

## John Vojtovitch – How music is made

I welcome all the music enthusiasts who are interested in music. I will introduce some substantial aspects to you which are, in my opinion, essential for music creation. I will try to explain everything straightforward, simply and distinctly. Before I start, it is suitable to begin with my understanding of music.

### **My global understanding of music.**

Music is a great phenomenon; it can express feelings and it is approaching speech a lot. In fact, it is rather difficult to understand and that is why people, to make it simpler, started to put it into imaginary boxes (styles). Thanks to this, they can concentrate on one particular favourite style and move within it. It is easier for them and they can understand it. Music can be compared to the languages of nations. We usually know one language but music can address anybody, no matter what language they speak.

It often happens that people reject other music styles and stick doggedly to their “box”. An interesting aspect is the interference of the music style by another style, which usually becomes an event and everybody is speaking about it, because it made them so excited; they do not realize that this particular moment of style connection is so entertaining since it brings the element of contrast. Thus they have partially peeked into the global compositional understanding of music.

My great role model is the composer and multi-instrumentalist Mike Oldfield, who understood long ago (and thus was ahead of time) that music was not about styles but about general concept of certain elements. The genius of this composer consists in his never favouring his guitarist's ambitions. In his compositions everything is subject to the perfect harmony, melody, joints, colours, forms, layers, and all of this is enhanced by beautiful space and perfect mix. That is why this composer is so popular and his compositions have been played for decades and so will they be for a long time. As a composer, he has, in fact, access to almost all the material, thanks to his global view of music. And, in connection with the forms of classical style, which we can see as primary (regarding its structures), he can give music the right dimension. And thus, this provokes emotions.

If you do not stick to styles and you free and open your mind... listening is enough; emotions and inspiration will come soon after. If you did not understand the above mentioned terms because you are just about to begin, nothing happens, we will get to them in the following chapters.

On one hand, music is, in fact, simple but on the other hand, it seems to be very complicated. In my opinion, it is substantial, how you look at it. If you open any music textbook, be sure that along with the first browsing you will be deterred. You will find there a lot of information and usually a bad explanation form. It can be compared to school where a teacher starts writing a lot of formulas on the blackboard and then they leave you with the words: “I will be back in a minute, I hope you understood.” However, there are also teachers who are able to explain the point within a few moments so that the student understands it quickly, not necessarily being a genius.

So will I try to tell you the substantial information by taking the essential aspects out of my experience ... we can call them rules. Due to these rules, you will progress in your study very quickly without having to study for years (and the same way, finally you will only remember a few basic principles). If somebody wants to criticize my publication because of superficiality, it is not because of not having studied into depth but I am trying to make the pace of learning faster with the help of really the most important elements which can get you to the goal, and that is the purpose of my publication. A question may arise – how fast can you become a musician with this publication? It is individual, it can take a month or years, it depends on many factors of a given person; how eager they are to become musicians, how much time they dedicate to it, how persistent they are, if and how long they play an instrument and so on. Do not forget that sometimes less is more, and at a certain moment proceeding slowly but well is better than fast and superficially.

Before we move to the rules, you will, after all, need certain preparation. If you do not go through the preparation, you will not understand certain terms, which would be a problem. That is why I kindly recommend you to study it and then to start with the rules.

## Preparation

### The Selection of a Musical Instrument

You can choose the instrument of your heart, nonetheless, if you want to record music, a **keyboard** and a **guitar** are recommended; they are two basic instruments which you have to master at least roughly. The other instruments like an electric bass or percussion will be a breeze if you manage the principles of the two above mentioned instruments – the keyboard and the guitar.

There is a reason for choosing the two instruments:

The keyboard is the most used midi driver; it is possible to play ten tones at once, and the guitar is irreplaceable thanks to the timbre and way of playing; and, above all, thanks to the tone bending beautiful sounds are produced.

Here we have come across the first term: **midi**.

### Midi (system)

To be able to record music, you will need a few things; among these, the midi system, which is quite substantial for your work. If you push a key, there is a sound of a piano, if you change the sound bank, there comes a sound of a different instrument with different timbre. That is amazing, isn't it? You can even put some pressure onto the key (After-touch) and thus the sound starts changing within the real time. You can play any volume (Main volume) or the separate tones can have different velocity. You can move the sound, for example, in the direction from the left to the right (Pan), or the sound can be fluently bended (Pitch-bend), modulated-shaken (Modulation), kept with the prolongation of the tone length (Sustain) (as with the classical piano). The Program change will change the sound timbre and the

articulation controller will produce the concrete articulation of an instrument.

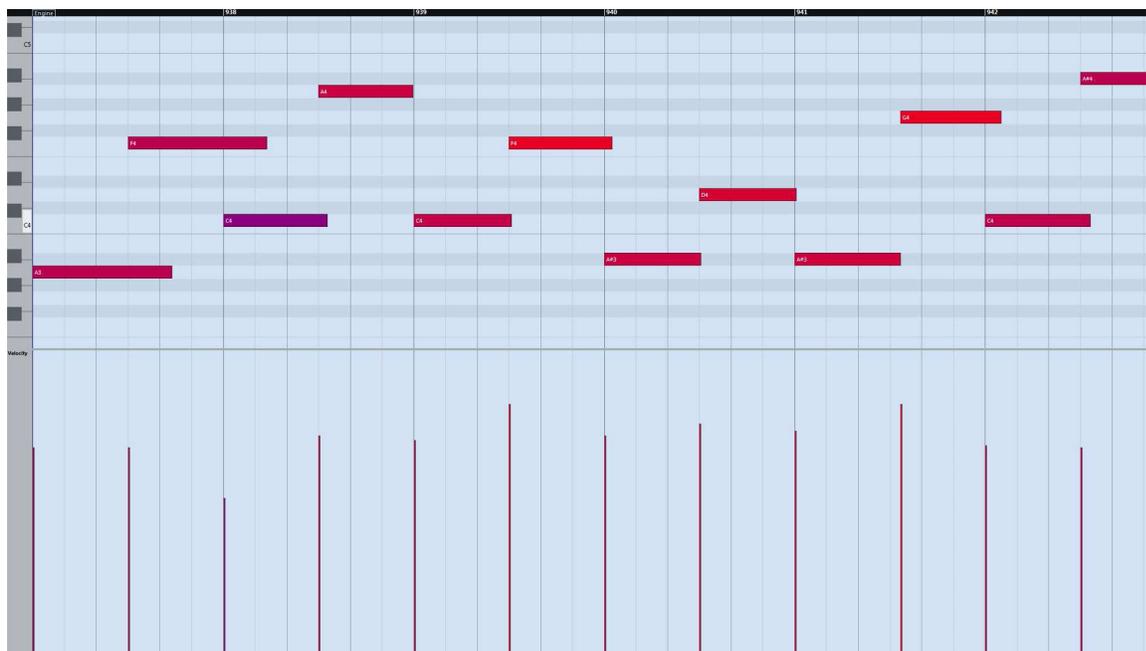
There are 127 supportive controllers but we will remember only those we will work with the most, we can choose the others according to our own needs. In the book by Daniel Forro you can find out all the midi possibilities.

You will need these:

### Basic Midi Controllers

Main volume, program change, velocity, modulation, pan, pitch bend, articulation, sustain, and after touch. The controllers are recorded, be it in the real time or postproductionly (after recording). Please note that with the help of these supportive elements we can work with tones. If we want to, for example, place the tone completely to the left, we write the number -64, if we want to place the tone to the right, we write the number +64, and if we want to place the tone to the middle, we will write 0. Or anything within the range 0-127, thus the tone is moving in a direction also in the real time. And that is how all the controllers work.

In the sequencer Cubase (which I work with) it is possible to draw these records optically without having to write down the numbers. In the picture, you can see, for example, the velocity of particular tones. What you can see in the bottom part of the picture is a field of controllers; you can choose any out of the 127 controllers and draw the values related to the tones above.



## **Sequencer (working place)**

In the past, music was recorded on a tape recorder, later on a multi-track record where it was possible to record more sounds next to each other, and later they were playing at the same time. They were recorded gradually, for example, percussion, bass, singing and so on.

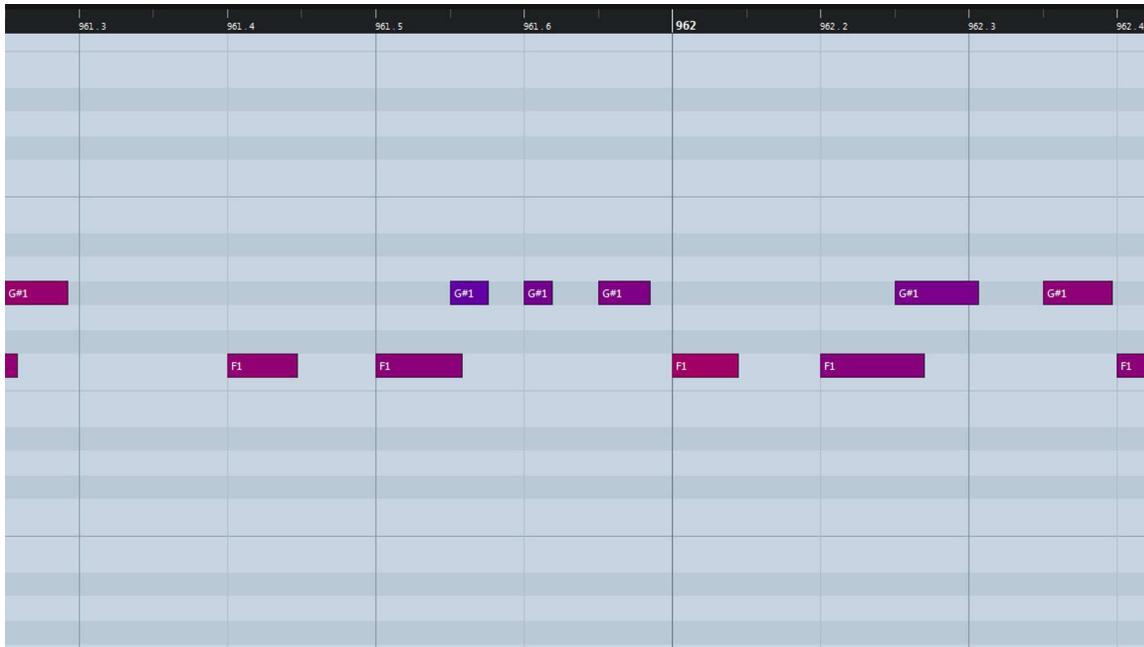
In fact, nowadays we work in the same way, recording into tracks, and in each track one instrument is playing. The tape recorders had two disadvantages. The first disadvantage was the fact that if there were no tracks left, which was really common (because 16 tracks will not be enough to record music), the tracks had to be mixed into two **stereo tracks** and other tracks were recorded into the freed tracks, all of it was mixed, and so on. There was an unpleasant side effect of this method – the rising sound noise with the proceeding mixture. The other disadvantage of tape recording was the fact that if you were mistaken when recording, you had to repeat the record or cut and glue the tape in a complicated way. Today we are working in the digitized way and this enables us to record eternally without losing the quality. We can also correct any place on the record or move it and copy it. Believe me – this is really amazing and much faster. We can repeat separate tones, change their timbre after recording, delete the errors, correct or edit them. And all of this is possible with the midi system. The possibilities are immense.

Nowadays, it is not necessary to buy expensive instruments, it is enough to get a solid computer plus a monitor, keyboard, microphone, sequencer, amplifier, speakers and you have a studio. I have not mentioned other recording systems yet. We can call them hardware digital hard disk recorders. They were devices which usually managed a limited number of tracks and were very expensive. I used to use HD1 (Sound-scape) – 8 stereo tracks (16 mono). The device was very reliable, nonetheless, due to the limit of the tracks, they were really time-consuming to work with. The current sequencers enable you to record into eternal tracks (depending on the power of your computer).

A sequencer is a place (programme) in which the music is gradually recorded, mixed and added with various effects or noises and others. The result is a record composed of particular tracks. This is later exported into the wav format. After being transformed into a concrete format, it can be listened to as a cdr or mp3 or aif, and so on.

## **Tone Edit**

In the past, we used to write everything down in notes, nowadays it is much easier to work with music optically or, rather, graphically. Everything is more intuitive and thus quicker. I will not teach you how to work with a sequencer, you will learn it on the Internet, I just want to show you the basic principle of tone editing, which is a genius invention. In the picture, you can see some “noodles” - they are tones. You can record them in the real time, draw them, shorten them, lengthen them or move them anywhere or delete them, and thus adjust your record. Isn't it great? You can also hear them in the real time. That is how today we work with music. Of course, Cubase enables you to work also with notes, if you, for example, need to print the musicians' parts.



### **Stereo and Mono (Space Where You Hear It)**

As a rule, we usually hear the sound in the basic form which is stereo – left (L) or right (R). If we record from the keyboard source, it is probable that the sound will be formed from a stereo source. In each speaker, a different timbre can be played and thus the sound becomes more colourful; we call it a layered sound (layering). As the opposite of that, the sound of a guitar or singing comes from the microphone from one point and that is why it is not possible to record it in stereo, we record it in mono. It does not mean, though, that the mono sound stays mono, there comes the adjustment into stereo with the use of various additional effects. The sound can stay mono, if we do not move with the instrument in a direction. Then there are different sounds in each speaker which together form the layering.

### **Effects (the Space - How You Hear It)**

Within my music experience, I have met a lot of music enthusiasts who have been speculating about sound for days, months or years. Some spend their whole lives dealing with it. Believe me, it is not necessary, if we omit all the nonsense, we will finally realize that only a few basic effects influence the sound.

**Pan** (sound placement)

**Reverb** (the feeling of space)

**Delay** (echo)

**Other used effects:**

**Chorus** (sound compaction)

**Vibrato** (sound vibration)

**Distortion** (it is used with electric guitars)

**Flanger, Tremolo** and others.

The effects in this group are, though, associated mainly with electric guitars.

May it interest you, you will really do with the first trinity of effects; on my discs I usually use the only effect **reverb**, which is set for each particular instrument. It is strange, isn't it? But so true. I also use the other effect **Delay** with the electric guitars. It is often used with singing as a supportive effect to reverb. Simply, these two effects are used the most. We do not need to count **Pan** as an effect, it is, in fact, a basic function of a sequencer. You can see that the space of music is controlled only by two effects – reverberation and repetition (if we do not count the effects of guitars).

### **Sound Timbre**

The timbre of a concrete musical instrument is, in fact, substantial, and it is important how the given timbre is dealt with.

The timbre (frequency) influences a lot of things and inspires us a lot. We will divide the sound colour into two groups:

- 1.) **Basic** (one timbre)
- 2.) **Layered** (more timbres) – we will divide this into two more groups:
  - a.) **Layering** in the real time (we hear all the timbres at once when recording)
  - b.) **Layering** after recording (we add timbres after recording)

The basic timbre is, for example, the timbre of one instrument; it can be a guitar or a single sound of the keyboard, which is, for example, a piano.

Three basic timbres are usually used in music but if you want to proceed a little more and improve the sound as if in an orchestra, you will get to the other group – Layering (layers).

The layers are usually used in music as well as in photographs or films. Even separate music tracks can be considered layers. Now we are talking about the layering of one instrument in the real time.

Imagine we do not hear only one sound but also more sounds at the same time. Swish, which is situated on the left, bell ringing on the right and a guitar, for example, in the middle. The sound all at once gets a different dimension. Somebody might object that it is not natural music. But let's leave the

discussion about what is or is not natural up to the music critics (who usually do not understand music that much).

Nowadays, synthesizers (or samplers) are generally produced to play sounds and they already have a sampled sound, saved in registers of sounds and usually it is composed of up to 8 other sound layers. A sampler has thousands of in-coded sounds. The sounds from such an instrument are original and we can, in fact, call them a new instrument.

It is controversial, what is or is not natural. A Neanderthal would find a piano also something unnatural but we consider it a real musical instrument. It is obvious that a musical instrument can be, in fact, anything – a gavel, a drum, a fujara, a synthesizer, even human voice (if the frequency fulfills the tone purity).

The best explanation of music layering is the idea of an orchestra where in the real time one melody is played by 10 instruments at once, either the same instruments but also each instrument can play a different melody. By the combination of these possibilities, we achieve a layered sound of an orchestra.

### **Sound Frequency**

Speaking about timbres, we cannot forget how the colours arise.

A human can hear in a certain audibility zone, generally 16hz-20 000Khz. There are bass, middle or high-pitched sounds ; according to these speakers are produced. Usually, Subbas is added, which plays the most bass frequencies.

If we imagine the piano keyboard, we can divide it into several octaves of audibility (an octave is a term of twelve tones (e.g. c1-c2), there are eight basic ones, but let's talk about it later).

### **The octaves from the deepest:**

Sub Contra

Contra

Great

Small

1 Line

2 Line

3 Line

4 Line

5 Line

As you can see, there are 9 of them and if we play, for example, in the 5 Line octave – the tones sound

high-pitched; the opposite is the Sub Contra octave where the tones sound very deep.

I will also explain the term of frequency. Now we will imagine the murmur of the sea. Is it a music sound? No, it is not. It is considered some noise (with an uncertain alias unclear frequency). The opposite of noise is a sound whose frequency sounds clear, such a sound is called a tone.

The tones of a piano can have various frequencies of tuning, the tempered tuning is the most used where there is a certain compromise of the purity of tuning. This tuning enables the producers and players to get used to a certain compromise system of listening.

Before passing to tones and intervals, which is a bit more complicated, I will explain one more term: Audio system.

### **Audio System**

We have dealt with the midi system above (a file with the "mid" extension) which is capable of splendid things. Now we will deal with another basic system which we often meet in a music studio and that is an audio system.

Within the midi system, everything can be corrected and taken back. Unfortunately, it is not possible in the audio system. If you record something into the audio system, you usually cannot do much about it. What is such a system good for then? It is really necessary, because it is used to make a complete record into the format with the extension -Wav (or others) or to transfer individual midi tracks to Wav. It is also used when we record live, for example, singing on the microphone or a guitar on a microphone. The record is made by the amplitude measurement, alias a digital record. Also all the noises are recorded into the audio system. Drum loops in audio format are also largely used.

Midi is depicted in a sequencer as noodles of the particular tones, on the opposite, audio is depicted in an electrical sine wave. A Sine wave can be cut as well as the midi one, it can even be copied or moved, but it cannot be corrected. There are several functions, though, that are worth mentioning.

**Record acceleration or slowdown** – (without any deformation of a sound) this function is very effective, for example, if you are not able to record a guitar in the real time, you can record it slowly and then make it quicker (but be careful : the playing must be natural).

**The correction of singing** – Cubase enables you to correct out-of-tune singing. It is a great function.

**The Equalization of the amplitude** – to the highest voice level which is zero in the digital system. It means, in practice, that your resulting record will be as loud as the one of other experienced composers.

I would like to say at the end of this chapter that in the music studio there are two systems used: midi and audio, each has its advantages and disadvantages but both belong together and they complement each other.

## Monitoring

Monitoring is listening to music and the way you listen. We could write books about systems, amplifiers, loudspeakers, cables, microphones, or also about stubborn audiophiles. We do not need to deal with it. It is enough to buy a decent system with which you have the feeling that you hear everything you need. Whatever you buy, you will find after some time that it does not consist in the loudspeakers or a microphone or an amplifier ... it is about the global concept of music. And it is a composer's teaser. There are 3 systems used in monitoring

1. Headphone system – it is good for clarity
2. Near and medium listening (listening from one metre) – great for panoramatization and volume balance of the recording and for listening which is not deformed by a room
3. loud listening – inspiration of standard listening in a hall (here the sound is influenced by the room according to acoustic features).

If you are curious what I use:

1. The headphones from Lidl for 370 CZK and, in addition, I listen to subbas Heco
2. Active monitors Adam A7X 1 + subbas Heco
3. Active monitors Quested V3110

I also use:

Harman/Kardon Amplifier

a monitor for the sequencer and a monitor for editing instruments

midi controllers: keyboard (Kawai K4), guitar (Roland GK-3), drum (Roland TD-11)

Synthesizers: 2x Yamaha TG 500, 2x – Korg 03/RW, Yamaha Mu 80, Roland GR-55 Alesis D4, ProCussion

Effects: 2x Rocktron Intellifex, Roland RSP550, Sony, Zoom

Midi interface: Motu 128, Edirol UM-1X, Studio 64x

Dat system

Sound card: Ferofisch A16 MK-II+card, 2x AudiFire12

Microphone Shure

Guitars: 2x electro-acoustic, acoustic, bass, electric, 5string banjo

Virtual instruments:

AEON

AFRICA

CANTUS

CELTIC

CINE SYMPONY LITE

DELTA BLUES

ELECTRICITY

ERA

ETHNO WORLD

FOREST

GOLIASH

GRAVITY

GUITAR RIG5

PIANO BABY

PIANO GALAXY

PIANO STEINWAY

LEGENDS

M1

NATURAL FORCE

OMNISPHERE 2

RETRO

MASTER Drum

RHODOPE

SCORING GUITAR

SHAKUSHASHI

SHEWANAI

OLYMPUS

TRILIAN

VOCALISE

WAWESTATION

HALION

ADDITIVE DRUMS

AGENT DRUMS

EDIROL ORCHESTRAL

HYPER CANVAS

QUARTET

CELTIC ERA

ERA UU CODEX

VOCALOID3 AWANA

Virtual effects: usually from Cubase system

Sequencer: Cubase 8

**Volume** is a very important aspect. It is necessary to realize that it is not possible to work only on one system, each system of listening has its advantages and disadvantages. For example, if you kept listening to loud music all day, it would be very tiring, moreover, a human ear behaves a little strangely and there is no wonder -it is protected against destruction. If you keep listening for a long time and loudly, two problems will arise:

1. The ear forms by itself certain frequencies and suppresses the others (a proof is a visit of a club where at the beginning all seems to be very loud at first, but you get used to it after some time).

2. Over-listening - if you keep recording one composition, your brain evaluates certain aspects and you will be excited about the listening in the evening, but the morning can be a great surprise. This second issue is massively misused on the radio. Because if you listen to the same silly song again and again, finally you will develop liking for it. It is physiology.

I recommend creating an outline of a composition on the close listening with low volume where you can check all the substantial aspects of music like:

Bass, key, harmony, melody, rhythm, melody links, harmony connections, melody form, order of verses, arrangement of instruments ... simply the composition. As following, you deal with layers and panoramas. During the loud listening you adjust the volume, colours and space. In the headphones, you check tone errors or space.

### **Music theory**

Now pay attention because with the following material we are getting to the music theory. It will be a little more complicated but it is a necessary cost to understand music and, believe me, you simply cannot do without this information.

The music theory can also seem very boring at the beginning, and a lot of students might be discouraged. Nonetheless, a little later, you will find out that you can use the acquired information in a pleasant way in practice and it is essential for your work in the studio for a composer's career.

If you overcome certain detest of the music theory ... you have won, it is a **key to be successful** in your music studio activity. As soon as you understand how to connect tones by harmony, how to order sentences and so on, you will reach the goal. Suddenly, music will be an exciting issue, which, as I hope, will fill you up for the rest of your life.

I should also mention one essential idea ... **what you need** and what leads you to the goal is:

**Not only determination, diligence and talent but mainly endurance.**

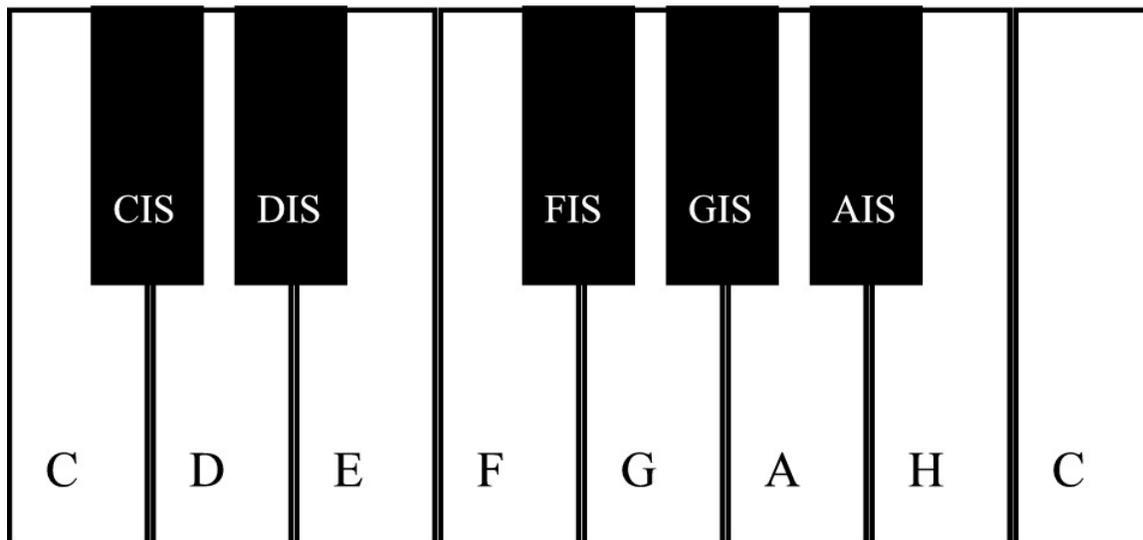
I myself have gone through a big effort a lot of times, but thanks to endurance and love of music I have overcome everything well. This guidebook will be (as I hope) also your big aid.

Let's go through the most important theory knowledge and after that let's immerse into the music rules due to which you can work very effectively. Without understanding the theory it would not be possible, though. Then you would not understand the rules.

Are you ready? OK, let's start:

### Line of Tones

To simplify, we can imagine a line of tones one after another (chromatically) passing through the universe. It keeps repeating over and over and it sounds like this:



If it sounds from the deepest to the highest tone - we will only hear the 9 octaves, but now memorize this 12-tone line so that you can name it at any time without thinking.

Notice that there is no tone between E-F and H-C.

## **Intervals**

Short intervals are called half tones and tones.

Intervals (distance between tones) are governed by the following rules:

1. A half tone: the shortest distance (C-C#)
2. A tone: (C-D) (they are actually two half tones -semitones)

If we raise by a half tone ... we add #

If we raise by a tone ... we add the ##

If we lower by a half tone ... we add "b"

If we lower by a tone ... we add "bb"

### **The list of all basic intervals:**

1. unison
2. second
3. third
4. fourth
5. fifth
6. sixth
7. seventh
8. octave
9. ninth
10. tenth
11. eleventh
12. twelfth
13. thirteenth
14. fourteenth
15. fifteenth

It sounds worrying, I understand, but again you have to learn it by heart as the multiplication table. There are no more basic intervals within an octave.

## Basic Table of Interval Terminology:

Degree	Interval name	Half tones	Basic tone:C	(e.g.) basic tone: E
1	perfect unison	0	C – C	E – E
2	minor second	1	C – Db	E – F
2	major second	2	C – D	E – F#
3	minor third	3	C – Eb	E – G
3	major third	4	C – E	E – G#
4	perfect fourth	5	C – F	E – A
5	perfect fifth	7	C – G	E – H
6	minor sixth	8	C – Ab	E – C
6	major sixth	9	C – A	E – C#
7	minor seventh	10	C – B/Hb	E – D
7	major seventh	11	C – H	E – D#
8	perfect octave	12	C – C	E – E

and so on.....up to the 15th.

The terms for **perfect** tones are: **1,4,5,8**

The terms for **major** and **minor tone intervals** are: **2,3,6,7**

It is not as easy as that; almost each tone can have 3 terms but we will not deal with it now. We can find it out, for example, on Wikipedia - see the term: Interval. It is necessary to realize that C-C# is a minor second as well as C-Db. (If we raise C to C# or if we lower D to Db.)

## Scale Creation

Now, knowing the basic chromatic line:

**c c# d d# e-f f# g g# a a# h-c**

we can form scales by ourselves, we only need to know the rule of the tone mode and what a chord is.

The tone mode is either **MAJOR** or **MINOR**.

A major chord sounds happy and solemn, on the opposite a minor chord sounds mysterious and sad.

Thus, it is obvious that if we want to make a composition with a transition to a cheerful part, we choose the major mode, if a sad one, we choose the minor one.

**The Rule How to Form a Major Scale:**

Adding half tones between 3-4 7-8

**The rule How to Form a Minor Scale:**

Adding half tones between 2-3 5-6

Note: The difference between a major and a minor chord is only one tone and it is in the third. Major third – Major, minor third – Minor.

Let's have a task to form the basic C major scale.

	cis	dis		fis	gis	ais	
1	2	3-4		5	6	7-8	
C	D	E	F	G	A	H	C

First, we will write down the numbers from 1 to 8.

We will start with the first C tone (according to the assignment) and, following the major rule, we add half tones between the tones 3-4 and 7-8 by putting a hyphen there and we go on adding letters and numbers (while checking the chromatic line above). For a check, the first and the last tone must always be the same. Notice, moreover, that the letters above the numbers are, in fact, the black keys of a piano, and the lower letters are the white keys.

Now we will form the basic A minor scale:

	ais		cis	dis		fis	gis	
1	2	-3	4	5	-6	7	8	
A	H	C	D	E	F	G	A	

We will start with the first A tone (according to the assignment) and now we add, according to the minor rule, half tones between the tones 2-3 and 5-6. (Again, we keep checking the chromatic line above.) The first and the last tone must be the same again.

**Now let's move on and start to create different scales with a key signature.**

A new task is the D major scale (with ##).

	dis	f		gis	ais	c	
1	2	3 - 4	5	6	7 - 8		
D	E	Fis G	A	H	Cis	D	

Another task is to create the Hmi scale

	c		dis	f		gis	ais
1	2 - 3	4	5 - 6	7	8		
H	Cis	D	E	Fis	G	A	H

Now you can create other scales by yourselves. For example, you choose G major scale, you write 8 numbers and you start with the letter G and according to the chromatic line, you fill in the letters according to the major rules, and so on.

For a review, I attach my table, which is very suitable for composing music, it can be used as an overview of keys, basic chords (stones), key signatures, scales, parallel chords, tone modes, et cetera. We can also call it a transposition modulation table. In the table, the C scale with the Ami scale is placed in the centre (where there is 0). These scales are without a key signature; on the right there are scales with raising, left with lowering.

ENHARMONICKE

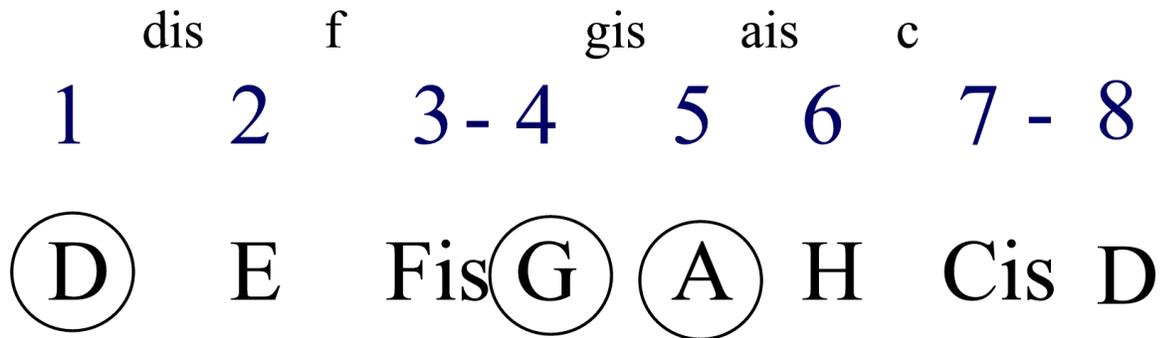
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7
I.	C	A <sup>b</sup>	G	E <sup>b</sup>	D	B <sup>b</sup>	A	F <sup>b</sup>	E	C <sup>b</sup>	B	G <sup>b</sup>	F	D <sup>b</sup>	C
II.	D	B <sup>b</sup>	A	F <sup>b</sup>	E	C <sup>b</sup>	B	G <sup>b</sup>	F	D <sup>b</sup>	C	A <sup>b</sup>	G	E <sup>b</sup>	D
III.	E	C <sup>b</sup>	B	G <sup>b</sup>	F	D <sup>b</sup>	C	A <sup>b</sup>	G	E <sup>b</sup>	D	B <sup>b</sup>	A	F <sup>b</sup>	E
IV.	F	D <sup>b</sup>	C	A <sup>b</sup>	G	E <sup>b</sup>	D	B <sup>b</sup>	A	F <sup>b</sup>	E	C <sup>b</sup>	B	G <sup>b</sup>	F
V.	G	E <sup>b</sup>	D	B <sup>b</sup>	A	F <sup>b</sup>	E	C <sup>b</sup>	B	G <sup>b</sup>	F	D <sup>b</sup>	C	A <sup>b</sup>	G
VI.	A	F <sup>b</sup>	E	C <sup>b</sup>	B	G <sup>b</sup>	F	D <sup>b</sup>	C	A <sup>b</sup>	G	E <sup>b</sup>	D	B <sup>b</sup>	A
VII.	B	G <sup>b</sup>	F	D <sup>b</sup>	C	A <sup>b</sup>	G	E <sup>b</sup>	D	B <sup>b</sup>	A	F <sup>b</sup>	E	C <sup>b</sup>	B

Now, when we are able to form scales and when you see the table in front of you, the whole music world is opening to you, but we still have to explain what a key is and what a chord is.

Since almost everything in the universe is divided into three parts (an atom, an electron, a neutron), it is not different in music. To know the chord, you have to hear 3 tones; to recognize perfectly a key, you have to hear 3 chords.

### Keys

The keys are really essential to create music. Each key has a different character and it sounds differently. There are major and minor keys. If we look, for example, at the D major scale, it is possible to recognize the key. The foundation stones of a key, be it a major or minor one, are **1 – 4 - 5 degrees of the given scale.**



Let's have a look into the transposition table (see above) and focus on the 1,4,5 degree and you will recognize the basic chords used in the given keys.

A characteristic feature of the keys is their foundation stones which have their distinctive sound characteristics:

1<sup>st</sup> degree: TONIC – where it all begins and ends

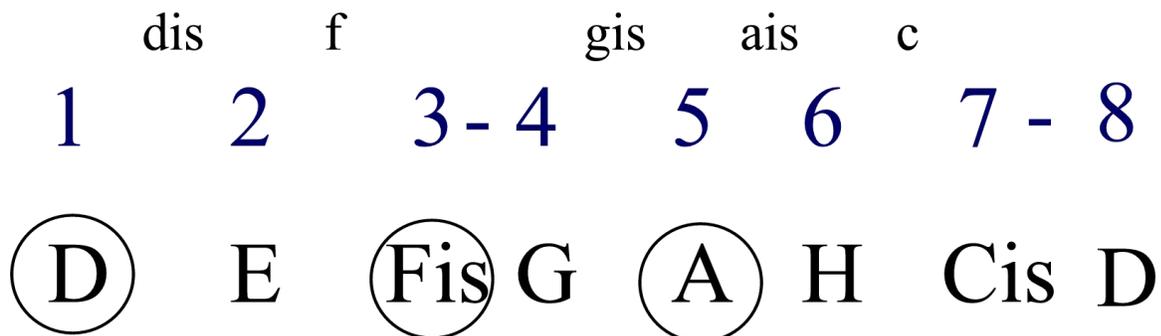
4th degree: SUBDOMINANT – the peak

5th degree: DOMINANT - calming down

These are the basic sound characteristics of each key and it is necessary to learn to listen to them by listening compositions or, at best, by playing a musical instrument. Just realize what chord you are playing, if it is a tonic, a subdominant or a dominant. Gradually, you will take it for granted. It is, in fact, the base of a harmony. It is called cadence. Now we are speaking here only about the basic cadence, but it is sufficient (if you do not intend to play jazz).

### Chords

The creation of a basic chord (the chord of the fifth) is easy. You choose the 1 – 3 – 5th tone of a scale. Again, it is all the same, if it is a major or a minor one.



And there we have it. We have the basic chord (the chord of the fifth) because it finishes with the perfect fifth), in this case D major (according to the appointed intervals).

### **Chord markers**

We have reached the chord markers, it is a bit more comprehensive study, so I will ask you to look up a publication about chord markers where everything would be perfectly described. You do not have to worry at all, just take some basic information, where everything is graphically displayed.

### **Keyboard**

Now that you know what the C7, Gmaj7, Dsus4, etc. chords are, I recommend moving to the piano keyboard and listening to how the chords sound. Practicing on a keyboard takes a while, I recommend learning first the left hand's play, e.g. C-G-C1-G. Later add the right hand for the melody. After training for about 10 days, the hands are synchronized.

The keyboard controller (or, a midi keyboard) is now available in various designs. You can choose only a controller or a synthesizer or sampler controller, there are also variants (e.g. By Native company) where the keyboard also includes virtual sounds (the advantage is that the keyboard has controls that control specific sounds and banks).

If you are a pianist, there is a piano controller for you. But I do not recommend it for regular players, keys would be far from each other and it is not used often in midi systems. The standard number of keys is 61, you can also use a longer keyboard, e.g. With 89 keys or more.

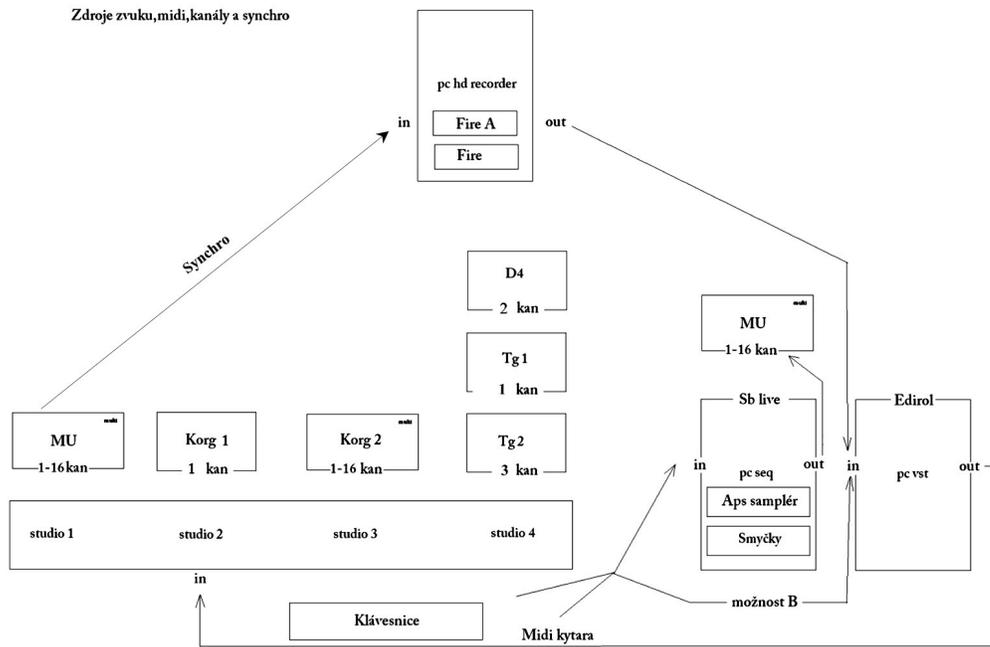
### **Midi interface**

If you want to use physical synthesizers, you need to connect them to your computer (in and out). As mentioned above, I use 128 channels (8 in and 8 out). In practice, this means that I can use multiple physical synthesizers. If you want to make your own sounds, you have to connect both in and out of a physical machine, a specific software editor then controls the machine through the computer and it sends back its data.

The disadvantage of physical machines is a rather late latency, so you have to own a professional sound card. If you want to hang an effect behind the machine, I recommend doing it always on the computer, otherwise you might no longer be able to correct the recording. The advantage of physical (hardware) synthesizers is the specificity of sounds, special editors and standalone PCU units, due to which you do not overload your computer.

On the other hand, virtual instruments are not so expensive, but unfortunately, they load your computer more.

The example of my midi connection in the past:



## Sounds

If you're wondering where the sounds come from in the synthesizers, I'll try to explain briefly.

The synthesizer has the possibility to sample something (to load a live sound) and it is hidden in a certain bank, which is then called by pressing a certain button or by calling the bank numbers in the sequencer. With the help of the Wavetable method (the table of sounds), we can hear these sounds. Virtual sounds work in the same way, just the data are placed on your computer.

Nowadays, the sounds are of such a high quality that you are not able to tell (if you close your eyes) whether there is a symphonic orchestra in front of you or one player with a synthesizer and a sampled sound of that orchestra.

## The Number of Channels

There are 16 broadcast channels for one midi circuit, you can have one synthesizer sound on each channel (it can also be layered). Usually in physical machines there are several modes:

E.g. for Korg 03 / RW, the modes work as follows:

1. COMBI: the sound composed of 8 sounds + an effect on one channel
2. PROGRAM: the sound mixed from two banks + an effect on one channel
3. MULTI: 16 sounds on 16 channels

Of course, every synthesizer is different, but they are similar. In addition, the manufacturers have tried to make the system compatible through various mappings such as GM, XG, and so on. But let's not deal with it.

I want to add to this topic that you are not limited with the physical midi interface in virtual instruments, which is great, because you can have many synthesizers regardless of your interface. Each synthesizer has 16 channels and you can load it repeatedly.

### **Analysis**

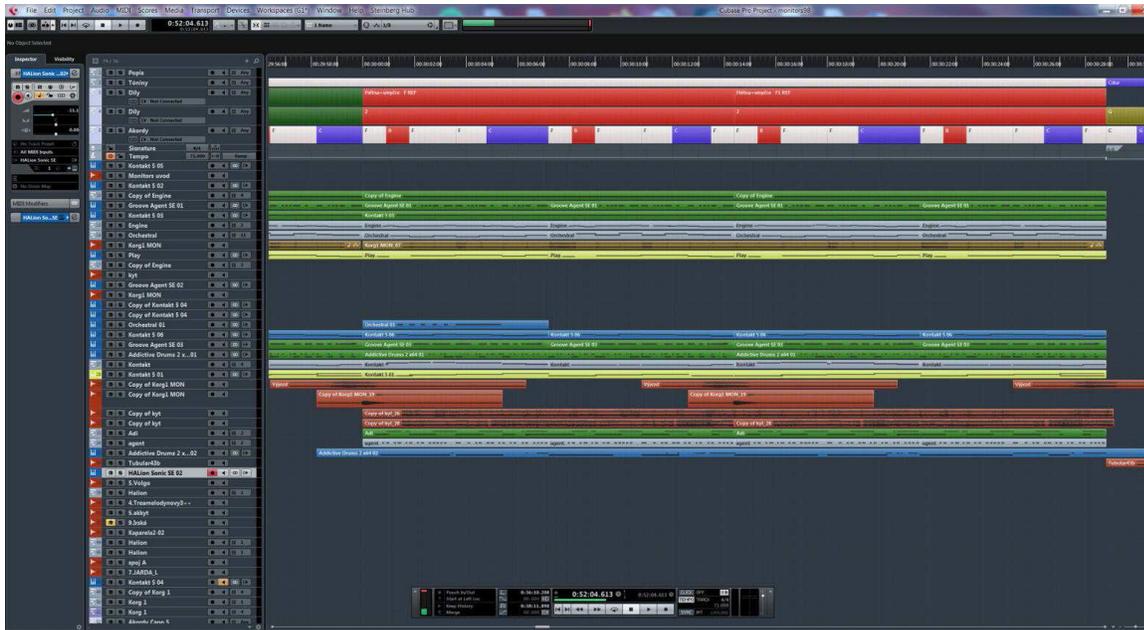
You cannot do without an analysis of what you have created. Imagine, if you were a doctor and you had a patient with a broken leg and you would cure him of a flu.

A retrospective analysis, a check of everything, is therefore important to determine the correct diagnosis and thus to describe correctly the specific problem. If you know a specific problem, you can treat it.

To be able to have a composition under control, you have to note down particular information about a given composition, for example:

1. Composition description
2. Composition type
3. Beat
4. Pace
5. Tone
6. Verses + periods
7. Blocks
8. Chords
9. Dynamic peaks
10. Melodic joints
11. Comparison of the harmony of verses

Here you can have a look at an analytic record of chords from my prepared album Monitors:



Cubase sequencer is a great tool, it is popular for its simplicity and clarity. If you choose to add a track (you have 3 options):

1. Audio
2. Virtual instrument
3. Midi

To add an analytical track, select the midi track, turn off all inputs and outputs, and you have the edit bar.

You can cut it exactly according to the tact and pace. The point is the colouring of the foundation stones:

1. Tonic (white colour)
4. Subdominant (red colour)
5. Dominant (blue colour)

That is how I control, for example, the chords, keys, joints, verses, blocks, and so on (see above).

## Cubase

Speaking of sequencers, I must add that there is a number of less or more powerful systems. However, I claim that the simplicity of understanding is very important for the speed of work. It's not about spending all the days of your life over the systems that you buy today and tomorrow they're old. We do not want to study new ideas of innovators all the time; it is about defining what you want. So if the

sequencer does what you want, it is no longer worth studying other systems, but you can use your time more efficiently (by making your songs).

We got to the end of preparation, which I congratulate you on. And now we can proceed to the more entertaining study.

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## **Melody**

Now we have got to the stage of concrete theory that will lead you to composing.

In order to compose music, you have to use your head, analyze everything and determine where it will be located. The composition is built on the contrast and unity, as we already know, so it is necessary to observe these building pillars.

If a composer – a layman - starts recoding something, they usually record something intuitively, but after a short time they do not know how to go on. It should not happen to you if you know certain principles.

In order to work with a composition, we have to stick to something. The melody is the second most audible factor after the rhythm, but we will put it on the first place as the building block of the song. The reason is simple – the analysis.

So how is a song made? There can be many ways. I will show you how I do it:

### **Theme Creation**

(Note: It is clear that you have already set the pace and beat.) I assume that you already know the note lengths (such as whole, half, quarter, sixteenth, thirty-second, triplets, et cetera). If not, use Wikipedia again.

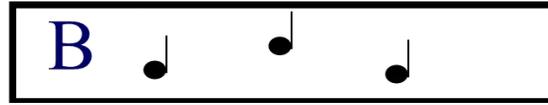
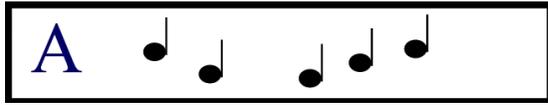
Copying and subsequent editing of themes, are basic building systems of a composition, in fact we thus follow the rule of unity. When we create B theme, we follow the rule of contrast. By further copying the B theme (against the first B) we again follow the rule of unity, et cetera.

1. First we will create a topic. 5 tones are ideal, and be careful !! ... with the support of one chord. I called this system chord rhythmization. What is rhythmization? It is a rhythmical division of a melody according to which you can work with the song and thanks to this rhythmization you can analyze the song.

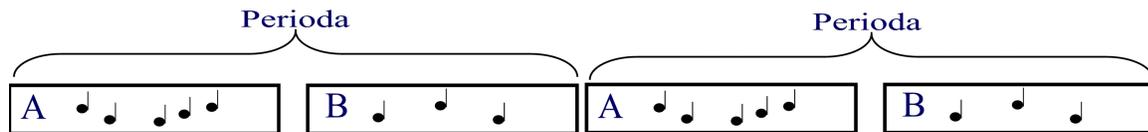
If you play, for example, C major with your left hand, (it is even better to use only one building tone e.g. C, F or G) .. and at the same time, with your right hand you can invent a theme only within the C scale and these chords.

Thus, you have founded your song and we can create another theme.

Here are 2 theme title options:

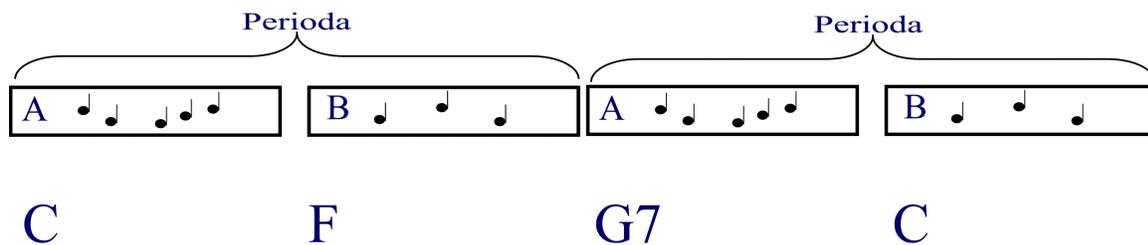


It is clear from the picture that A1 is the copied theme and the last note is edited, but the B theme is a completely new contrasting theme. Both options are correct, but for demonstration we choose the option with B to explain better the construction of the verse.



We will choose the option with B theme and copy it all. By copying the first period, a **Verse** was created.

To complete the verse, we have to add the chords we played when we were inventing the themes. The part holds the rule that there must be at least 2 chords but the standard is 3 but there can be more. In this case we use the foundation stones - C, F, G.



Hurray ... we have the complete first verse.

In case we choose the first option, the result will look like this:



unity would be 100 % followed which is wrong. The ideal is 50 % unity and 50 % contrast. It just would be boring so we need to make some changes. If we do not want to disrupt the rhythmization of the melody, we can change the timbre of the instruments and thus the way of playing. And there we have a contrasting composition. (The contrast is usually formed by many factors.)

To create an even bigger contrast (a completely different rhythmization of themes and melody) we can create the third additional verse which will serve as the third basic stone of the composition to make it complete.

The third verse is repeated fewer times. Be careful with this part, usually it is repeated twice.

**We have created a composition and thus we can say you are starting a composer career.**

You can ask, why there have to be only 3 verses? If you kept creating new and new parts on and on, you would violate the rule of unity and the composition would be broken by new ideas. And after one and half minutes you are going to lose your listener. The result will sound as 10 different compositions in one package which nobody would like. The truth is that there is such music, but do not take it as an example.

But there is one exception when you can keep creating new themes and it is in case you repeat in each verse the same harmony due to which you balance the new contrast with unity. I call them equal-harmony compositions.

**So are you starting to like it? This is the stage (if you got here) where you are getting really excited. You can find out unsuspected possibilities of your composing and suddenly all starts to dovetail and it is, in fact, so easy. That is why it is so fascinating.**

If you paid good attention, now you are creating the themes by yourselves and you are captivated by that... yes, you are going the right way. I really recommend the analyses of the compositions of your favourite composers.

I will tell you more rules to help your composing more.

### **Double Theme**

The themes can be also repeated twice in a row, it is used in Irish music a lot, and I also like using it. Some of the best Oldfield's compositions use this double system. Try to find them by yourselves.

### **Coda**

It is a new theme segment (a concluding segment). Try to analyze by yourselves the introduction theme of Olfield's Tubular Bells II. Coda is obvious here. It is also used at the end of compositions where it brings a new idea or a passes into a new pace, key, and so on.

### **The Connection of Harmony**

The connection of chords might seem difficult at the first sight, but it is enough to realize that the ideal

connection is a dominant – a tonic, or a tonic-a tonic, another ideal connection is a tonic major – a tonic minor. I call this connection a parallel one. Both tonics are located in one key on the first degree and the transition from one chord to another is not considered a modulation into another key because they are situated in the keys with the same number of key signatures.

Out of this rule, the possibilities of the composition have been extended from three stones to six stones (see the transposition table). Note, however, that 3 stones are Major and 3 Minor. So if you use 3 major and 3 minor chords, the song will sound 50 % sad and melancholic, and 50 % cheerful and festive. However, you can determine the percentage of Major or Minor by yourself, by using the given chords, so in extreme cases you can only have a minor composition with three chords (in that case you have not used any major chord, or vice versa).

There is a nice exception ... you can change the tonality, for example, from minor to major (see the harmonic and melodic minor). For example, Vangelis used this in the famous composition – the Conquest of Paradise in the opening theme. Even in modulations we often swap major and minor tones.

### **Modulation**

Modulation can be very effective, the more you move out of the key, the greater the contrast, and vice versa. When you move in the close keys, the affinity is greater. It is given by the amount of key signatures (the more of them, the higher contrast).

You can switch to another key, for example, through the second or sixth degree.

You can also move on the first row of the transposition table. Jazzmen are very happy to keep you in tension so that you do not know the key, so they have been on the first stage for some time and you do not know what the key is. It is also a good modulation tool.

The basis of the modulation is the fact that if you are e.g. on an E7 chord (on the first degree of the E major key) ... you can modulate it into the A major key. The E7 chord is a natural dominant of the A major key.

You got from one key to another. You just look for the last chord you want to jump from, imagine it is the fifth degree, and add the first degree to it and you are in another key.

There are many modulations, this is only an example of the most typical (dominant) one.

Note: At the dominant chords the minor seventh is usually added (see chord marks).

### **Melody Joints**

The ideal connection (of two keys on the piano) is the major second with the exception of 3-4 and 7-8 intervals.

Thanks to these connections of the second, there is a melodic sine wave when the melody moves graphically up and down. Sometimes it is good to put a melodic leap into the melody. This is the ideal of the melody.

If we then want to link two melodies - the same rule applies as for combining harmony. For example, from the 5th tones to the 1st ones (the dominant connection), or an ideal connection - the major second. But it can also be another tone, if we modulate into another key.

### **Scale Types**

You can find the types on Wikipedia, it is said that they are the perfect material for soloists. There are various ones – oriental, gypsy, Chinese and so on. Playing scales is not pleasant, but it can help you to master the technique of playing.

### **Figures**

Figures are lightweight themes that do not represent significant contrasts in the melody, and as a result, they flow over and over as the base of the main melody. When you listen to Tubular Bells II., there is a figure of 80 bars at the beginning after a short presentation of the main theme. Out of this, you can clearly understand the role of the figures.

A figure can also be a good inspirational material if you can't find a melody.

### **Rhythmic division of the theme**

If we go deep into the theme, we find that our standard theme is usually rhythmically divided into A - B, of course, we can also use A - A, but the first case is more frequent here.

### **Five-finger Technique**

If you are looking for a melody, it is good to put your right hand on the keyboard on the first 5 tones of the scale, you can use the help of the transposition of the keyboard (for example, if you want to play in D major and you don't know the tones or you are not used to them, but you would still like to hear this key, it is quicker to transpose the keyboard, thus you can play in C major but you hear D major).

### **The Starting Melody Tones**

We usually start:

with the first, third or fifth tone of a melody (perfect unison, major or minor second, depending on the mode of the tone, and the perfect fifth).

If we connect the melodies of the verses, it is good to start always with a different interval.

### **Harmonic Turnarounds**

Turns of tones are another aid, this time in the area of harmony. Note, if we accompany the melody in a standard way, the tones 1 - 3 – 5 of the given scale sound in the left hand chord. But we can change the position of the tone so that it will always be the same tones, only the pitch will change. The first tone moves to the eighth tone (as a result the tones are the same, but it doesn't sound so convincing anymore).

There are therefore the following turnarounds (I will not bother you with their names):

Basis: 1-3-5

the first variant: 3-5-8

the second variant: 5-1-3

Thus, there are 3 ways to play the accompanying chords.

### **Accompanying Melodies**

If you listen to some classical music orchestra, you will quickly find out that there are often accompanying melodies, we can call them the thirds, fourth, fifth and unison (which is the octave).

These melodies sound in certain passages along with the main melody, but they are slightly modified (so that they would harmonize). You don't need to know more about it, just use them.

### **Secondary and Main Melodies**

Melodies are divided into the main ones (we have already talked about them), but there are other melodies, which are used to complement the deaf places ... (those are the melodies that the main melody has not used).

### **Playing the Thirds**

It is a great improvisation system and also an effective modulation tool.

Imagine that each melody tone you press on your keyboard has its major or a minor third... you press it and hear the given chord. As you continue, you can naturally modulate into another key. Of course, the left hand follows the right one.

### **Free and firm timing**

In the sequencer, the timing (exact time) is represented by lines, depending on which beat and pace you select.

You can then quantify your unequal recording onto these lines to correct the inaccuracy of playing.

The quantization is usually done in Cubase (by Q key) depending on which quantization value you have just set.

However, from time to time it is good to use free timing in music where you are not bound by the snap grid of the set timing. You can freely record a recording without the use of an accompanying click and then you do not quantize anything ... and that's it, you have the free timing.

### **Polyphonic Playing**

Notice that some composers combine multiple melodies over each other, we will call it polyphonic

playing. With Oldfield, it's very obvious, he really likes it. And I have to admit that polyphony fascinates me, too, even though I have not used it in my compositions so much so far, but I hope it will change soon.

### **Composition Dynamics**

The song cannot be always played on the same dynamic level, it would be boring, and the rule of contrast usually requires the dynamic difference at the beginning of the second verse. So think about it and the song gets a 3D dimension. Each composition should have its dynamic peak.

### **Instrument Timbres**

The more timbres, the better, but be aware of overlapping frequencies, for example, if you select similar guitars (playing within a narrow spectrum), you may hear only one guitar, even though you have recorded five of them.

Music is based on timbres and they are great inspiration for composers.

### **Changes**

The changes in bars and pace, key, style of playing, beginnings of melody tone, rhythm changes ... simply the contrasts of everything are the spices of music and, above all, of great musical works. Just listen to the sonata form by Oldfield - Tubular Bells II. And you will understand everything.

### **Types of Albums**

1. Songs independent of each other ... here you do not have to connect songs; the truth is that you still have to choose subconsciously the order. (So there is also some connection from the previous listening.)
2. Great works - compositions dependent on each other ... here it is necessary to precisely select the order of the compositions so that the songs harmonize, especially in terms of harmony and melody.

### **Slow Recording**

If you record something slowly in midi, you have the opportunity to think about it more and play it physically, which can produce a very professional composition. Then just speed up the sequencer to the different pace.

### **Melody Modulation**

Ideally, move harmonically on the first degree and think up a simple melody to the given chord. It is enough to transpose it and there comes the melody modulation. The modulation melody is essential in the modulation passages, when we switch from one key to another, or even over several keys at the same time.

### **The Comparison of Harmony of the First Verse with the Second One**

The harmony of verses cannot avoid unity. That is why also this rule is a certain lead to make the second part. Sometimes it is enough to change two chords in the second part. In this case, copying makes sense again.

### **One-piece Verses**

Once in a time it is good to break the outline with a one-piece verse. It is, in fact, a verse without periods, thus a half of a part, which is not repeated. It is usually used as a connection or when we want to contrast a composition. Usually, it concerns great works.

### **A music studio uses these basic principles of work:**

- recording of singing or acoustic guitars into the microphone
- recording of electric guitars through the line or through guitar amplifiers and other audio widgets
- recording of acoustic guitars (a sensor in a guitar) through the line with the preamplifier
- recording of other instruments through midi
- recording of drums via microphones or sensors
- a virtual source of sounds and effects
- a hardware source of sounds and effects
- an external source of sounds and noise
- the export to wav or mp3 format
- recording of electric guitars through midi converter

I use all the possibilities except the recording of electric guitars without amplifiers, where I use all the distortions and effects virtually, I also record drums through virtual inputs. Drums can be controlled via midi, be it from a keyboard or via Roland TD11 drum sensors.

- Audio – it is a ready recording, usually in the wav format (nothing much can be done about it)
- Midi – an amazing system where you can use any instrument, be it a hardware one or a virtual one in the real time and it also enables you to correct anything you wish
- A hardware tool (with its processor) – it enables you to get to the sounds which cannot be got anywhere or are not produced anymore
- The virtual system is very modern and it is developing fast. The advantage of this system is that it does not fizzle and the possibilities are limited only by your processor and graphic card of your computer. It is able to create a sound, an effect and so on.

-A Midi converter for a guitar enables the guitar to play a different sound

The sequencer Cubase 8 ensures the recording, I have been using the virtual instruments for some time and I admit that they allow me to use certain music timbres which I was not able to use in the past. I use hardware instruments commonly with well-known favourite and proven sounds that can be neither produced virtually nor have been produced yet.

I use Cubase because of its clarity and the advantage is a clear midi editing and the input system for virtual instruments.

There are many ways to create a composition.

I usually have to define:

- what purpose the composition is intended for
- what kind of song it should be
- how many verses it should have
- what type of harmony it should contain
- where the dynamic peak will be
- the creation of themes
- copying and variations
- the creation of verses
- layering (layering of instruments in real time or after the recording)
- harmony recording
- secondary melody
- combining melodies, harmonies, parts and themes
- contrasts and unity (the purpose of music is to create a balanced percentage of both elements)

Of course, inspiration and certain improvisation also play an important role in my composing.

