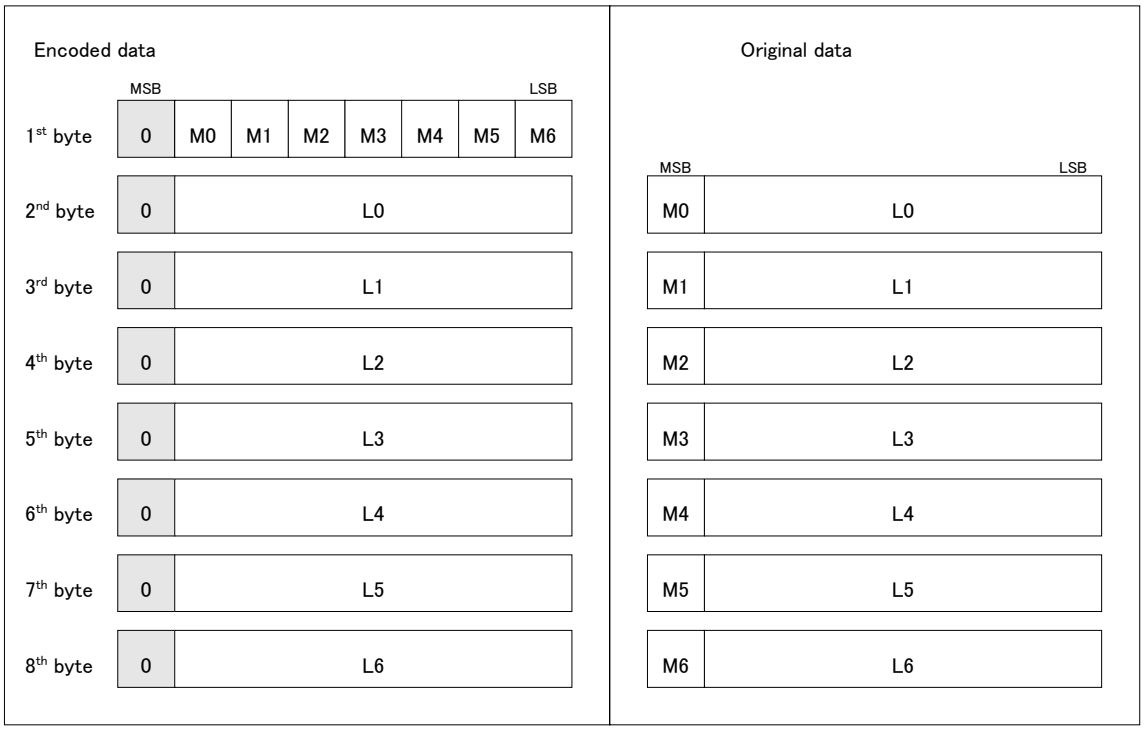
[Event] = [DeltaTime][MIDI event] or
[DeltaTime]Meta event] or
[DeltaTime][SysEx event]

[DeltaTime] = 1..4 byte
bit7:Continue bit, bit 6..0: time

3.10 MIDI message to support

3.10.17 bit encode

To send specific data in the format of MIDI ExMsg, conversion is made so that the most significant bit becomes "0". This 7 bit encoding method is as described below, where a byte that holds lacking MSB-bit at every 8th byte.



3.10.2Metha-events

Designation of title 0xFF, 0x03, <Len>, <text>

Description

Designates titles of musical compositions. Since character codes are not designated, entry using ASCII codes is recommended. Some combination of character codes and reproduction units can provide incorrect display of the title.
It is expected that this is at Tick=0.

Argument

None

Designation of copyright information 0xFF, 0x02, <Len>, <text>

Description

Designates copyright information. Since character codes are not designated, entry using ASCII codes is recommended. Some combination of character codes and reproduction units can provide incorrect display of the copyright information.
When this designation is provided, it is deemed that the copyright is protected.
It is expected that this is at Tick=0.

Argument

None

Designation of play ending position 0xFF, 0x2F, 0x00

Description

Designates play ending position. Data other than the ending position are ignored.
When this is not designated, it is placed at the end of the data.

Argument

None

Designation of tempo 0xFF, 0x51, 0x03, HH, MM, LL
0xFF, 0x51, 0x04, HH, MM, LL, XX

Description

Changes reproduction speed (basic time = 1-TickTime).
Basic time [us] = Tempo / resolution
Resolution is shown with data that is included in the head of SMF.
default : 500,000

Argument

HH/MM/LL : Tempo = (HH << 16) + (MM << 8) + LL
XX : Ignored.

3.10.3SysEx events

SysEx1 0xF0, L1,..Ln, X1,..Xm, 0xF7

Description

Method of presentation of extended message (1)

Argument

L1..Ln : Data length (m+ 1)

X1..Xm : SysEx message that does not include the head 0xF0 and the last 0xF7.

SysEx2 0xF7, L1,..Ln, X1,..Xm

Description

Method of presentation of extended message (2)

Argument

L1..Ln : Data length (m)

X1..Xm : SysEx message

3.10.4MIDI events

NoteOff 0x8n, kk, vv

Description

KeyOff

Argument

n : Channel number (0..15)
kk : Note number (0..127)
vv : Key velocity "vv" is ignored.

NoteOn 0x9n, kk, vv

Description

KeyOn. However, ignore it since KeyOn is used as Vibrator Control in SP-MIDI standard in Bank=0x79:0x06, Prog=0x7C.

Argument

n : Channel number (0..15)
kk : Note number (0..127)
vv : When velocity (0..127)vv = 0, it is interpreted as NoteOff.
Vol[dB] = 20 * log (vv/127), however, MUTE when vv = 1.
By source option setting, Velocity curve can be changed into 40Log().

BankSelect(MSB) 0xBn, 0x00, vv
BankSelect (LSB) 0xBn, 0x20, vv

Description

Sets data bank of designated channel. The change of real tone occurs on ProgramChange. 0x00/0x00 is a setting for a part of outdated GM data relief.
The initial value is 0x79/0x00(n != 9) and 0x78/0x00(n == 9).

Bank#=0x00/0x00 becomes GM melody (n!=9), GM drum (n==9).
GM melody is designated for Bank#=0x79/0x00.
Prg=0x00 becomes GM drum designation for Bank#=0x78/0x00.
Melody extension is designated for Bank#=0x7C/0x00..0x7C/0x09.
Prg=0x00..0x09 becomes Drum extension designation for Bank#=0x7D/xx
When there is no voice in the extended domain, they are to be GM voices.
However, Bank=0x79:0x06, Prog=0x7C is no pronouncing since it is used as Vibrator Control in SP-MIDI standard.

Argument

n : Channel number (0..15)
vv : Set value (0..127)

Modulation 0xBn, 0x01, vv

Description

Changes the amount of vibrato of designated channels.
With of change varies among the voices.

Argument

n : Channel number (0..15)

vv : Depth of vibrato added to standard vibrato (0..127)
0 : OFF
1..127 : Standard setting x 2^ (vv/32) [cents]
1..31 : Standard setting
32..63 : Standard setting x 2
64..95 : Standard setting x 4
96..127 : Standard setting x 8
default: 0

Channel Volume 0xBn, 0x07, vv

Description

Changes volume of designated channels.

Argument

n : Channel number (0..15)

vv : Data value (0..127)
Gain[dB] = 20 * log (vv^2/127^2), <Gain = MUTE if vv = 0>
default: 100

Panpot 0xBn, 0x0A, vv

Description

Sets stereo orientation position of designated channels.

Argument

n : Channel number (0..15)

vv : Control value (0..127)
Lch[dB] = 20 * log(Cos(PAI/2 * vv/127) , < Lch = MUTE if vv = 127>
Lch[dB] = 20 * log(Cos(PAI/2 * vv/127) , < Lch = MUTE if vv = 127>
default: 64

Expression 0xBn, 0x0B, vv

Description

Changes volume that is set with ChannelVolume of designated channels.

Argument

n : Channel number (0..15)

vv : Control value (0..127)
Exp[dB] = 20 * log (vv^2/127^2), <Exp = MUTE if vv = 0>
default: 127

Hold1 0xBn, 0x40, vv

Description

Changes damper setting of designated channels.
Valid only for voices for which damper is valid.
Default is OFF.

Argument

n : Channel number (0..15)
vv : Damper setting (0..63:OFF, 64..127:ON)

DataEntry(MSB) 0xBn, 0x06, vv
DataEntry(LSB) 0xBn, 0x26, vv

Description

Data entry
Supports only RPN (0,0) (Setting of pitch bend change width).
vv that is set at MSB side shows sensitivity in 100 [cents] (0..24)
LSB is ignored. Default is 200 [cents].

Argument

n : Channel number (0..15)
vv : Set value (0..127)

NRPN(MSB) 0xBn, 0x63, vv
NRPN(LSB) 0xBn, 0x62, vv

Description

Sets NRPN number.
Initial value is 127.
NRPN (0,0) is not supported, however, discrimination whether DataEntry is for NRPN or for RPN is made.

Argument

n : Channel number (0..15)
vv : RPN number (0..127)

RPN(MSB) 0xBn, 0x65, vv
RPN(LSB) 0xBn, 0x64, vv

Description

Sets RPN number.
Initial value is 127.
RPN(0,0) becomes a pitch bend change width setup.

Argument

n : Channel number (0..15)
vv : RPN number (0..127)

ResetAllCtl 0xBn, 0x79, 0x00

Description

Resets Control value of designated channels.
Mod[Ch] = 0 (OFF)
Expression[Ch] = 127 (Max)
Hold1[Ch] = 0 (OFF)
PitchBend[Ch] = 512 (1.0)
RPN[Ch] =0x7F:0x7F

Argument

n : Channel number (0..15)

AllSoundOff 0xBn, 0x78, 0x00

Description

Performs tone deadening of designated channels.

Argument

n : Channel number (0..15)

AllNoteOff 0xBn, 0x7B, 0x00

Description

KeyOff all tones of designated channels.

Argument

n : Channel number (0..15)

MonoModeOn 0xBn, 0x7E, 0x01

Description

Designates monophonic tone generation for designated channels.
All default tone generations are poly-phonic.
However, when drum is designated, it is interpreted automatically as PolyModeOn, and designation of MonoModeOn is ignored.

Argument

n : Channel number (0..15)

PolyModeOn 0xBn, 0x7F, 0x00

Description

Designates poly-phonic tone generation for designated channels.
All default tone generations are poly-phonic.

Argument

n : Channel number (0..15)

ProgramChange 0xCn, pp

Description

Sets voices of designated channels.

Argument

n : Channel number (0..15)

pp : Program number (0..127)
default: 0

PitchBend 0xEn, LL, HH

Description

Changes pitch of designated channels. Initial value of Max change width is 200[cents], and this Max. can be changed with RPN00H/00H.

Argument

n : Channel number (0..15)

LL : Amount of bend (LSB : 0..127)

HH : Amount of bend (MSB : 0..127)
HH:LL : 0x00:0x00 (-Max)..0x40:0x00 (0[cents])..0x7f:0x7f (+Max)
default: 0x40:0x00
Cent-linear change curve.

3.10.5Extension messages

3.10.5.1General purpose extension

GM1 SystemOn 0xF0, 0x7E, 0x7F, 0x09, 0x01, 0xF7
GM SystemOff 0xF0, 0x7E, 0x7F, 0x09, 0x02, 0xF7
GM2 SystemOn 0xF0, 0x7E, 0x7F, 0x09, 0x03, 0xF7

Description

Initializes parameters after deadening sounds.
MaxGain=76（-9dB）
MasterVolume = 127(0dB)
#Bank[all] = 0x79/0x00(n != 9), 0x78/0x00(n == 9)
#Prog[all] = 0
Poly[All] = 1
ChVolume[all] = 100
Panpot[all] = 64(Center)
Mod[all] = 0(OFF)
Exp[all] = 127(Max)
Hold1[all] = 0(OFF)
PitchBend[all] = 0[cent]
RPN[all] =0x7F:0x7F
MIP_MUTE[ALL] = FALSE

Argument

None

MasterVolume 0xF0, 0x7F, 0x7F, 0x04, 0x01, LL, HH, 0xF7

Description

Sets the Master Volume.

Argument

LL : Master Volume low rank (0..127)
Ignore
HH : Master Volume Upper rank (0..127)
Gain[dB] = 40 * Log10(HH/127)[dB]
default: 127(0dB)

MIP Message 0xF0, 0x7F, 0x7F, 0x0B, 0x01, {cc, vv}, 0xF7

Description

Set MIP value.

All channels effective in the initial setting. Perform MIP setting after all channels are annulled if it receives MIP message. {} for a maximum of 16 channels can be set up. If it exceeds 16, it is ignored. The result of inaccurate message in which MIP value decreases on the way is not guaranteed if plural MIP values are pasted in the same channel.

In the installation of MA-3, the processing to ignore NoteOn to the channel which exceeds the maximum pronunciation number of system. FM pronunciation number is treated as the maximum pronunciation number of system. FM pronunciation number can be set as 16 tones or 32 tones by the Compile option.

Argument

cc : Number Channel (0..15)

vv : MIP value (0..127)

3.10.5.2 Devoted to MA-3

The YAMAHA extension message for MA-3, which starts from 0xF0, 0x43, 0x79 and 0x06, is only defined, not guaranteed.

Max Gain	0xF0, 0x43, 0x79, 0x06, 0x7f, 0x00, vv, 0xF7

Description

Sets maximum value of channel volume at MIDI reproduction.
True channel volume is obtained as a synthesis of this setting and channel setting volume.
This is used when raising sound pressure per a single sound.

Argument

vv: Master volume (0..127)
Gain[dB] = 40 * Log10 (vv/127)[dB]
default: 76 (-9dB)

4 Appendix

4.1 Default sound set

4.1.1 Melody voices

The Key Range is recommended musical scale range, and thus, the voices are not guaranteed to be designated instrument voices.
Key Range (that may be heard as different instruments) is to be key number with MIDI representation, and the voice generation is to be a temperament unless otherwise designated. As the voices, ROM voices build in MA-3 are used.

PC#	Instrument	Key Range	PC#	Instrument	Key Range
0	GrandPno	21-108	32	AcoBass	28-55
1	BritePno	21-108	33	FngrBass	28-55
2	E.GrandP	21-108	34	PickBass	28-55
3	HnkyTonk	21-108	35	Fretless	28-55
4	E.Piano1	28-103	36	SlapBas1	28-55
5	E.Piano2	28-103	37	SlapBas2	28-55
6	Harpsi	41-89	38	SynBass1	28-55
7	Clavi	36-96	39	SynBass2	28-55
8	Celesta	60-108	40	Violin	55-96
9	Glocken	72-108	41	Viola	48-84
10	MusicBox	60-84	42	Cello	36-72
11	Vibes	53-89	43	Contrabs	28-55
12	Marimba	48-84	44	TremStr	28-96
13	Xylophon	65-96	45	PizzStr	28-96
14	TubulBel	60-77	46	Harp	23-103
15	Dulcimar	60-84	47	Timpani	36-57
16	DrawOrgn	36-96	48	Strings1	28-96
17	PercOrgn	36-96	49	Strings2	28-96
18	RockOrgn	36-96	50	Syn.Str1	36-96
19	ChrchOrg	21-108	51	Syn.Str2	36-96
20	ReedOrgn	36-96	52	ChoirAah	48-79
21	Acordion	53-89	53	VoiceOoh	48-79
22	Harmnica	60-84	54	SynVoice	48-84
23	TangoAcd	53-89	55	Orch.Hit	48-72
24	NylonGtr	40-84	56	Trumpet	58-94
25	SteelGtr	40-84	57	Trombone	34-75
26	JazzGtr	40-86	58	Tuba	29-55
27	CleanGtr	40-86	59	Mute.Trp	58-82
28	Mute.G.tr	40-86	60	Fr.Horn	41-77
29	Ovrdrive	40-86	61	BrasSect	36-96
30	Dist.Gtr	40-86	62	SynBras1	36-96
31	GtrHarmo	40-86	63	SynBras2	36-96

PC#	Instrument	Key Range	PC#	Instrument	Key Range
64	SprnoSax	54-87	96	Rain	36-96
65	AltoSax	49-80	97	SoundTrk	36-96
66	TenorSax	42-75	98	Crystal	36-96
67	Bari.Sax	37-68	99	Atmosphr	36-96
68	Oboe	58-91	100	Bright	36-96
69	Eng.Horn	52-81	101	Goblins	36-96
70	Bassoon	34-72	102	Echoes	36-96
71	Clarinet	50-91	103	Sci-Fi	36-96
72	Piccolo	74-108	104	Sitar	48-77
73	Flute	60-96	105	Banjo	48-84
74	Recorder	60-96	106	Shamisen	50-79
75	PanFlute	60-96	107	Koto	55-84
76	Bottle	60-96	108	Kalimba	48-79
77	Shakhchi	55-84	109	Bagpipe	36-77
78	Whistle	60-96	110	Fiddle	55-96
79	Ocarina	60-84	111	Shanai	48-72
80	SquareLd	21-108	112	TnklBell	72-84
81	SawLead	21-108	113	Agogo	60-72
82	CaliopLd	36-96	114	SteelDrm	52-76
83	ChiffLd	36-96	115	Wood Block	60-72(*1)
84	CharanLd	36-96	116	Taiko Drum	60-72(*2)
85	VoiceLd	36-96	117	Melodic Tom	60-72(*3)
86	FifthLd	36-96	118	Synth Drum	60-72(*4)
87	Bass&Ld	21-108	119	Reverse Cymbal	60-72(*4)
88	NewAgePd	36-96	120	Guitar Fret Noise	60-72
89	WarmPad	36-96	121	Breath Noise	60-72
90	PolySyPd	36-96	122	Seashore	60-72(*5)
91	ChoirPad	36-96	123	Bird Tweet	60-72(*6)
92	BowedPad	36-96	124	Telephone Ring	60-72(*7)
93	MetalPad	36-96	125	Helicopter	60-72(*7)
94	HaloPad	36-96	126	Applause	60-72(*6)
95	SweepPad	36-96	127	Gunshot	60-72(*5)

*1 : 50 cents / halftone, #69 = F#4
*2 : 50 cents / halftone, #69 = A2
*3 : 50 cents / halftone, #69 = C#4
*4 : 50 cents / halftone
*5 : 20 cents / halftone
*6 : 5 cents / halftone
*7 : 10 cents / halftone

4.2 Percussion sound set

Tones generated when drum bank is designated. As the voices, ROM voices build in MA-3 are used.

Key#	Instrument	Pan	Key#	Instrument	Pan
24	-		56	Cowbell	84
25	-		57	Crash Cymbal 2	44
26	-		58	Vibraslap	29
27	-		59	Ride Cymbal 2	44
28	-		60	Bongo H	99
29	-		61	Bongo L	99
30	-		62	Conga H Mute	39
31	-		63	Conga H Open	39
32	-		64	Conga L	44
33	-		65	Timbale H	84
34	-		66	Timbale L	84
35	Bass Drum M	64	67	Agogo H	29
36	Bass Drum H	64	68	Agogo L	29
37	Closed Rim Shot	64	69	Cabasa	29
38	Snare M	64	70	Maracas	24
39	Hand Clap	54	71@	Samba Whistle H	99
40	Snare H	64	72@	Samba Whistle L	99
41	Floor Tom L	34	73	Guiro Short	94
42	Hi-Hat Closed	84	74@	Guiro Long	94
43	Floor Tom H	46	75	Claves	84
44	Hi-Hat Pedal	84	76	Wood Block H	99
45	Low Tom	58	77	Wood Block L	99
46	Hi-Hat Open	84	78	Cuica Mute	44
47	Mid Tom L	70	79	Cuica Open	44
48	Mid Tom H	82	80	Triangle Mute	24
49	Crash Cymbal 1	84	81	Triangle Open	24
50	High Tom	94	82	-	
51	Ride Cymbal 1	44	83	-	
52	Chinese Cymbal	44	84	-	
53	RideCymbal Cup	44	85	-	
54	Tamboulin	74	86	-	
55	Splash Cymbal	54	87	-	

• Only the voices marked with @ responds to KeyOf.

The following can applies to other than BANK#=128.
• Exclusive assignment of three high-hat tones (Key#42/#44/#46)
• Exclusive assignment of Key#71/#72
• Exclusive assignment of Key#73/#74
• Exclusive assignment of Key#78/#79
• Exclusive assignment of Key#80/#81

4.3 MIDI Implementation Chart

YAMAHA [Tone Generator] Date : 21-MAY-2001
Model YMU762(MA-3) MIDI Implemention Chart Version : 1.0

Function...		Transmitted	Recongnized	Remarks
Basic	Defult	X	X	
Channel	Changed	X	X	
	Default	X	3	
Mode	Messages	X	X	
	Altered	**********	X	
Note		X	0 - 127	
Number	:True voice	**********	0 - 108	
Velocity	Note ON	X	o 9nH,v=1-127	v=1 is Mute.
	Note OFF	X	X	
After	Key's	X	X	
Touch	Ch's	X	X	
Pitch Bender		X	o	
	0,32	X	o	
	1,5,7,10,11	X	o	5 is un-mounted.
	6,38	X	o	Only bend range setup (0:0)
	64-67	X	o	Only Hold1
Control	71-74	X	X	
Change	84	X	X	
	91,93,94	X	X	
	96-97	X	X	
	98-99	X	X	
	100-101	X	X	
Prog		X	o 0- 127	
Change	:True#	X		
System Exclusive		X	o	
	:Song Pos.	X	X	
Common	:Song Sel.	X	X	
	:Tune	X	X	
System	:Clock	X	X	
Real Time	:Commands	X	X	
Aux	:All Sound Off	X	o(120)	
	: Reset All Cntrls	X	o(121)	
Mes-	:Local ON/OFF	X	X	
sages	:All Notes OFF	X	o(123)	
	:Active Sense	X	X	
	:Reset	X	X	
Note:				

Mode3: OMINI OFF, POLY

o : Yes
X : No