1 Yamaha Keyboards - Style Creation Course

Table of contents

1.1   Introduction

Anyone having a Yamaha keyboard will from time to time want to have new styles, although extremely many styles are available.

The purpose of this course is to give this user (the style programmer) knowledge, tools, ideas and tips to create new styles.

In this course we will discuss the major principles in style programming using MIDI sequencer software. Almost any MIDI sequencer software will do.

The course is subdivided in a number of parts each explaining principles and pitfalls, tips and tricks in one area of the creation process.

- In Part 2 and 3 we will create the skeleton for our new style
- In Part 4 to 9 we will create the musical content in the style (the MIDI part)
- In Part 10 we will finish the style by adding CASM, OTS and MDB data chunks
- In Part 11 we will discuss ways to enhance the style features
- In Part 12 we will discuss problems - and their solution

Part 5 - 9 are in no way meant to be a complete guide to music programming. The purpose of these parts is to give an initial introduction to style music programming.

The styles created following the principles in this course will work in Yamaha Tyros, PSR, CVP, DGX and YPG keyboards.

Please mail me (js@jososoft.dk) for questions, comments and suggestions for extending this course. Thank you.

1.2   The overall Picture

The Yamaha keyboard styles are MIDI format 0 files with one or more additional sections. The MIDI part of the style file is divided in style parts with MIDI Text Markers, which defines where the MIDI data for this particular style part begins. Each style part matches the keyboard model features. Normally keyboards can use all style files even though they may have fewer or more style parts.

In newer keyboards valid style part names (Text Markers) are:

- "Main A", "Main B", "Main C", "Main D"
- "Intro A", "Intro B", "Intro C"
- "Ending A", "Ending B", "Ending C"
- "Fill In AA", "Fill In BB", "Fill In CC", "Fill In DD", and "Fill In BA" (Break).

Each style part can be from 1 to 128 measures in length, except Fill In parts which must be 1 measure long. Typical lengths are:

- Intro parts: 1 to 8 measures
- Main parts: 4 to 8 measures
- Ending parts: 1 to 8 measures

The first measure holds voice definitions, volume, reverb, chorus, pan etc. settings and have two Text Markers "SFF1" and "SInt". The newest keyboards: "SFF2" and "SInt". In the table is shown a part of the style parts and the corresponding Markers.

MIDI data									Non-MIDI data
Meas.	1	2-5	6	7	8	9-12	13	14 >	CASM, OTS and MDB
Style part	SFF1 SInt	Main A	Fill In AA	Intro A	Ending A	Main B	Fill In BB	more parts	

Each style part can hold information in a maximum of 16 channels. These are known as "Source Channels". The default Yamaha destination channels (output channels at the keyboard) are shown in the table.

Dest. ch.	09	10	11	12	13	14	15	16
Acc. part	Rhythm Sub	Rhythm Main	Bass	Chord 1	Chord 2	Pad	Phrase 1	Phrase 2

A "simple" style will have equal source channel and destination channel layout. If another channel layout or more than 8 channels are used in the style file the source channels must be redirected in the CASM section. This topic is discussed in part 10.

For this course we will start our style project by setting up a MIDI file, and adding Text Markers as shown in the sequencer software event list. We assume that Time Signature and Tempo definitions are added automatically when the file is created, otherwise this must be done too.
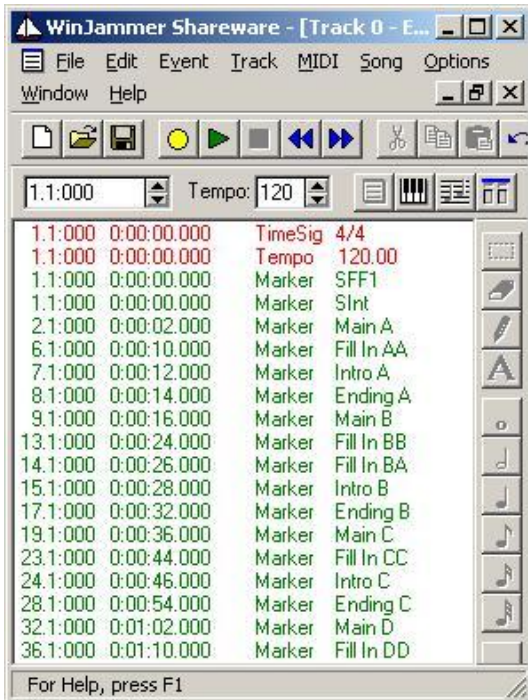
1.3   General Setup

After setting up the main structure we will add at the very beginning of the file:

- Copyright notice
- Track Name (= Style Name)
- System Exclusive Messages
    - GM System On = F0 7E 7F 09 01 F7
    - Yamaha = F0 43 73 39 11 00 46 00 F7
  Furthermore is often added:
    - XG Works On = F0 43 76 1A 10 01 01 01 01 01 01 01 01 F7
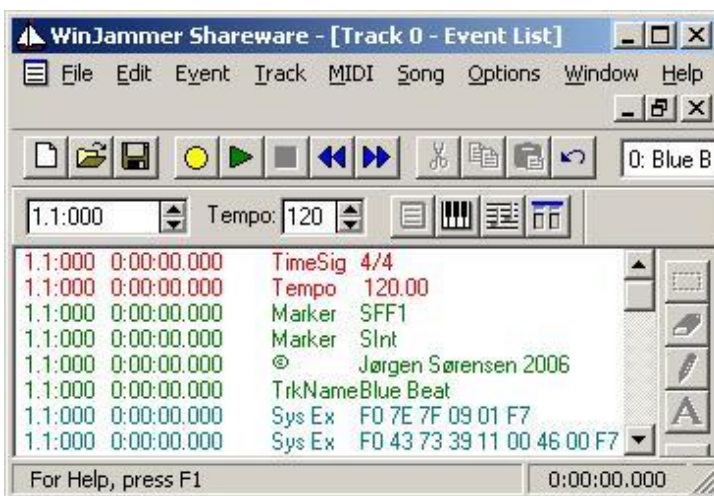
Next thing to do is to add voices - and voice parameters - to the channels 9 - 16 within the first measure of the MIDI file as shown partly below. In this example we add to each voice:

- Volume, Expression and Chorus Controller data
- Voice MSB Bank, LSB Bank and Program Change - in this order

As shown we have added in Channel 10: Drums; in Channel 11: Electric Bass (finger); and in Channel 12: Acoustic Piano. There are added other non-shown instruments in channels 13, 14, 15 and 16.

You can place an instrument in any MIDI channel, except channel 10 which is a Drum channel only.

In this course we will follow a "simple" layout (MIDI source channel = Keyboard destination channel). A typical setup will be:

- 09: Rhythm Sub: Often the various Latin American percussion instruments
- 10: Rhythm Main: The drum set
- 11: Bass: Any bass instrument, or piano, or tuba
- 12: Chord 1: Often Rhythm Guitar
- 13: Chord 2: Often Rhythm Guitar or Piano
- 14: Pad: Often a "floating" voice like Strings or Choir
- 15: Phrase 1: Small melodic phrases often played on a brass instrument
- 16: Phrase 2: Small melodic phrases often played on a brass instrument

1.4   Creating the accompaniment

1.4.1   Generic vs. Song Style

When creating styles you have to decide if the style is

- a generic style (e.g. a ballad style)

Or

- a song style (e.g. a style for the song "Yesterday").

The generic style is intended for use in many songs, therefore the accompaniment must be flexible. This is most often done by increasing the accompaniment complexity AND number of instruments used from the "Main A" part to the "Main D". And for the Intro, the Fill and the Ending parts as well.

Example: The Main A part may have only a drum, a bass and a chord channel, all playing rather simple patterns. Main B may add another chord channel. Main C may add a pad channel. And Main D may add a phrase channel.

If we consider a song style we will have to create style parts for what traditionally are called the "A" and the "B" part. And for "the bridge" as well. This means that complexity and number of instruments used are dictated by the original song.

In song styles the Intro and the Ending parts will have to sound like the original intro and ending. Quite often these parts include both the chord progression (which in other parts is played with the left hand) and the melody line (which in other parts is played with the right hand).

If the style is created with these "melodic" Intro's and Ending's, all the performer has to do is to hit the song's root chord. Then the style will play a melodic intro, and when this is finished the performer takes over by playing one of the Main parts.

1.4.2   Creating the channel parts

We are now ready to add notes to the channels. There are several ways to do this:

*   Record the notes using your keyboard
*   Pick the notes you need from an existing style
*   Program the notes in the sequencer software

or combinations of these methods.

When recording from the keyboard all the small variations (and the errors) are recorded. The small variations (e.g. timing, note loudness, note length etc.) will give the style a more natural sound - keep them. But of course the errors (too large variation) have to be corrected. The best approach is to correct the erratic notes individually instead of quantisizing, which will remove the natural sound.

When creating the style in sequencer software, the performance often becomes too perfect. The best approach is to add some (random) variation to timing, note loudness, note length etc. Quite often the sequencer software has a "Humanize" feature for this purpose.

A pitfall to be avoided is to copy and paste too much. There is no idea in creating a 4 measure long part if all the four measures are identical. And - as stated before - it is a good idea to increase the pattern complexity in generic styles going from the A variation to the D variation.

We will discuss the above topic further in the coming parts.

All style parts should be recorded using notes in CMaj7. You are able to change chords within the parts, but the overall performance has to be in this key. The following rules are recommended:

*   In Bass and the two Phrase channels: Use only C, D, E, G, A and B notes
*   In Pad and the two Chord channels: Use only C, E, G and B notes

1.4.3   Intro and Ending Parts

Intros and Endings can be created in three different methods:

*   Without chord progression and melody.
    In this situation the performer will have to play the chord progression with his left hand and a melodic phrase in his right hand.
*   With chord progression, but without melody line.
    In this situation the performer will have to start the accompaniment by hitting the root chord with his left hand and then play a melodic phrase in his right hand.
*   With chord progression and melody line.
    In this situation the performer will only have to start the accompaniment by hitting the root chord with his left hand. The Intro and ending parts are in reality complete MIDI files. This method is often used in Song Styles.

1.5   Drum Channel

When programming the drum channel "simplicity is a virtue". Do not create too complex rhythms or use too many instruments, just because you can. Remember that a live drummer only has two arms and two legs, and that he seldom uses all of them at exact the same time.

In all the examples below: Move all strokes some ticks forth or back to give the feeling of a "live" drummer.
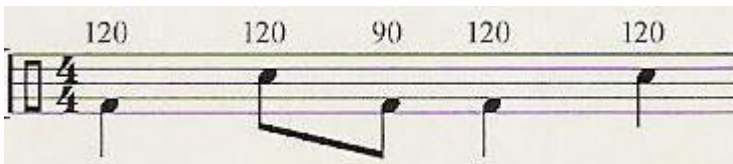
In this course we will use this notation. The numbers refer to: Bass Drum / Snare Drum / High Tom / Middle Tom / Low Tom / Cymbal / Open High Hat / Closed High Hat

Start programming the High Hat, where e.g. the velocity (volume) are all unequal; and the velocity at the beats are higher than at the "off-beats":
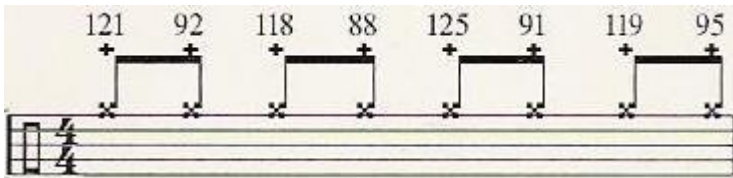
Next comes the Bass Drum and the Snare Drum, e.g. like this:
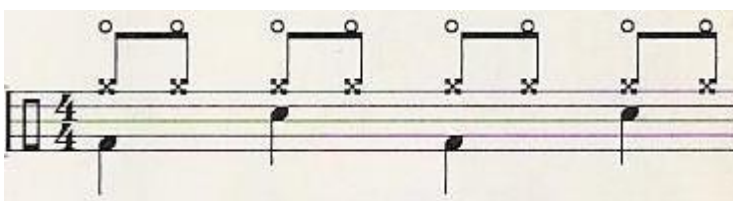

Notice that the Bass Drum velocity right before beat 3 is lower than the "on-beats".

Now create some variations on these two patterns, e.g. like this, where the off-beat after 2 is a snare drum; and the high hat is removed:
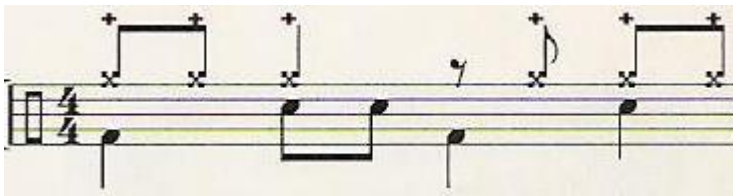
Or like this, where the high hat is open throughout the measure.

A Fill can have a roll "down" the toms while omitting the high hat. A Crash can be added too.

"Ghost Strokes" (low velocity strokes at e.g. the snare drum) can be added like this:
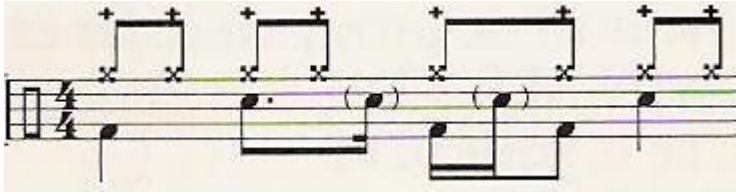
The low velocity means that these strokes are more "felt" than "heard".

1.6   Bass Channel

The bass uses the root note a lot. Therefore one-measure variations like these will often do:

Other notes used are the chord notes. The more accentuated a beat is, the more "basic" notes are used. This is demonstrated in most of these 2 measure variations:

The bass pattern depends of course on the music category. Here are some examples:

The preset styles in the keyboard can often give good inspiration for the bass pattern - as well as for all other instruments.

The bass pattern must match the drum pattern, especially the Bass Drum. To avoid conflicts listen carefully to only these two instruments.

Another problem arises when other accompaniment instrument are playing in the same octave as the bass. If the piano plays the root notes in the left hand, the bass must play the very same notes. The lowest guitar notes may also collide with the bass.

Generally speaking this doubling of (especially root) notes has to be avoided, especially in the lower octaves. The sound simply gets too "heavy" and "stiff".

1.7 Guitar Channel

1.7.1 Rhythm Guitar

Programming the guitar channel is normally very time consuming. If you play the pattern at a keyboard you will always have to edit - often as much editing that is faster to step program the whole pattern in the sequencer software directly.

The guitar chords are played at more strings, which physically can not be hit at the very same time tick. Furthermore the chords can be played "downwards" (= the lowest note is hit first) or "upwards" (= the highest note is hit first). This means that there have to be some ticks between the "Note On" events of the single notes in a chord.

Normally the guitar player will continue his hand movement even though he might not hit the strings every time he passes the strings. Most often the "downwards" movement starts a bit too early, while the "upwards" movement starts at the beat.

Hitting all the strings in a chord will often make the sound to "heavy". Therefore not all strings are hit in all passages. The strings which are not hit will continue to vibrate (and produce sound) from the preceding time they were hit.

On the other hand the strings which ARE hit must in MIDI terms have a "Note Off" before they are hit again to prevent colliding/overlapping note events.

The chord itself can be played in numerous ways - some easy and some complicated. When programming an "authentic" chord, notice that the strings are tuned E1, A1, D2, G2, B2 and E3.

In rock music the Power Chord (the root and the fifth) are often used, sometimes doubling the root, e.g. C1, G1 and C2.

If you have more than one guitar channel, it is recommended not to play the chords at the exact same tick, but to move one of the guitars some ticks. (app. 15 ticks in 480 ticks per quarter note resolution, more in faster rhythms). Otherwise the rhythm will sound "mechanical". The longer between the notes the "softer" the rhythm will be.

1.7.2 Solo Guitar

The guitar can also be used as a melody instrument, e.g. in Intro and Ending style parts.

When playing as a melody instrument, bending the guitar strings is an often used effect. However the programmer must be careful not to bend too fast, which will sound wrong.

Another useable effect is Modulation. But once again, be careful: Too little is better than too much.

As using the effects above produces many MIDI events, it is recommended to strip out some of these to avoid too much MIDI traffic.

When playing a solo melody, another voice than the default voice (defined in the initial setup measure of the style file) is sometimes required. As the keyboard reads voice changes (MIDI Program Change) inside style parts, you just program this change.

1.8 Brass Channel

Brass instruments (e.g. trumpet, saxophone and trombone) are often used as melody instruments in Intro and Ending style parts.

In other parts brass is often used as accompaniment instruments to play riffs in each measure or in the end of a 4 measure period. These riffs can be unison or more instruments can be used.

The brass instruments have lots of dynamics, meaning they can sound very aggressive, and on the hand very soft and gentle. This has to be considered when the brass channel is programmed. Furthermore the velocity (volume) of the voice must be set appropriately, as in last of these two examples:
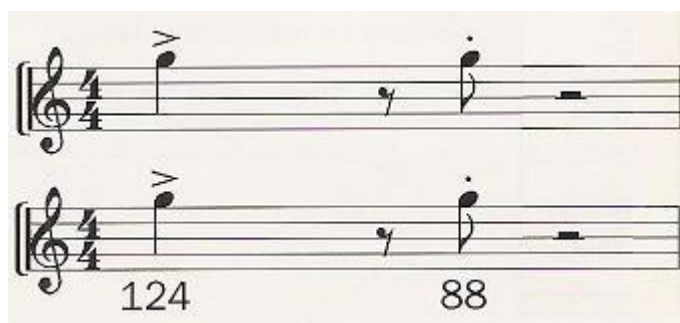
Brass instruments are often used to play chords, either riffs (as the examples above) or as floating voices. In riffs the brass voice velocity (volume) can be rather high; but when playing floating voices the best results are obtained if the velocity is more modest. Otherwise the brass instruments will dominate the accompaniment too much.

One way to create the pattern is shown as the first example below. Here we let the brass instruments play the chord notes from the highest note and downwards. Eventually letting the lowest note be an octave lower than the top note.

Another way to create the pattern is shown as the next example below. Here we do as before, but we get the third or the seventh note in the pattern too.

When programming styles the most natural channel to use for brass instruments are the two Phrase channels - or the Pad channel.

However we will soon run out of output channels at the keyboard. A solution may be to use one of the "Brass section" voices.

When more brass instruments are used do not copy and paste the patterns from one instrument to the other without adding some variation. But - on the other hand - do not overdo the variation.

Avoid recognizable melodies in the phrases, as this will dictate the use of the style too much in playback.

1.9   Strings Channel

The string instruments in a classical string orchestra are Violin, Viola, Cello and Contrabass. Together these instruments have a quite large note range:
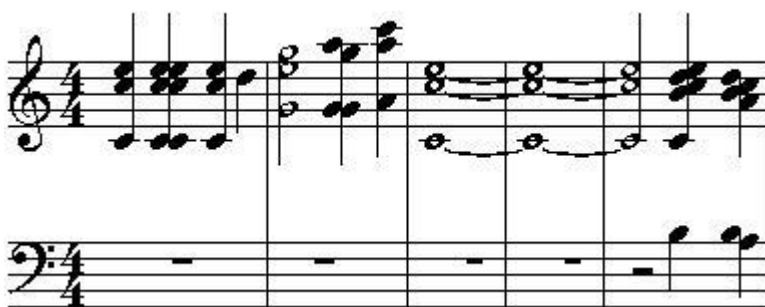

In style accompaniments the strings often play Pad-like floating voices.

As we have a limited number of keyboard channels, we will have to select one of the String Ensemble voices for this purpose.

By choosing this approach we are not able to program the string instruments individually. Therefore select carefully the right ensemble voice, and add some kind of dynamics to the accompaniment.

Variations in velocity between the style parts are one way to add some dynamics to the strings. Another method is gradually increasing (crescendo) or decreasing (dimininuendo) the volume (MIDI Expression Controller) within the part.

The floating pad voice may tend to be quite monotonous. Therefore let the strings have a break now and then. Or changing between legato and staccato parts will also be effective.

If the strings play more Phrase/Riff like accompaniments using fewer (or just one) instrument we have of course better possibilities for programming the instrument accompaniment.

1.10 Finishing the Style

1.10.1 Style File Format and Name

We have finished the MIDI content of the style, and have to save the file as MIDI format 0 file. Style files had some years ago always ".sty" file extension. Now a number of files extensions are used: pst (pianist); pcs (piano combo); sst (session); prs (pro); bcs (basic) and fps (free play).

Next is to add a CASM section; and OTS and MDB sections except for older keyboards, which do not support styles with these sections.

1.10.2 CASM section

The CASM section tells the keyboard how to interpret the MIDI data. CASM sections can NOT be created in MIDI software; but can be created at the keyboard if the "MIDI source channel = Keyboard output channel" layout is used. However if the style is enhanced with features described in the next part, you will have to use software, e.g. CASM Editor at http://www.jososoft.dk/yamaha/software/casmeditor/index.htm

The CASM section controls these parameters:

Redirection Schema	Defines redirection of the 16 source channels to the 8 keyboard style channels (read more in Part 11)
Chord Root / Chord Type	Determines the original key of the source pattern. The default is CMaj7 (chord root is "C" and the chord type is "Maj7") is often used.
Note Transposition Rule (NTR)	Specifies the transposition rule to be used by the transposition table: "Root Trans" or "Root Fixed". SFF2 format: Adds a "Guitar" rule.
Note Transposition Table (NTT)	Specifies the note transposition table to be used for source pattern transposition: "Bypass", "Melody", "Chord", "Bass" (Replaced by "Melody" in newer models), "Melodic Minor", "Melodic Minor 5th Var.", "Harmonic Minor", "Harmonic Minor 5th Var.", "Natural Minor", "Natural Minor 5th Var.", "Dorian" or "Dorian 5th Var." SFF2 Format: The Guitar setting in NTR (above) has 3 NTT settings: "All-Purpose"; "Stroke" and "Arpeggio".
High Key	Specifies the upper root limit
Note Low/High Limit	Specify the low and high note limits for all notes in the specified part

Retrigger Rule	Specifies how notes held through chord changes will be handled: "Stop", "Pitch Shift", "Pitch Shift to Root", "Retrigger" or "Retrigger to Root"
Bass On	If set, the channel recognizes on-bass chords allowed in the Fingered On Bass mode, regardless of the NTT setting
Auto Start	If set, the channel will start playing when a key is hit (if Sync Start is On)
Editable	If set, the channel can be edited in the Keyboard Style Creator
Active Keys	If a note value (e.g. the "A" note) is set to "On", all "A" notes in the channel will play; otherwise they are muted
Active Chords	If a chord type (e.g. the "aug" chord) is set to "On", all "aug" chords in the channel will play; otherwise they are muted (read more in Part 11)

A default CASM section file (in zip format) can be downloaded from http://www.jososoft.dk/yamaha/articles/def_casm.zip. Unzip the file and use the Style Split and Splice software at http://www.jososoft.dk/yamaha/software/sands/index.htm to add the CASM section file to the MIDI part of your style file. A CASM section file with "Bass On" (information in table) can be downloaded from http://www.jososoft.dk/yamaha/articles/casm_bassOn.zip. If you want the "Bass On" feature, use this file instead of the default.

Both CASM section uses "MIDI source channel = Keyboard output channel" -layout. They also use identical settings for all style parts. You can use this CASM for further editing.

More about the CASM parameters at http://www.jososoft.dk/yamaha/articles/casm.htm

1.10.3 OTS section

The OTS section holds the 4 One Touch Settings (OTS) = the predefined voice settings at the keyboard. Each OTS has some common settings for the entire OTS, and some specific settings for 4 channels: the Right 1, the Right 2, the Right 3 and the Left voices.

The common settings are System Exclusive messages controlling Harmony, Multi Pad etc.

The channel specific settings are:

- Voice Control: Program, Voice MSB, Voice LSB;
- The 20+ MIDI Controllers for Modulation, Main Volume, Panpot, Expression, Sustain etc.
- The 10+ NRPN controllers for Vibrato Rate, Vibrato Depth, Vibrato Delay etc.
- The 4 RPN controllers for Pitch Bend Sensitivity, Fine Tune, Coarse Tune, Modulation Sensitivity
- A number of System Exclusive (SysEx) Messages for Velocity Sense Depth, Velocity Sense Offset, EQ Bass Gain etc.
- DSP Effect Settings

OTS sections can be created and edited at the keyboard or with the OTS Editor software at http://www.jososoft.dk/yamaha/software/otseditor/index.htm

1.10.4 MDB section

The MDB section contains the Music Data Base records in the style file.
Each record has these data: Song Title; Genre; Keyword 1; Keyword 2; Tempo; and Time Signature.

MDB sections can be created and edited at the keyboard or with the MDB Editor software at http://www.jososoft.dk/yamaha/software/mdbedit/index.htm

1.10.5 The End

Coming so far we have ended the creation of a style. However some feature enhancements can be done as describes in the next Part.

1.11 Enhancing the Style Features

1.11.1 Chord Type dependent Accompaniment

Until now we have discussed style creating, where the instruments source (MIDI) channel is equal to the keyboard (destination) channels, e.g. the bass instrument pattern is in MIDI channel 11, and is played through the Bass channel at the keyboard. Using this approach we will only use 8 of the 16 available MIDI channels (channel 9-16).

However all 16 MIDI channels can be used for all instruments except channel 10 which by definition is a drum channel. This means that the channel designation does not have to follow the above method. This can not be set up in the keyboard, but has to be done in software, e.g. CASM Editor software at http://www.jososoft.dk/yamaha/software/casmeditor/index.htm. Here you set up a redirection schema for all the MIDI channels used.

Furthermore more than 8 channels can be used. This is an especially interesting feature, which can be used to create alternative accompaniment patterns, depending on the played chord. E.g. different patterns in the Chord 1 channel (Style Channel 12), when playing Major, Minor, and 7th chords. Neither can this be set up in the keyboard, but has to be done in software, e.g. CASM Editor software at http://www.jososoft.dk/yamaha/software/casmeditor/index.htm.

To obtain this effect the procedure in this software:

- Create the 3 different patterns in the MIDI Part, e.g. Major pattern in channel 4, Minor pattern in channel 5, and 7th pattern in channel 6
- Redirect these 3 MIDI channels to the SAME keyboard channel
- In MIDI ch. 4 remove ALL check marks in "Active Chords Minor" and "Active Chords 7th"
- In MIDI ch. 5 remove ALL check marks in "Active Chords Major" and "Active Chords 7th"
- In MIDI ch. 6 remove ALL check marks in "Active Chords Major" and "Active Chords Minor"

When this approach is used, most often 3 alternative patterns are created as demonstrated above. However the alternative patterns can be assigned to any number and combination of the 35 chord types (check your manual for a list of these) the keyboard recognizes, e.g. a pattern solely for the "minorb9"-chord. However, as each group of chords requires one MIDI channel in practice you will soon run out of free channels.

As mentioned above you can use up to 16 channels, which means that the number of MIDI channels is too small for creating alternative patterns for all the 8 instruments. Most often this feature is used for bass and chord instruments.

1.11.2 Long Fill In parts

By definition the length of Fill In parts must be 1 measure long. To create a Fill In (Break) of any length we can use one of the Intro parts (which can be any length) instead.

When playing we have to think ahead, as an Intro part will start AFTER the current measure, while a normal Fill part will be run IMMEDIATELY when the Fill button is pressed. After the intro the keyboard will resume playing the same Main part as were used when the Intro was called.

1.11.3 Half Bar Fill In / Break parts

Often a song requires a short break (e.g. a half measure). As a style file can have one Time Signature - and consequently one measure length - only, you will have to create a "hack". Use the Style Half Bar Fill Creator software http://www.jososoft.dk/yamaha/software/filledit/index.htm to create this feature.

1.11.4 Different Time Signatures in parts

As the keyboard can handle only one Time Signature, the changing of Time Signature can be faked through a combination of tempo changes and note movements. To obtain this effect use the Style Time Editor software at http://www.jososoft.dk/yamaha/software/stytime/index.htm.

1.11.5 Different Tempo in parts

The style parts can have unequal tempo. This can be set when creating the MIDI part of the style file. However the keyboard will continue to play in latest tempo given. To avoid wrong tempo in parts, a tempo "resetting" in the very beginning of ALL style parts has to be added. Use the Style Tempo Editor software at http://www.jososoft.dk/yamaha/software/stytempo/index.htm to add different tempos.

1.12   Trouble Shooting

Symptom	Probable cause	Remedy
Silent channels	Error in redirection in CASM section	Change redirection
	Empty channels	Record something
Style doesn't work at all	Missing/misspelled "SFF1" ("SFF2") and/or "SInt" Text Marker in the first measure	Correct/add these
	Style file not saved as Format 0	Save in Format 0
Hanging notes	A "Note Off" event is missing	Check note events in MIDI part
	An error in the note length definition	Correct the note length
Chords sounds bad	Mismatch in source key and Chord Root/Type setting in CASM	Change the Chord Root/Type setting in CASM
Missing parts	Misspelled markers	Correct the spelling. Capitalization and spaces matters
Keyboard suddenly stops	Empty measures within a part	Record something
Silent keyboard (older models only)	Order of style parts	Try moving the Main A part to be the first part in MIDI
	Missing Main A part	Create a Main A part
Channels in wrong octave	Mismatch between recorded notes and Note Low and High Limits in CASM	As the Note Limit values overrules the octave of the recorded notes, define the desired octave by setting Note Low and High Limits
Balance between instruments	Some instruments too loud or too weak	Change the Master Volume in channels
Style error when loading	Missing Main A part (older models only)	Create a Main A Part
	Style file too large	Remove some style parts. Use Style ReMixer software at http://www.jososoft.dk/yamaha/software/sremix/index.htm for this.
Wrong instruments	A wrong instrument is playing	The keyboard has a "fall-back" procedure which will make the General MIDI voice sound, if a non-existing voice in the keyboard is defined. Use Style Revoicer software at http://www.jososoft.dk/yamaha/software/revsty/index.htm for correct voice settings.
Style sound bad in a MIDI Player	Ordinary MIDI Players can not read CASM	The style is not interpreted correctly anywhere else than in a keyboard. Always use this method to check a style.
Instrument not triggered	The "Note On" tick occurs BEFORE the part Text Marker	Move the "Note On" tick inside part boundaries

1.13   CASM Section Format 1

The CASM section holds the Ctab settings and some other settings of the style. Only some of these settings can be done at the keyboard.

In December 1999 I reverse-engineered the CASM section format. The original format was published March 2000.

By the arrival of the first Tyros keyboard the CASM section format was altered slightly. These changes were reverse engineered in February 2003. The revised format was published October 25th 2004.

The CASM format was changed radically with the release of Tyros 3 in November 2008. The new format has been applied to later keyboards, e.g. Tyros 4; PSR S750/S950; PSR S710/S910 and the CVP 6xx/5xx series; and has not yet been reverse engineered.

In the following x represents a byte.

Line no.	CASM data	Function	Hex value	Comment
00	CASM	CASM Marker	43 41 53 4d	Beginning of CASM Section
01	xxxx	CASM Length		Length of the entire CASM section
02	CSEG	Section Marker	43 53 45 47	Beginning of CSEG Section within CASM. A CSEG Section holds information about style parts using equal settings.
03	xxxx	Section Length		Length of the CSEG section
04	Sdec	Parts Marker	53 64 65 63	Beginning of Sdec part within CSEG Section
05	xxxx	Parts Length		Length of the Sdec part
06	Main A,Main B etc.	Style parts		Style part names of the styles with this setting. Names are separated with commas, but no comma at the end of the part name string.
07	Ctab	Channel Marker	43 74 61 62	Beginning of Ctab string
08	xxxx	Channel Length		Length of the Ctab string
09	x	Source Channel	00 - 0F	The source channel in the MIDI part of the style file which holds note information. Valid values are 00 - 0F (= channel 1 - 16).
10	xxxxxxxx	Voice Name		Voice name. Always 8 bytes. The voice can be called any name.
11	x	Destination Channel	08 - 0F	Source channel data must be remapped to a valid destination channel. Valid values are 08 - 0F (= channel 9 - 16).
12	x	Editable	00 - 01	01 Channel Read Only - 00 Channel Editable

13	x	Note Mute	00 - 0F
			1. digit
			2. digit
				Notes to play (0 = not play)
				<pre>1.digit = 0 (always)
				2.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
				    B 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
				    Bb 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0
				    A 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
				    G# 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0</pre>

14	x	Note Mute	00 - FF
			3. digit
			4. digit
				<pre>3.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
				    G 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
				    F# 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0
				    F 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
				    E 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0</pre>

| | | | | ```
4.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
    Eb     1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
    D      1 1 1 0 0 0 0 1 1 1 1 0 0 0 0 0
    C#     1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
    C      1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
```<br>Example: 0E A3 means that C C# F G A Bb and B plays. When other notes are pressed the accompaniment is muted. |
| 15 | x | Chord Mute | 00 - 07<br>1. digit<br>2. digit | Chords to play (0 = not play)<br>```
1.digit = 0 (always)
2.digit = 3 2 1 0      add 4 if auto start
  1+2+5   1 1 0 0
  sus4    1 0 1 0
3.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  1+5     1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
  1+8     1 1 1 0 0 0 0 0 1 1 1 1 0 0 0 0
  7aug    1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  M7aug   1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
``` |
| 16 | x | Chord Mute | 00 - FF<br>3. digit<br>4. digit | ```
4.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  7(#9)   1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
  7(b13)  1 1 1 0 0 0 0 1 1 1 1 0 0 0 0 0
  7(b9)   1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  7(13)   1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
``` |
| 17 | x | Chord Mute | 00 - FF<br>5. digit<br>6. digit | ```
5.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  7#11    1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
  7(9)    1 1 1 0 0 0 0 1 1 1 1 0 0 0 0 0
  7b5     1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  7sus4   1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
``` |
| 18 | x | Chord Mute | 00 - FF<br>7. digit<br>8. digit | ```
6.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  7       1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
  dim7    1 1 1 0 0 0 0 1 1 1 1 0 0 0 0 0
  dim     1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  m7M(9)  1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
``` |
| 19 | x | Chord Mute | 00 - FF<br>9. digit<br>10. digit | ```
7.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  mM7     1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0
  m7(11)  1 1 1 0 0 0 0 1 1 1 1 0 0 0 0 0
  m7(9)   1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  m(9)    1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
8.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  m7b5    1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
  min7    1 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0
  min6    1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  min     1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
9.digit = F E D C B A 9 8 7 6 5 4 3 2 1 0
  aug     1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
  6(9)    1 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0
  M7(9)   1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  (9)     1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
10.digit= F E D C B A 9 8 7 6 5 4 3 2 1 0
  M7#11   1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
  Maj7    1 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0
  Maj6    1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0
  Maj     1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
```<br>Example: 03 FF EF FF F8 means that when playing a Maj chord or a 7sus4 chord the accompaniment is muted. |
| 20 | x | Source Chord | 00 - 0B | These settings determine the original key of the source pattern (i.e. the key used when recording the pattern). The default, CM7 (the source root is "C" and the source chord type is "M7"), is automatically selected whenever the preset data is deleted prior to recording a new style, regardless of the source root and chord included in the preset data. |
| 21 | x | Chord Type | 00 - 21 | Valid Chord Types are: Maj, Maj6, Maj7, M7#11, Madd9, M7(9), M6(9), aug, m, m6, m7, m7b5, |

				m(9), m7(9), m7(11), mM7, mM7(9), dim, dim7, 7, 7sus, 7b5, 7(9), 7(#11), 7(13), 7(b9), 7(b13), 7(#9), M7aug, 7aug, 1+8, 1+5, sus4, 1+2+5
22	x	Note Transposition Rule	00 - 01	NTR specifies the transposition rule to be used by the transposition table. Two settings are available: ROOT TRANS (00): When transposed the pitch relationship between notes is maintained. For example, the notes C3, E3, and G3 in the key of C will become F3, A3, and C4 when transposed to F. Use this setting for parts that contain melodic lines. ROOT FIXED (01): The note is kept as close as possible to the previous note range. For example, the notes C3, E3, and G3 in the key of C will become C3, F3, and A3 when transposed to F. Use this setting for chordal parts.
23	x	Note Transposi-tion Table	00 - 05	NTT specifies the note transposition table to be used for source pattern transposition. The following table types are available. Note that to obtain the settings marked with *, the NTT setting in the Cntt section (line 32) must be set too. BYPASS (00): No transposition. MELODY (01): Suitable for melody line transposition. Use for melody parts such as PHRASE 1 and PHRASE 2. CHORD (02): Suitable for chord transposition. Use for the CHORD 1 and CHORD 2 parts when they contain piano or guitar-like chordal parts. BASS (03): Suitable for bass line transposition. This table is basically similar to the MELODY table, but recognises "on-bass" chords allowed in the FINGERED 2 fingering mode. Use primarily for bass lines. MELODIC MINOR (04): This table lowers the third scale degree by a semitone when changing from a major to a minor chord, or raises the minor third scale degree a semitone when changing from a minor to a major chord. Other notes are not changed. *MELODIC MINOR 5th Variation (04) HARMONIC MINOR (05): This table lowers the third and sixth scale degrees by a semitone when changing from a major to a minor chord, or raises the minor third and flatted sixth scale degrees a semitone when changing from a minor to a major chord. Other notes are not changed. *HARMONIC MINOR 5th Variation (05) *NATURAL MINOR. If BassOff (04). If BassOn (05) *NATURAL MINOR 5th Variation (04) *DORIAN (04) *DORIAN 5th Variation (04) NOTE When NTR (above) is set to ROOT FIXED and NTT (also above) is set to BYPASS, the SOURCE ROOT and SOURCE CHORD parameter names change to PLAY ROOT and PLAY CHORD. In this case it is possible to change chords and hear how the results sound for all parts. If "P" or "PRESET" appears for the SOURCE ROOT, SOURCE CHORD, NTR, or NTT parameter, the preset data uses special settings.

24	x	High key	00 - 0B	HIGH KEY specifies the upper root limit. Chords with a root higher than the specified limit will be played in the octave immediately below the high-key limit. This setting is effective only when the NTR parameter (above) is set to ROOT TRANS. Example: When HIGH KEY = F. Root Motion: C C# D F F# Notes Produced: C3-E3-G3 / C#3-F3-G#3 / D3-F#3-A3 / F3-A3-C4 / F#2-A#2-C#3
25	x	Note Low Limit	00 - 7F	NOTE LIMIT LOW and HIGH specifies the low and high note limits for all notes in the specified part. Notes outside this range are transposed to the nearest octave within the range. Example: When LOW = C3 and HIGH = D4 Root Motion: C C# D# Notes Produced: E3-G3-C4 / F3-G#3-C#4 / D#3-G3-A#3
26	x	Note High Limit	00 - 7F	
27	x	Retrigger Rule	00 - 05	RTR (Retrigger Rule) specifies how notes held through chord changes will be handled. 6 settings are available: STOP (00): The note is stopped, and resumes sounding from the next note data. PITCH SHIFT (01): The pitch of the note will bend without attack to match the type of the new chord. PITCH SHIFT TO ROOT (02): The pitch of the note will bend without attack to match the root of the new chord. RETRIGGER (03): The note is retriggered with attack at a new pitch matching the new chord type. RETRIGGER TO ROOT (04): The note is retriggered with attack at a new pitch matching the new chord root. NOTE GENERATOR (05): This setting will only be available if programmed in the original style. A designated note is produced with designated pitch, length, and velocity matching the new chord.
28	x	End Marker	00	End Marker for this channel
... and over from line 07 for each **channel** in the CSEG section. When all channels are set, continue from line 29 with all channels with defined values in line 32.			
29	Cntt	New NTT	43 6E 74 74	Beginning of the Cntt string
30	xxxx	Cntt Length	00 00 00 02	Length of the Cntt string
31	x	Source Channel	00 - 0F	The source channel. Same value as in line 09.
32	x	Note Transposition Table	see next column	NTT specifies the note transposition table to be used for source pattern transposition. 11 table types are available: Type / Bass Off / Bass On BYPASS / not def. / 80 MELODY + BASS / not def. / 81 CHORD / not def. / 82 MELODIC MINOR / not def. / 83 MELODIC MINOR 5th VAR / 04 / 84 HARMONIC MINOR / not def. / 85 HARMONIC MINOR 5th VAR / 06 / 86 NATURAL MINOR / 07 / 87

				NATURAL MINOR 5th VAR	08	88
				DORIAN	09	89
				DORIAN 5th VAR	0A	8A
... and now over from line 29 for each **channel** with defined values in line 32 in the CSEG section						
... and now over from line 02 for each **CSEG** section in CASM						