Registration Memory Files (on Tyros 3)

1 Tyros Components – An Introduction to the Registration Memory Files

1.1 Registration Program Buttons (PRG-Buttons)

The Tyros 3 has eight Registration Program Buttons which offer the great possibility to save several keyboard settings. Thus, the keyboard can – later on – be set up with one click and the keyboarder can start to play without having to adjust all settings individually every time he wants to play a specific song.

1.2 Registration Memory Content Groups

The Registration Memory Content groups play a very important role when storing keyboard settings in a PRG-button. It is a very powerful "tool" that allows the keyboarder to only store a particular group of settings, e. g. only settings for the voices and the style. This means, that when switching to another PRG-button, not all storable keyboard settings need to be changed. When only saving information about the voices and the style, the button doesn't affect all of the other settings at all, e. g. Multipads, Pedal, Score, Song etc.

1.3 Registration Memory Files

The keyboard settings are stored in these PRG-Buttons but saved in a specific file with the .RGT file-name extension. Like every other file, this file only consists of a pattern of 0s and 1s, the binary digits. The filename extension only determines how to interpret these patterns.

This means that every byte has a specific meaning in this file and when the keyboard parses it, it "knows" exactly which byte stands for which functionality. There needs to be a basic structure in these .RGT-files in order to separate the different Registration Memory Content groups. Heiko Plate did a great job in working out this basic structure. However, his documentation didn't provide very precise information about the specific keyboard settings at byte-level. This is why I started to take a closer look at these .RGT files.

I made the effort and started to test each keyboard functionality individually. To demonstrate how to do this, let's test the volume of the different instruments in a style. At the beginning, you need a reference because you can only locate the byte where these volumes are stored by comparing two files. I saved a basic .RGT-file for every Registration Memory Content group. So, I just turned on my Tyros 3 and saved a Registration Memory file with one PRG-button active and – in this case – only the Registration Memory Content group "Style" selected. Then I changed the volume for one instrument: RHY 1. In a hex editor I compared these two files and I noticed a change of a specific byte.

This is how I could allocate the bytes position in the file and that's basically what I wrote down in the table below. In addition to that, I also noted the value range of the keyboard setting (*here*: 0 – 127) and the value range of the appropriate hex value (*here*: 00 – 7F). My goal was to have a complete overview over every keyboard functionality that can be set up in a .RGT-file and maybe the value range would be helpful when programming an application which can edit these files (which – indeed - turned out to be very helpful).

So that was my goal. While examining each keyboard setting individually, I also started to create my own Tyros Registration Manager in order to do something more adventurous than allocating bytes in

a file. Since java was my first programming language at school, I wrote the program in java and could improve my skills. It is at the moment in a very initial stage but I will continue working on the program over the months or years. Hopefully, one day, this software is covering every keyboard setting and works without crashing.

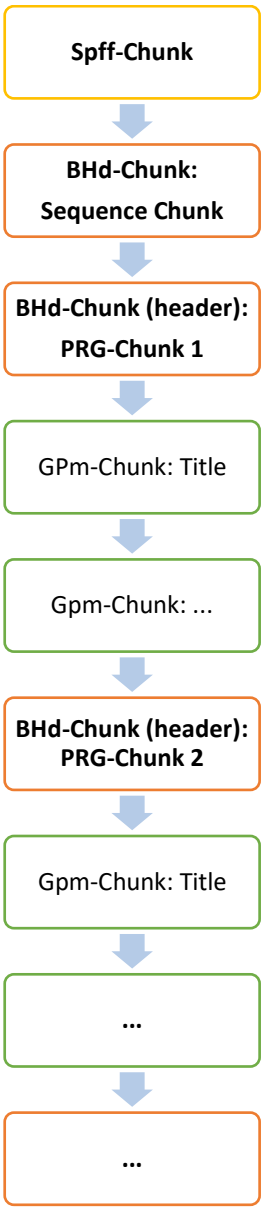
1.4 DISCLAIMER

In the following, you'll find my notes for the different chunks. I do **not** guarantee that any of these information is correct. My notes may even seem contradictory. At this time, I'm still examining the structure and only a small part is done. Many keyboard settings still wait to be tested…

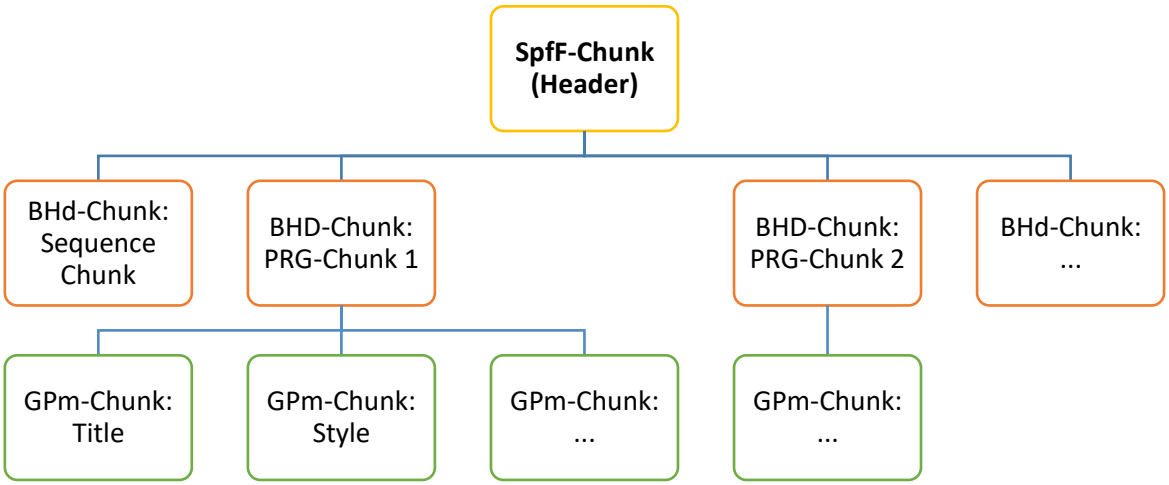
Furthermore, the following pages may seem a little chaotic and German and English is mixing a lot. Nonetheless, I hope that I can provide an overview over these .RGT-files. In my opinion, this is a very interesting topic. I have never worried how all of these settings are saved in a file before. Programming your own application is exciting and offers the possibility to improve your skills. It's even more exciting if you have done your own researches on a given file and summarized your results in a specification.

2 THE BASIC STRUCTURE

2.1 THE SEQUENCE OF CHUNKS



2.2 HIERARCHICAL STRUCTURE



3 SpfF-Chunk (Header)

The SpfF-Chunk is the header of every .RGT-file. It provides basic information, e. g. how many bytes the whole file contains.

Every SpfF-chunk has a fixed length of **22 bytes**. Some bytes have a fixed value as well.

53 70 66 46	**SpfF** (ASCII coded)
00 10	number of following data bytes in this chunk
0C 12, OB 75	
52 47 53 54	**RGST** (ASCII coded)
00 02	could be: (according to SysEx messages) Sub-ID #2 = General MIDI Off type 1 Maj 7 Internal Clock Substatus Lyrics Indication On/Off
00 02, 00 01	
00 00 03 66	number of bytes in the whole document; here: 870 bytes
00 70, 00 78	

4 BHd-Chunks (Sequence/Registration)

The first BHd-Chunk contains the data for the Registration Sequence. The following eight BHd-Chunks represents the eight PRG-buttons on the keyboard.

42 48 64	**BHd** (ASCII coded)
00 / 01	type: Registration (00) or Sequence (01)
00 24	number of bytes in this chunk

4.1 Sequence-Chunk

The Sequence Chunk occurs only one time in the whole file at the beginning. It has a fixed length of **42 bytes**. Thus, the SpfF-Chunk and the Sequence-Chunk take up 64 bytes (bytes 0x000 to 0x030) in *every* .RGT-file.

- last byte: code for Sequence End
  - ➔ 00: Sequence End Stop
  - ➔ 01: Sequence End Top
  - ➔ 02: Sequence End Next Bank
- all data bytes filled up with FF: Registration Sequence disabled → last byte doesn't matter

5 GPm-Chunks

5.1.1 GPm Header

47 50 6D	**GPm** (ASCII coded)
0B	type
00 2A	number of following data bytes in this chunk

5.1.2 GPm Data

Drehregler:

- Tyros: -64 bis 63
- Dezimal: 0 bis 127 (Mitte: 64)
- Hex: 00 bis 7F (Mitte: 40)
- bei Panpot: -64 = 63 am Tyros, d. h. 0 = 1 dez.

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
Title 01			
Registration PRG Title	1	ASCII coded	
Basic 02			
	1	7F	02 bei Song Volumeänderung (von 52 auf 127) 04 bei Style Brightness Änderung 01 wenn DSP on (auch in Kombination mit Variation)
	2	03	7F bei Style Brightness Änderung
	3	04	
	4	02	7F bei Song Volumeänderung /von 52 auf 51 und von 52 auf 127) 7F if User Type DSP1
	5	06	
	6	06	
	7	07	
	8	02	
	9	05	
	10	06	
Song 04			
Volume	1	00 - 7F	0 - 127
Channel 1 on / off	2	02 / 01	on / off
Channel 2 on / off	3	02 / 01	on / off
Channel 3 on / off	4	02 / 01	on / off
Channel 4 on / off	5	02 / 01	on / off
Channel 5 on / off	6	02 / 01	on / off
Channel 6 on / off	7	02 / 01	on / off
Channel 7 on / off	8	02 / 01	on / off
Channel 8 on / off	9	02 / 01	on / off
Channel 9 on / off	10	02 / 01	on / off
Channel 10 on / off	11	02 / 01	on / off
Channel 11 on / off	12	02 / 01	on / off
Channel 12 on / off	13	02 / 01	on / off
Channel 13 on / off	14	02 / 01	on / off
Channel 14 on / off	15	02 / 01	on / off
Channel 15 on / off	16	02 / 01	on / off
Channel 16 on / off	17	02 / 01	on / off
	18	F0	
Song 05			
	1		
	2		

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
Dateipfad	ab 3	43 3A 2F … 2E 4D 49 44	C:/… .MID
Standard Style 07			
	1	20	
	2	A5	
ACMP an / aus	3	7F / 00	an / aus
Style-Part	4	00, 01, 02 (03) 08, 09, 0A, 0B 10, 11, 12, 13 18 20, 21, 22 (23)	Intro 1, Intro 2, Intro 3 (Intro 4) Main A, Main B, Main C, Main D A-Fill, B-Fill, C-Fill, D-Fill Break Fill Ending 1, Ending 2, Ending 3 (23)
	5	2A	
	6	32	
Split Point Style	7	36	36: F#2 30: C2
Split Point Left	8	36	37: G2 → MIDI Notes
Fingering Type	9	04	01: Single Finger 02: Multi Finger 03: AI Fingered 04: Fingered 06: Fingered On Bass 07: Full Keyboard 0C: AI Full Keyboard
Style-Part	10	08, 09, 0A, 0B	A, B, C, D
Sync Start	11	7F / 00	on / off
Sync Stop	12	7F / 00	on / off
	13	00	
	14	00	
	15	02	
Style Attributes 08			
Volume	1	00 -7F	0 - 127
	2		
	3		
	4		
Reverb	5	00 - 7F	0 - 127
Chorus	6	00 - 7F	0 - 127
	7		
Channel on / off	8	00 - FF	→ see 6.1 Style Channel Numbers e. g.: 00: all off, FF: all on
	9		
	10		
	11		
Volume Change	12	00 / FF	00: standard values FF: changed values
Volume RHY1	13	00 - 7F	-64 - +63
Volume RHY2	14	00 - 7F	-64 - +63
Volume BASS	15	00 - 7F	-64 - +63
Volume CHD1	16	00 - 7F	-64 - +63
Volume CHD2	17	00 - 7F	-64 - +63
Volume PAD	18	00 - 7F	-64 - +63
Volume PHR1	19	00 - 7F	-64 - +63
Volume PHR2	20	00 - 7F	-64 - +63

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
Panpot Change	21	00 / FF	00: standard values FF: changed values
Panpot RHY1	22	00 - 7F	-63 - +63
Panpot RHY2	23	00 - 7F	-63 - +63
Panpot BASS	24	00 - 7F	-63 - +63
Panpot CHD1	25	00 - 7F	-63 - +63
Panpot CHD2	26	00 - 7F	-63 - +63
Panpot PAD	27	00 - 7F	-63 - +63
Panpot PHR1	28	00 - 7F	-63 - +63
Panpot PHR2	29	00 - 7F	-63 - +63
Reverb Change	30	00 / FF	00: standard values FF: changed values
Reverb RHY1	31	00 - 7F	-64 - +63
Reverb RHY2	32	00 - 7F	-64 - +63
Reverb BASS	33	00 - 7F	-64 - +63
Reverb CHD1	34	00 - 7F	-64 - +63
Reverb CHD2	35	00 - 7F	-64 - +63
Reverb PAD	36	00 - 7F	-64 - +63
Reverb PHR1	37	00 - 7F	-64 - +63
Reverb PHR2	38	00 - 7F	-64 - +63
Chorus Change	39	00 / FF	00: standard values FF: changed values
Chorus RHY1	40	00 - 7F	-64 - +63
Chorus RHY2	41	00 - 7F	-64 - +63
Chorus BASS	42	00 - 7F	-64 - +63
Chorus CHD1	43	00 - 7F	-64 - +63
Chorus CHD2	44	00 - 7F	-64 - +63
Chorus PAD	45	00 - 7F	-64 - +63
Chorus PHR1	46	00 - 7F	-64 - +63
Chorus PHR2	47	00 - 7F	-64 - +63
DSP1 Active (see 1D)	48	00 / FF	off / on
	49	00	
	50	00	
	51	00	
	52	00	
	53	00	
	54	00	
	55	00	
	56	00	
	57	7F	
	58	7F	
	59	7F	
	60	7F	
	61	7F	
	62	7F	
	63	7F	
	64	7F	
Style-Instrumente	65	00, FD	Indicator? entscheidenden Ein-fluss auf Voices!!
Voice RHY1	66	00	MSB
	67	72	LSB
	68	19	PRG (PRG from Data List - 1 !)
Voice RHY2	69	7F	MSB

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
	70	00	MSB
	71	59	PRG
Voice BASS	72	00	MSB
	73	73	LSB
	74	00	PRG
Voice CHD1	75	68	MSB
	76	04	LSB
	77	00	PRG
Voice CHD2	78	68	MSB
	79	00	LSB
	80	03	PRG
Voice PAD	81	68	MSB
	82	01	LSB
	83	02	PRG
Voice PHR1	84	68	MSB
	85	02	LSB
	86	00	PRG
Voice PHR2	87	00	MSB
	88	72	LSB
	89	00	PRG
Harmonic Content Change	90	00 / FF	00: standard values FF: changed values
Harmonic Content RHY1	91	00 - 7F	-64 - +63
Harmonic Content RHY2	92	00 - 7F	-64 - +63
Harmonic Content BASS	93	00 - 7F	-64 - +63
Harmonic Content CHD1	94	00 - 7F	-64 - +63
Harmonic Content CHD2	95	00 - 7F	-64 - +63
Harmonic Content PAD	96	00 - 7F	-64 - +63
Harmonic Content PHR1	97	00 - 7F	-64 - +63
Harmonic Content PHR2	98	00 - 7F	-64 - +63
Brightness Change	99	00 / FF	00: standard values FF: changed values
Brightness RHY1	100	00 - 7F	-64 - +63
Brightness RHY2	101	00 - 7F	-64 - +63
Brightness BASS	102	00 - 7F	-64 - +63
Brightness CHD1	103	00 - 7F	-64 - +63
Brightness CHD2	104	00 - 7F	-64 - +63
Brightness PAD	105	00 - 7F	-64 - +63
Brightness PHR1	106	00 - 7F	-64 - +63
Brightness PHR2	107	00 - 7F	-64 - +63
EQ Low Change	108	00 / FF	00: standard values FF: changed values
EQ Low RHY1	109	00 - 7F	-64 - +63
EQ Low RHY2	110	00 - 7F	-64 - +63
EQ Low BASS	111	00 - 7F	-64 - +63
EQ Low CHD1	112	00 - 7F	-64 - +63
EQ Low CHD2	113	00 - 7F	-64 - +63
EQ Low PAD	114	00 - 7F	-64 - +63
EQ Low PHR1	115	00 - 7F	-64 - +63
EQ Low PHR2	116	00 - 7F	-64 - +63
EQ High Change	117	00 / FF	00: standard values FF: changed values
EQ High RHY1	118	00 - 7F	-64 - +63

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
EQ High RHY2	119	00 - 7F	-64 - +63
EQ High BASS	120	00 - 7F	-64 - +63
EQ High CHD1	121	00 - 7F	-64 - +63
EQ High CHD2	122	00 - 7F	-64 - +63
EQ High PAD	123	00 - 7F	-64 - +63
EQ High PHR1	124	00 - 7F	-64 - +63
EQ High PHR2	125	00 - 7F	-64 - +63
Voice global 0A			
Octave	1	3F / 40 / 41	-1 / 0 / +1
Sustain on / off	2	7F / 00	on / off
Initial Touch on / off	3	7F / 00	on / off
Touch Off Level	4	01 - 7F	1 - 127
Modulation Wheel R1 / R2 / Left on / off	5		➔ see 6.3 After Touch and Modulation Wheel: R1 / R2 / R3 / Left Numbers
Modulation Wheel R3 on / off	6	FD / FC	on / off
Initial Touch R1 / R2 / Left on / off	7	00 – 07	➔ see 6.2 Initial Touch: R1 / R2 / R3 / Left Numbers
Initial Touch R3 on / off	8	01 / 00	on / off
After Touch R1 / R2 / Left on / off	9		➔ see 6.3 After Touch and Modulation Wheel: R1 / R2 / R3 / Left Numbers
After Touch R3 on / off	10	FD / FC	on / off
Split Point R3	11	48	37: G2 48: C4 (MIDI Notes) 55: C#5
Keyboard Volume (KBD)	12	00 - 7F	0 - 127
Voices 0B / 0F / 17 (13 Left)			
Aktiviert?	1	00 / 7F	aus / ein
MSB	2	00	
LSB	3	73 (Dez: 115)	
PRG	4	00	PRG Nr. - 1
Portamento Time	5	00 - 7F	0 - 127
Volume Voice Edit	6	00 - 7F	0 - 127
Volume	7	00 - 7F	0 - 127
Panpot	8	00 - 7F	-63 - +63
Mono / Poly	9	7F / 00	Mono on / off
Poly / Mono Wiederho-lung (only for OB → Voice R1?)	10	00 / 7F	
Filter Harmonic Content	11	00 - 7F	-64 - +63
Panel Sustain	12	00 - 7F	0 - 127
Filter Brightness	13	00 - 7F	-64 - +63
Reverb Depth	14	00 - 7F	0 - 127
Chorus Depth	15	00 - 7F	0 - 127
Vibrato Speed	16	00 - 7F	-64 - +63
Vibrato Depth	17	00 - 7F	-64 - +63
Vibrato Delay	18	00 - 7F	-64 - +63
EQ Low Frequency	19	04 - 28	32Hz - 2.0kHz
EQ Low (Gain)	20	00 - 7F	-64 - +63 (-12 - +12dB)
EQ High Frequency	21	1C - 3A	500Hz - 16.0kHz

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
EQ High (Gain)	22	00 - 7F	-64 - +63
EG Attack	23	00 - 7F	-64 - +63
EG Decay	24	00 - 7F	-64 - +63
EG Release	25	00 - 7F	-64 - +63
Pitch Bend Range	26	00 – 0C	0 - 12
Tuning	27	00 - 7F	-64 - +63
Touch Sense Offset Wiederholung	28	00 - 7F	0 - 127
Touch Sense Depth	29	00 - 7F	0 - 127
Toch Sense Offset	30	00 - 7F	0 - 127
Octave	31	3E (62) / 3F (63) / 40 (64) / 41 (65) / 42 (66)	-2 / -1 / 0 / 1 / 2
Modulation Filter	32	00 - 7F	0 - 127
Modulation Amplitude	33	00 - 7F	0 - 127
Modulation LFO PMOD	34	00 - 7F	0 - 127
Modulation LFO FMOD	35	00 - 7F	0 - 127
Modulation LFO AMOD	36	00 - 7F	0 - 127
After Touch Filter	37	00 - 7F	0 - 127
After Touch Amplitude	38	00 - 7F	0 - 127
After Touch LFO PMOD	39	00 - 7F	0 - 127
After Touch LFO FMOD	40	00 - 7F	0 - 127
After Touch LFO AMOD	41	00 - 7F	0 - 127
	42	00	
Voices Divers 0D / 11 / 19			
DSP on / off	1	7F / 00	on / off
Variation on / off	2	7F / 00	on / off
	3	00	
Variation Value	4	27, 09, 01, 4A, 49	
	5	FF	
	6	FF	
DSP MSB	7	57, 15, 63, 14	
DSP LSB	8	10, 00	
	9	00	
DSP Depth	10	01 - 7F	1 - 127
	11	00	
Basic 1B Reverb			
	1	FF	00 bei Änderung allgemein 00 bei Song Volumeänderung (von 52 auf 51 und von 52 auf 0 und von 52 auf 127) 00 bei Song Channeländerung FF: Split Point Style Change (C2)
	2	FB	FF wenn anderer Reverb FD wenn nur Song abgespei-chert wird 02 bei Änderung allgemein 04 bei Song Volumeänderung (von 52 auf 51 und von 52 auf 0 und von 52 auf 127) 04 bei Song Channeländerung

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
			02 bei Style-Part Änderung (von A nach B) 02 wenn Style-DSP1-9 Änderung FB: Split Point Style C2
	3	FF	
	4	FF	
	5	01	**MSB**
	6	13	**LSB**
	7	40	
Basic 1C Chorus			
	1	FF	00 bei Änderung allgemein 00 wenn anderer Reverb 00 bei Song Volumeänderung (von 52 auf 51 und von 52 auf 0 und von 52 auf 127) 00 bei Song Channeländerung
	2	FB	02 bei Änderung allgemein 02 wenn anderer Reverb FF wenn anderer Chorus 04 wenn Song Volumeänderung (von 52 auf 51 und von 52 auf 0 und von 52 auf 127) 04 bei Song Channeländerung 02 bei Style-Part Änderung (von A nach B)
	3	FF	
	4	FF	
	5	**41**	**MSB**
	6	**00**	**LSB**
	7	40	
Basic 1D DSP1-9			
	1	FF	
	2	FD	FB wenn Style-Part Änderung (von A nach B) FE wenn StyleDSP1-9 Änderung
	3	00	
	4	00	
	5	00	
DSP 1 Type??	6	03	0C (12): DSP1 Flanger 1 19 (25): DSP1 Flanger 2 0A (10): DSP1 Clean2 (Distor-tion?) 06: DSP1 Reverb Hall1 09: DSP1 TempoDelay
	7	FF	00 if User Type
	8	FF	00 if User Type
DSP 1	9	62	MSB
	10	1A	LSB
	11	00	
	12	7F	
	13	40	

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
	14	00	
DSP1 Part	15	18 (2C?)	1C wenn Style-Part Änderung (von A nach B) 18: RHY1 19: RHY2 1A: BASS 1B: CHD1 1C: CHD2 1D: PAD 1E: PHR1 1F: PHR2
Basic 1E			
	1	00	
	2	00	
	3	7F	
	4	00	
	5	00	
	6	0A	09 wenn Style DSP1-9 Änderung
	7	FF	
	8	FF	
	9	62	15 wenn Style DSP1-9 Änderung
	10	1A	00 wenn Style DSP1-9 Änderung
	11	00	
	12	00	
	13	20	7F wenn StyleDSP1-9 Änderung
	14	FF	
	15	FD	F9 wenn StyleDSP1-9 Änderung
Basic 20			
	1	00	
	2	7F	00 wenn nur Song abgespei-chert oder auch nicht?
	3	00	
	4	00	7F, dann 00 nach DSP1 User Type
	5	00	
	6	01	3E wenn Song Volumeänderung (von 52 auf 51) 0A wenn Song Volumeänderung (von 52 auf 127)
	7	FF	
	8	FF	
	9	63	FF wenn Song Volumeänderung (von 52 auf 51) 62 wenn Song Volumeänderung (von 52 auf 127) 01 if DSP1 User Type
	10	10	11 wenn Song Volumeänderung (von 52 auf 51) 1A wenn Song Volumeänderung (von 52 auf 127)
	11	00	
	12	00	

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
	13	03	7F wenn Song Volumeänderung (von 52 auf 51) (von 52 auf 51) 00 wenn Song Volumeänderung (von 52 auf 127) 7F is DSP1 User Type
	14	FF	
	15	FA	FF bei Änderung allgemein bei Änderung des Tempos FD wenn nur Song abgespeichert F9 wenn Song Volumeänderung (von 52 auf 51) FF wenn Song Volumeänderung (von 52 auf 127)
Basic 21			
	1	00	
	2	7F	
	3	00	
	4	00	
	5	00	
	6	09	0D wenn Song Volumeänderung (von 52 auf 127)
	7	FF	
	8	FF	
	9	15	
	10	00	10 wenn Song Volumeänderung (von 52 auf 127)
	11	00	
	12	00	
	13	01	
	14	FF	
	15	FA	FF bei Änderung allgemein bei Änderung des Tempos
Basic 22			
	1	00	
	2	7F	
	3	00	
	4	00	
	5	00	
	6	15	
	7	FF	
	8	FF	
	9	42	
	10	10	
	11	00	
	12	00	
	13	02	
	14	FF	
	15	FA	FF bei Änderung allgemein?
Tempo 29			

Funktion	Data-Byte	Wertebereich	Erklärung bzw. Wertbereich am Tyros
Tempo ?	1 / 2	00 05 - 01 F4	5- 500
Tempo Song	3 / 4	00 05 - 01 F4	5 - 500
Tempo Style	5 / 6	00 05 - 01 F4	5-500
	7	00 / 7F	aus / ein Vermutung: nur ein, wenn Tempo Song nicht gleich Tempo Style
Basic 3E			
	1	00	
	2	00	7F wenn Style-Part Änderung (von A nach B)
	3	00	
	4	00	
	5	00	
	6	00	03 wenn Style-Part Änderung (von A nach B)
	7	FF	
	8	FF	
	9	40	62 wenn Style-Part Änderung (von A nach B)
	10	00	11 wenn Style-Part Änderung (von A nach B)
	11	00	
	12	00	
	13	7F	1B wenn Style-Part Änderung (von A nach B)
	14	FF	
	15	F9	FB wenn Style-Part Änderung (von A nach B)

6 APPENDIX

6.1 STYLE CHANNEL NUMBERS

Hex	1	2	3	4	5	6	7	8
00								
RHY 1 (Channel 1)								
01	**X**							
RHY 2 (Channel 2)								
02		**X**						
03	X	**X**						
Bass (Channel 3)								
04			**X**					
05	X		**X**					
06		X	**X**					
07	X	X	**X**					
CHD 1 (Channel 4)								
08				**X**				
09	X			**X**				
0A		X		**X**				
0B	X	X		**X**				
0C			X	**X**				
0D	X		X	**X**				
0E		X	X	**X**				
0F	X	X	X	**X**				
CHD2 (Channel 5)								
10					**X**			
11	X				**X**			
12		X			**X**			
13	X	X			**X**			
14			X		**X**			
15	X		X		**X**			
16		X	X		**X**			
17	X	X	X		**X**			
18				X	**X**			
19	X			X	**X**			
1A		X		X	**X**			
1B	X	X		X	**X**			
1C			X	X	**X**			
1D	X		X	X	**X**			
1E		X	X	X	**X**			
1F	X	X	X	X	**X**			
PAD (Channel 6)								
20						**X**		
21	X					**X**		
22		X				**X**		
23	X	X				**X**		
24			X			**X**		
25	X		X			**X**		
26		X	X			**X**		
27	X	X	X			**X**		
28				X		**X**		
29	X			X		**X**		
2A		X		X		**X**		
2B	X	X		X		**X**		
2C			X	X		**X**		
2D	X		X	X		**X**		
2E		X	X	X		**X**		
2F	X	X	X	X		**X**		
30					X	**X**		
31	X				X	**X**		
32		X			X	**X**		
33	X	X			X	**X**		
34			X		X	**X**		
35	X		X		X	**X**		
36		X	X		X	**X**		
37	X	X	X		X	**X**		
38				X	X	**X**		
39	X			X	X	**X**		
3A		X		X	X	**X**		
3B	X	X		X	X	**X**		
3C			X	X	X	**X**		
3D	X		X	X	X	**X**		
3E		X	X	X	X	**X**		
3F	X	X	X	X	X	**X**		
PHR 1 (Channel 7)								
40							**X**	
41	X						**X**	
42		X					**X**	
43	X	X					**X**	
44			X				**X**	
45	X		X				**X**	
46		X	X				**X**	
47	X	X	X				**X**	
48				X			**X**	
49	X			X			**X**	
4A		X		X			**X**	
4B	X	X		X			**X**	
4C			X	X			**X**	
4D	X		X	X			**X**	
4E		X	X	X			**X**	
4F	X	X	X	X			**X**	
50					X		**X**	
51	X				X		**X**	
52		X			X		**X**	
53	X	X			X		**X**	
54			X		X		**X**	
55	X		X		X		**X**	
56		X	X		X		**X**	
57	X	X	X		X		**X**	
58				X	X		**X**	
59	X			X	X		**X**	
5A		X		X	X		**X**	
5B	X	X		X	X		**X**	
5C			X	X	X		**X**	
5D	X		X	X	X		**X**	
5E		X	X	X	X		**X**	
5F	X	X	X	X	X		**X**	

Hex	1	2	3	4	5	6	7	8
60						X	**X**	
61	X					X	**X**	
62		X				X	**X**	
63	X	X				X	**X**	
64			X			X	**X**	
65	X		X			X	**X**	
66		X	X			X	**X**	
67	X	X	X			X	**X**	
68				X		X	**X**	
69	X			X		X	**X**	
6A		X		X		X	**X**	
6B	X	X		X		X	**X**	
6C			X	X		X	**X**	
6D	X		X	X		X	**X**	
6E		X	X	X		X	**X**	
6F	X	X	X	X		X	**X**	
70					X	X	**X**	
71	X				X	X	**X**	
72		X			X	X	**X**	
73	X	X			X	X	**X**	
74			X		X	X	**X**	
75	X		X		X	X	**X**	
76		X	X		X	X	**X**	
77	X	X	X		X	X	**X**	
78				X	X	X	**X**	
79	X			X	X	X	**X**	
7A		X		X	X	X	**X**	
7B	X	X		X	X	X	**X**	
7C			X	X	X	X	**X**	
7D	X		X	X	X	X	**X**	
7E		X	X	X	X	X	**X**	
7F	X	X	X	X	X	X	**X**	
PHR 2 (Channel 8)								
80								**X**
81	X							**X**
82		X						**X**
83	X	X						**X**
84			X					**X**
85	X		X					**X**
86		X	X					**X**
87	X	X	X					**X**
88				X				**X**
89	X			X				**X**
8A		X		X				**X**
8B	X	X		X				**X**
8C			X	X				**X**
8D	X		X	X				**X**
8E		X	X	X				**X**
8F	X	X	X	X				**X**
90					X			**X**
91	X				X			**X**
92		X			X			**X**
93	X	X			X			**X**
94			X		X			**X**

Hex	1	2	3	4	5	6	7	8
95	X		X		X			**X**
96		X	X		X			**X**
97	X	X	X		X			**X**
98				X	X			**X**
99	X			X	X			**X**
9A		X		X	X			**X**
9B	X	X		X	X			**X**
9C			X	X	X			**X**
9D	X		X	X	X			**X**
9E		X	X	X	X			**X**
9F	X	X	X	X	X			**X**
A0						X		**X**
A1	X					X		**X**
A2		X				X		**X**
A3	X	X				X		**X**
A4			X			X		**X**
A5	X		X			X		**X**
A6		X	X			X		**X**
A7	X	X	X			X		**X**
A8				X		X		**X**
A9	X			X		X		**X**
AA		X		X		X		**X**
AB	X	X		X		X		**X**
AC			X	X		X		**X**
AD	X		X	X		X		**X**
AE		X	X	X		X		**X**
AF	X	X	X	X		X		**X**
B0					X	X		**X**
B1	X				X	X		**X**
B2		X			X	X		**X**
B3	X	X			X	X		**X**
B4			X		X	X		**X**
B5	X		X		X	X		**X**
B6		X	X		X	X		**X**
B7	X	X	X		X	X		**X**
B8				X	X	X		**X**
B9	X			X	X	X		**X**
BA		X		X	X	X		**X**
BB	X	X		X	X	X		**X**
BC			X	X	X	X		**X**
BD	X		X	X	X	X		**X**
BE		X	X	X	X	X		**X**
BF	X	X	X	X	X	X		**X**
C0							X	**X**
C1	X						X	**X**
C2		X					X	**X**
C3	X	X					X	**X**
C4			X				X	**X**
C5	X		X				X	**X**
C6		X	X				X	**X**
C7	X	X	X				X	**X**
C8				X			X	**X**
C9	X			X			X	**X**
CA		X		X			X	**X**

Hex	1	2	3	4	5	6	7	8
CB	X	X		X			X	X
CC			X	X			X	X
CD	X		X	X			X	X
CE		X	X	X			X	X
CF	X	X	X	X			X	X
D0					X		X	X
D1	X				X		X	X
D2		X			X		X	X
D3	X	X			X		X	X
D4			X		X		X	X
D5	X		X		X		X	X
D6		X	X		X		X	X
D7	X	X	X		X		X	X
D8				X	X		X	X
D9	X			X	X		X	X
DA		X		X	X		X	X
DB	X	X		X	X		X	X
DC			X	X	X		X	X
DD	X		X	X	X		X	X
DE		X	X	X	X		X	X
DF	X	X	X	X	X		X	X
E0						X	X	X
E1	X					X	X	X
E2		X				X	X	X
E3	X	X				X	X	X
E4			X			X	X	X
E5	X		X			X	X	X
E6		X	X			X	X	X
E7	X	X	X			X	X	X
E8				X		X	X	X
E9	X			X		X	X	X
EA		X		X		X	X	X
EB	X	X		X		X	X	X
EC			X	X		X	X	X
ED	X		X	X		X	X	X
EE		X	X	X		X	X	X
EF	X	X	X	X		X	X	X
F0					X	X	X	X
F1	X				X	X	X	X
F2		X			X	X	X	X
F3	X	X			X	X	X	X
F4			X		X	X	X	X
F5	X		X		X	X	X	X
F6		X	X		X	X	X	X
F7	X	X	X		X	X	X	X
F8				X	X	X	X	X
F9	X			X	X	X	X	X
FA		X		X	X	X	X	X
FB	X	X		X	X	X	X	X
FC			X	X	X	X	X	X
FD	X		X	X	X	X	X	X
FE		X	X	X	X	X	X	X
FF	X	X	X	X	X	X	X	X

6.2 Initial Touch: R1 / R2 / R3 / Left Numbers

Hex	R1	R2	R3	Left
00 00				
01 00	X			
02 00		X		
03 00	X	X		
04 00				X
05 00	X			X
06 00		X		X
07 00	X	X		X
00 01			X	
01 01	X		X	
02 01		X	X	
03 01	X	X	X	
04 01			X	X
05 01	X		X	X
06 01		X	X	X
07 01	X	X	X	X

6.3 After Touch and Modulation Wheel: R1 / R2 / R3 / Left Numbers

Hex	R1	R2	R3	Left
F8 FC				
F9 FC	X			
FA FC		X		
FB FC	X	X		
FC FC				X
FD FC	X			X
FE FC		X		X
FF FC	X	X		X
F8 FD			X	
F9 FD	X		X	
FA FD		X	X	
FB FD	X	X	X	
FC FD			X	X
FD FD	X		X	X
FE FE		X	X	X
FF FF	X	X	X	X

6.4 SETTING-GROUPS (GPM-BLÖCKE)

GPm	Song	Style	Voice	Tune Tr.	Scale	Harmony	Tempo	Pedal	MPad	MicS	LineO.
01	X	X	X								
02	X	X	X								
03	X										
04	X										
05	X										
06											
07		X									
08		X									
09		x?									
0A			X								
0B			X								
0C											
0D			X								
0E											
0F			X								
10											
11			X								
12											
13		X	x?								
14											
15		X									
16											
17			X								
18											
19			X								
1A											
1B	X	X	X								
1C	X	X	X								
1D	X	X	X								
1E	X	X	X								
1F	X	X	X								
20	X	X	X								
21	X	X	X								
22	X	X	X								
23											
24											
25											
26											
27											
28											
29											
2A											
2B											
2C											
2D											
2E											
2F											
30											
31											

GPm	Song	Style	Voice	Tune Tr.	Scale	Harmony	Tempo	Pedal	MPad	MicS	LineO.
32											
33											
34											
35											
36											
37											
38											
39											
3A											
3B											
3C	X	X	X								
3D	X	X	X								
3E	X	X	X								

7 EPILOGUE / POSTSCRIPT (ETC.)