Recommendations for Producing XG Song Data

V 2.00

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Introduction

This document suggests some recommendations for producing MIDI song data with Yamaha's XG tone generators.

As you produce XG song data, we ask that you observe the guidelines set forth below in this document, and endeavor to produce song data that takes maximum advantage of the XG format and of each tone generator.

Contents

A. Production standards

1. Expressive means for the musical data

- Please make effective use of basic data such as velocity or gate time to strive to replicate the musical nuances of the original.

2. Polyphony

- Regarding polyphony, please observe the standards for each XG Level as described separately. If polyphony is insufficient and “stolen notes” occur, please eliminate unnecessary overlapping of gate time or unnecessarily long release times, avoid unneeded use of CC#64, and then delete or omit notes from low-priority parts. In this case, please arrange the song with due consideration paid to the song structure, the role of each instrument, and the sound.

3. Selection of sounds

- You need not feel bound by the names of sounds — please use sounds that allow the character of the original song to be expressed most faithfully.

B. Classification of XG song data

XG song data is classified into the following categories by XG format extension level.

1. XG Level 1

This category uses the most basic XG functionality, and is intended for current on-board tone generators and software synthesizers etc.

- Polyphony: 32 notes (32 elements)
- Number of parts: maximum 16 parts
- Effect blocks available: reverb, chorus, variation

* Limitations apply to effect types, sounds, and other functions. In general, those marked “Extension” in the XG Specification may not be used. In particular, please pay attention to “Extension” items related to MULTI PART parameter changes.

** Although they are “Extension” items, use of the Display Letter and Display BitMap Data functions are recommended as long as they do not adversely impact the playback.

*** The AD Part functionality may likewise be used. You may also use Multi EQ, but if you do, please make sure that an excessive difference does not occur when the data is played back on a tone generator which does not have Multi EQ.

2. XG Level 2

This category is intended for the current MU100 tone generator and products of a similar level.

- Polyphony: 64 notes (64 elements)
- Number of parts: maximum 32 parts, 2 ports
- Effect blocks available: reverb, chorus, variation, insertion 1, insertion 2, total EQ

* As a rule, you may use all the functionality, sounds, and effects etc. of the MU100.

** However, use of the individual outputs of the MU100R is not recommended.

*** You must use the “MU100 Native” sound map.

3. XG Level 3

This category is intended for the current MU128 tone generator.

- Polyphony: 128 notes (128 elements)
- Number of parts: maximum 64 parts, 4 ports
- Effect blocks available: reverb, chorus, variation, insertion 1, insertion 2, total EQ

* As a rule, you may use all the functionality, sounds, and effects etc. of the MU128.

** You must use the “MU100 Native” sound map.

4. XG Plug-In Board

This category assumes the use of various plug-in boards for installation in the MU100 or MU128.

- The currently applicable plug-in boards are the four types VH, VL, DX, and SG.
- Production guidelines for each type of board shall be decided by separate consultation.
- Polyphony: 64 notes (64 elements) + polyphony of the board
- Number of parts: maximum 32 parts (one of which is used by the internal board), 2 ports
- Effect blocks usable: reverb, chorus, variation, insertion 1, insertion 2, total EQ

* As a rule, you may use all the functionality, sounds, and effects etc. of the MU100.

** However, use of the individual outputs of the MU100R is not recommended.

*** You must use the “MU100 Native” sound map.

For a list of tone generators compatible with each XG level, please refer to the separate “Tone generator compatibility list.”

Standard musical instruments included in the “XG Specifications”

MU80	MU50	MU10	MU90	MU90B	MU90R
MU100**	MU100R**	MU100B**	MU128***	MU15	
QS300					
B2000					
SDX3000					
CS1x	CS2x				
K1XG					
DB50XG	DB60XG	DB51XG			
DS-1					
SW60XG	SW1000XG**				
QY70	QY700				
CVP92	CVP94	CVP96	CVP98		
PSR430	PSR530	PSR630	PSR730	PSR8000	
MDP-10					
SE7000	SE7000II				
MCT-100					
PCC10XG					
YU5SXG	YU3SXG	YU1SXG	YU5Wn	YU3Wn	YU1Wn
DGP-2XG					
EMR 1					
S-YXG100	S-YXG50(Mac)				
WF192XG	WF192XG Digital				

Unmarked	XG Level1
**	XG Level2
***	XG Level3

C. Sequence data format

1. File format for storage

XG Level 1: SMF format 0 (one multi-channel track)

XG Level 2, XG Level 3, XG Plug-In Board: SMF format 1 (X multi-channel track)

* When using SMF format 1, one track shall contain one part (one channel); use of multiple MIDI channels in a single track is not recommended.

** When using SMF format 1, setup data must be inserted at the beginning of the track for each part. Do not place the setup data together in a separate dedicated track.

2. Number of channels used

XG Level 1: 16 MIDI channels or fewer

XG Level 2: 16 × 2 MIDI channels or fewer

XG Level 3: 16 × 4 MIDI channels or fewer

XG Plug-In Board: 16 × 2 MIDI channels or fewer

3. Data size

Although, there is no particular limitation on data size, use of unnecessarily large files is not recommended. Please do not leave any unneeded data (proprietary flags or markers, unnecessary amounts of continuous controller data etc.) in the file.

4. Output Level settings (track volumes)

In general, you should first set the volume of the drum track, and then adjust the remaining volumes. At this time, the drum track volume will probably be about 100, but you may set it to a value that you consider appropriate in view of the character of the song or other circumstances. If the song does not have a drum track, you should mix down on the basis of the main accompaniment part or the bass part.

5. Master Volume (System Volume) settings

This will be the default value (127). There is no particular need to set this. When necessary, please adjust the Master Volume for each song so that the playback volume of each song is fairly consistent. In this case, do not use the XG Master Volume, but use the universal realtime message Master Volume instead (refer to the paragraph on Fade Out).

6. Usage of Volume and Expression

Volume (CC#7): Use this message to adjust the volume balance between parts.

* If it is necessary to adjust the balance after using a program change within a song, leave an interval of at least 1/480 tick from the program change.

Expression (CC#11): Use this message to create dynamic volume changes.

(I.e., crescendo, diminuendo, and dynamic envelopes etc.)

* Normally, you should always include an initial value of “127” (maximum) in the setup measure.

** If dynamic expression is not necessary, set this to 127 (this may not be omitted).

7. Other control changes

"Data Entry" and "RPN LSB/MSB" may be used as needed. For cases in which the data must be transmitted in the correct order, please leave an interval of at least 1/480 between each step.

8. Exclusive messages

For these settings, please refer to the separate setup materials of this document, to the XG Specification, and to the owner's manual of each tone generator.

Please give priority to the use of the system exclusive messages defined by the XG Specification. The use of system exclusive messages that are unique to each tone generator is not recommended.

9. Setting ranges for Time Base and Tempo

Time base (resolution of the sequence data) shall be in the range of quarter note = 48-480. The use of quarter note = 480 is strongly recommended.

Tempo shall be kept within the following range, including any changes (rit. etc.) within the song. Please strictly observe these ranges.

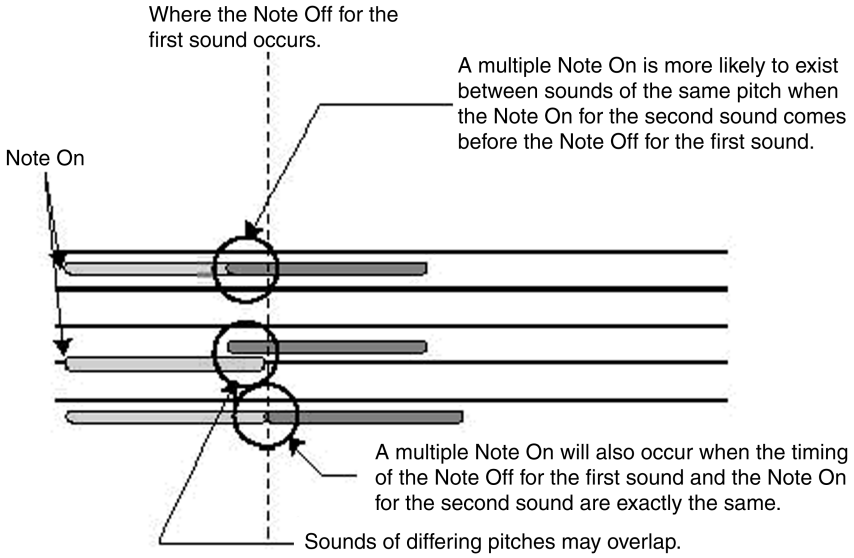
32 bpm - 280 bpm (XG Level 1)
20 bpm - 300 bpm (XG Level 2, XG Level 3, XG Plug-In Board)

10. Velocity

As far as possible, please reflect the performance nuances of the original. For example if an instrument is being played with a strong touch even though the volume is low, increase the Velocity values and use CC#7, CC#11 etc. to lower the volume as required.

11. Duration

Avoid multiple note-on. It is also considered a multiple note-on for a Note Off and Note On of the same note to exist at the same timing.

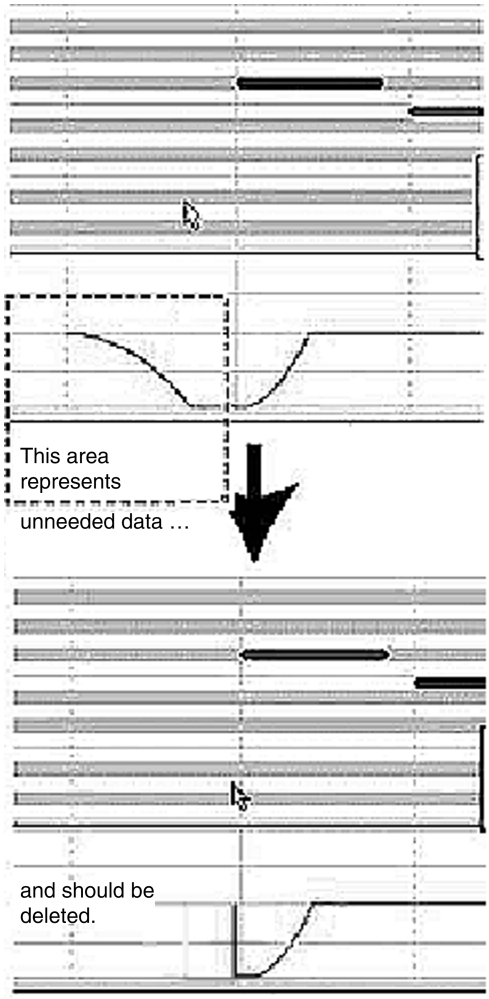


12. Program (Voice)

You must use voices according to the limitations of the specified XG Level.

13. Control data

a. You must delete unnecessary control data. (See diagram.)



For example if you realtime-recorded a performance that starts at Pitch Bend Down (-8192) and bends up to a pitch bend of 0, the “0” - “–8191” data that was recorded before the note-on will be unnecessary. In such cases, you must erase the data “0” - “–8191” and start from “–8192.”

b. Do not allow multiple values of the same control change to exist in the same step.

Such cases can be caused by errors in cut and paste, or in realtime recording.

c. As a rule, do not allow control change data or system exclusive data to exist at the same timing as a note-on.

* Leave an interval of 5/480 ticks or more between CC#64 (Damper Pedal) and any note-on/off messages.

d. Control codes that are not recommended.

Use of the following controllers is not recommended.

84 Portamento Control.
#120 All Sound Off
#123 All Note Off
Polyphonic Pressure
Channel Pressure

e. Control codes for which only 0 or 127 can be set

The following controllers may be used only as switches, with data values of 0 or 127. Use of other data values is not recommended.

#64 Damper Pedal
#65 Portamento
#66 Sostenuto
#67 Soft pedal

f. If the same step contains control change data for "MSB" and "LSB," some software may invert the order of output. You must separate these by at least 1/480 tick to ensure that the data is output in the correct order.

Example: NRPN MSB (CC#99) / NRPN LSB (CC#98) / Data Entry MSB (CC#6)
RPN MSB (CC#101) / RPN LSB (CC#100) / Data Entry (CC#6)
Bank Select MSB (CC#0) / Bank Select LSB (CC#32) / Program Change

g. After using RPN or NRPN, you must add "RPN Null."

14. Crowded data

Avoid crowded clumps of data that might produce audible delays in notes or might skew notes that should sound simultaneously. In particular, clumps of notes at the beginning of a measure are likely to impair the groove.

15. Endings

a. When performing a Fade Out, please use the universal realtime message Master Volume (F0H 7FH 7FH 04H 01H SSH TTH F7H). Do not use the XG Master Volume or Master Attenuator etc.

* If you wish to use a different fade-out curve for each part, please use Expression (CC#11). This can be used in conjunction with the above-mentioned universal realtime message Master Volume.

** If you use the variation effect as a System Effect, there may be cases in which the fade-out will not occur as desired. In such cases, you can use the system exclusive message Variation Return Level as needed to produce a natural fade-out.

b. The end of the song must be kept consistent.

(1) Note-off
For decay-type sounds such a piano, bass, and guitar, adjust the duration so that a note-off occurs as soon as the sound becomes inaudible.
(2) If a decrescendo occurs at the end of the song, the durations may extend beyond the point where Expression (CC#11) has reached a value of 0.
In such cases, the control data must be unified with the end of the note-off (duration). Also, please delete any unnecessary control data that occurs after the sound has ended.

Example: Initial settings such as CC#7=127, CC#11=127

c. If it is possible to keep the playing time of a song to within five minutes by adjusting the duration of the final sustained notes, please keep the song to within five minutes whenever possible.

d. In consideration of reverb or delay that lingers after the performance has finished, maintain a sufficient number of blank space (measures) that allows the sound to decay completely to an inaudible level.

16. Key and time signature settings

As a rule, the key and time signature should be the same as the original composition.

* If modulation or meter change occurs during the song, please follow it.

D. Parts and MIDI channels

The following MIDI channels are fixed. Please observe the following rules on the channel numbers to be used.

Channel 1: Melody or the part which mainly plays the melody in that composition

Channel 3: Bass or the part corresponding to the bass

Channel 10: Drums (This can be used only for a Drum voice, and may not be used by a Normal voice even if it is a percussion-type sound.)

1. The basic instruments of the ensemble (Piano-type, Guitar-type etc.) should use MIDI channels numbered as low as possible.

Example: Piano = ch.4 / Cutting Guitar = ch.5, etc.

2. Although MIDI Ch. 10 (Drum voice) is fixed, other parts that are otherwise unspecified should be assigned to fill up the lower-numbered MIDI channels so as not to leave channels unoccupied.

3. If the song is a duet, the melody parts will use MIDI channels 1 and 2.
As a rule, do not use MIDI channels other than 1 and 2 for melody parts. However, this does not apply to classical orchestral compositions, etc.

4. When using 17 parts or more with SMF Format 1 (XG Level 2 or higher)
As a rule, give priority to using port A, and follow the guidelines given above.

If the composition fits into 16 parts or less, use port A for all parts. For example even if you are using two or more drum kits, change a suitable part in the vicinity of part 10 to a drum voice (instead of using the drum kit of part 26 etc.).

If the composition occupies 17 or more parts, you should change a normal part to a drum part for the second and subsequent drum parts. In this case, note priority will be given to port A. Part 26 (port B) is a drum voice by default, but in view of the reasons given above, we recommend that you change one of the port A normal voices to a drum part, rather than using part 26 (port B). In any case, please try to avoid unnecessarily increasing the number of ports used.

E. Structure of the setup measure

The first measure of MIDI channel 1 should be created as a setup measure, as described in the attachment to this document. Performance data such as notes or pitch bend must never be placed in the setup measure.

* A certain length of time is required in order to process the setup data. Please be aware of this so as to avoid delays in notes sounding at the beginning of the performance, or failure of effects to be set correctly.

** In general, default data should not be left in the setup. However, the following items should be inserted in the setup measure even though they are defaults.

- SysEx.
  Type of each effect block, reverb time
- Control changes
  CC#0, CC#32, CC#7, CC#11, CC#91, CC#93, CC#94 (only if Variation effect is SYS)

F. Regarding sound setups during a song

If a Program Change occurs during the song, perform the setup in the following sequence.

Control Data:	Number:	Data
Bank Select MSB:	CC#0:	
Bank Select LSB:	CC#32:	
Program Change:		0 - 127
Volume:	CC#7:	1 - 127
Panpot:	CC#10:	0 - 127
Reverb Send Level:	CC#91:	0 - 127
Chorus Send Level:	CC#93:	0 - 127
Brightness:	CC#74:	0 - 127
Harmonic Content:	CC#71:	0 - 127
Attack Time:	CC#73:	0 - 127
Release Time:	CC#72:	0 - 127

Leave 1/480 tick or more between each event.
If an item is the default value (if there is no change), do not add it.

G. The melody part

1. Musical guidelines for the melody part

a. In general, the original song must be copied faithfully.

b. Use performance gestures appropriate for the voice that is used for the melody.

c. Reproduce natural articulation (Velocity, Duration etc.).

* "Faking," using grace notes, or adding chords etc. for the purpose of achieving point "b" above, or within bounds that do not impair the original melody, shall be allowed as long as musically appropriate.

2. Voices used for the melody

a. Please select and use voices that are appropriate for the character of the song.

In particular if the melody uses the same voice as used by other parts, please take measures to ensure that the melody is easily distinguished. (Range, volume, etc.)

b. In general, duet or chorus parts should use a different voice than the main melody.

c. When using decay-type voices for the melody, please set the Duration in the same way as for sustain-type voices. This allows for the possibility of changing voices, and for consistency with XF data.

H. Effect settings

Effect settings are an important element of the sound, and careful attention must be paid to them.

Rules for effect settings

a. For the effects that can be used in each XG Level, you are free to modify the settings as desired. (Except for parameters 11 and later of XG Level 1.)

* For the three parameters "Reverb Type," "Reverb Time," and "Chorus Type," you must input data even if you are not changing them from the default settings.

b. Effect-related exclusive messages must be inserted in the first measure of MIDI channel 1 (the setup measure). However if changes occur during a song, the data must of course be inserted at the appropriate point, but must still be placed in the track of MIDI channel 1.

* Regarding exclusive messages, please refer to the section "E. Structure of the setup measure."

c. The use of effect types that are indicated in the XG Specification as "Option" or "Extension" is not recommended (XG Level 1). Use only the "XG required" effects.

d. The use of effect parameters 11 and higher is not recommended. Please use parameters 1-10 (XG Level 1).

e. If you change the effect type during the song, please try to do so at a timing that will not adversely affect the playback. Since changes in effect type place a load on the tone generator, there may be cases in which notes fail to sound on time.