Chart of Double-Stops on the Flute

This is the printed version of the FLOUBLE software. Its both versions (full version FLOUBLE 1.0 and free version Flouble Basic) offers many more options, however, the most important information of the whole work is to see on this one A3 sized page and may be understood with the help of this explanation. Still, if you want to hear the sounds, to use the more known graphic fingering notation, to save the fingerings as image files and navigate easily on the Chart and learn more about it from the video instructions purchase the FLOUBLE 1.0 DVD-Rom or download the software from www.flouble.com.

The Chart of Double-Stops on the Flute includes double-sounds which result from pairing notes of the twelve-tone system at a range of two and a half octaves and which can be played on the flute.

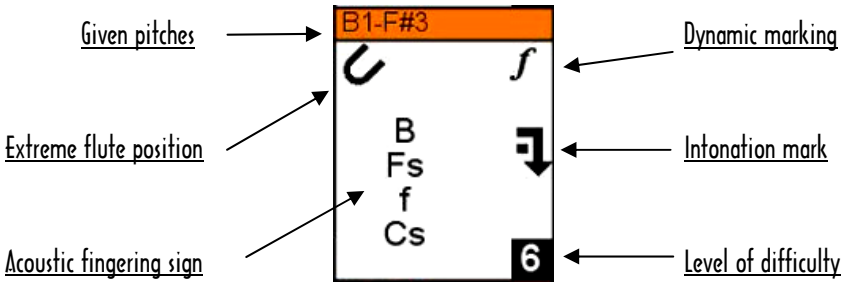
Follow the column belonging to one voice and the row belonging to the other and in their meeting point you will find the box which includes information about the desired double-sound.

In every case, these cells include:

- the acoustic fingering notation (in the middle of the box)
- a number from 1 to 7 regarding the level of difficulty (in the right bottom corner)

In many cases you also will find:

- a dynamic marking (right top corner)
- an intonation sign (to the right of the fingering sign)
- a sign for extreme flute position i.e. turning the flute far in or outwards (top left corner)



For certain practical reasons given pitches are referred to in the German pitch-name tradition, as in the above acoustic fingering notation. The only difference between the German tradition in comparison to the English tradition is that *B means B flat,* and for *B natural* the letter *H* is used. Each altered pitch is given as a sharp and not as its flat enharmonic, except for B flat (here simply called B). The numbers for the registers follow the simplest principle: the lower octave of the flute will be indicated with the number 1, the middle octave with 2, the top register with 3.

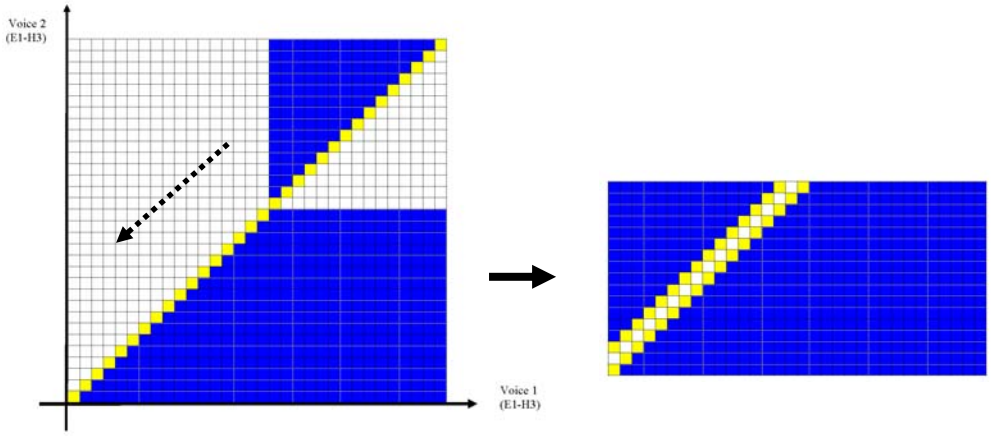
In many cases, there will be *two boxes* (two different fingerings) *within one cell,* each fingering resulting in a unique sound with different features (sound quality, dynamic, etc.). The boxes for combinations in which a fingering has not yet been determined or which are obviously impossible to produce are empty.

Concept for the Chart of Flute Double-stops

Knowing the basic acoustic laws of the flute makes it possible for us to understand and describe the phenomenon of multiphonics. Several attempts have been made to organize this information, but a general treatise about it is still missing. Some flutists have also made experiments for organizing multisounds available on the flute in a certain order to hand them over to composers and flutists. I had the same goal when planning my table. I tried to find the format which is the easiest to use, which includes the most useful and the least superfluous information, and which is logical and easy to survey. Therefore I did not choose a principle based on any technical feature of the flute like blowing-in or fingering, but I grouped sounds according to their most traditional and musical feature: pitch. Since the spectrum of possible chords is infinitely rich, I had to narrow down the choices; thus *this chart includes double sounds which can be played on the flute and result from pairing tones of the twelve-tone system at a range of two and a half octaves.* So I avoided micro-intervals and multiphonics with more than two notes.

My chart includes information in a system of coordinates where one axis stands for Voice 1, the other one for Voice 2. Since, in this system of coordinates, the information would be doubled (as in a mirror) on the two sides of the axis resulted by the sequence of the coupled identical notes (E1-E1, F1-F1 etc.), only one side of this traverse is used. In the printed version in lower two-third of the range, the upper voice can be followed horizontally, the lower voice vertically. For the higher combinations (over A2-A2) we use the left side of the system, placed down to the left bottom part of the page (see picture). This logic results in the most space-saving solution and a picture reminding us a bit of Mendeleev's Periodic System.

I have found the proper fingerings for each double-stop from practical experience, based on the theory of acoustics. Generally, I have chosen fingerings which are possible to play on a C-foot flute; fingerings requiring a B-foot have been chosen only if there was no other possibility or have been included as an alternative version to the C-foot fingering, if they offer a very different or better option. Empty spaces are left for combinations which I have not yet found a fingering for or which are obviously impossible to produce. Hopefully, some of these empty rectangles can be filled in the future. I have often found several fingerings for one particular sound. In these cases, I tried to select the best one; although it was often difficult to decide between them, and many of the omitted fingerings may be better in certain musical situations than those chosen. If I could not decide between fingerings or different variations had distinctive features in dynamics and sound quality which I thought important to include, I fitted more information into the right rubric.



I have chosen between fingerings according to the following aspects (in order of importance):

1. Correct intonation of the interval
2. Quality of the sound
3. Ease of producing the right sound
4. Simplicity of fingering - I obviously found the sound more important than saving the flutist certain difficulties.

Besides the fingering, I give dynamic limits, degrees of difficulty and, additionally, in the most extreme cases, the position of the flute. For notating fingerings I have chosen the system developed by István Matuz. This is a very clever and logical system which, besides describing the position of the fingers precisely and more concisely than methods with numbers or circles, relates important acoustic information to experts. Due to these advantages, I decided to use this acoustic fingering notation (see enclosed explanation at the end of this document) although this system is still largely unknown to flutists.

My work has multiple aims: I would like to open the ears of flutists to double-sounds, the practicing of which develops sound technique and refines hearing, widens the spectrum of technical skills, deepens contact with the instrument, and offers experiences about the physical being of our means of expression which we cannot attain in another way. On the other hand, I also want to pass the innumerable possibilities offered by multiphonic technique into the hand of composers. I would like to make it possible for them to use double-stops in their compositions knowing what sounds they can expect as well as the technical difficulties these sounds pose, and to call their attention to the fact that multiphonics are not only an effect, but are real musical sounds which, if used in the right way, can function as important elements of a musical texture both in structure and in dramaturgy. Additionally, with my work I hope to enrich general knowledge about the flute, the instructive set of tools and, by pieces composed on the basis of the 'periodic system', even the literature for the flute.

Difficulties of producing multiphonics

I found it very important to reference the various difficulties in playing each double-stop, although providing this information was not an easy task. For each individual, different types of methods of sound production prove to be more difficult. I could only judge their difficulty based on my own experience; thus I divided the multiphonics into seven groups to at least make a note of tendencies. I chose to ignore the difficulties caused by awkward fingerings, as this is generally obvious from the number of letters in a given fingering. The general tendency is that the more small letters (which signify open-holed keys) indicated (especially in their crossed-through, half-holed form), the more complicated the fingering is. The difficulty of soft multisounds consists of two major components: initially producing the required sounds, then keeping them. Between difficulty levels 2 and 4, we find increasingly difficult sounds which do not require a very unusual embouchure position or unique technique for sound production; however, the numbers from 5 to 7 refer to double-stops which require an extremely unusual technique in order to be played. The difficulty consists in finding either the unconventional technique for sound production or to find the common set which is that very narrow path where both sounds can resonate at the same time. Once these positions are found, holding them longer may not be more difficult than it is to hold the multiphonics marked with smaller numbers. Thus, 2 is related to 5 in level of difficulty, as 3 is to 6, and 4 is to 7.

On this scale of difficulty, 1 signifies that the normal way of playing must be good enough to result in the production of the two notes at the same time. The unusual position may mean turning the flute far outward or inward (in the most extreme cases the *slanted U* refers to this) but the flutist might experiment with many different combinations. (See more in the chapter How to play multiphonics.)

Sometimes one or two seconds may be needed in order to produce the soft sounds marked with numbers 3, 4, 6, or 7, so it is risky to use them in fast alternation. However, there are multiphonics (mostly among the louder ones) which are easy to play with a short attack, in fact, they are even sometimes easier to play *staccato* than as long notes. Playing successive chords tied in perfect *legato* is very often impossible. Having understood the fingering system and notation one can assume from the neighboring fingerings how complicated it is to change from one fingering to the other. There may also be a difference between the characteristics of blowing-in and sound quality, which may obstruct the real legato slurring from one double-stop to the other, too.

Levels of difficulty:

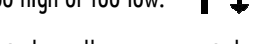
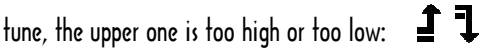
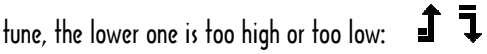
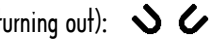
1. Easy double-stops which can be produced with classical sound production techniques
2. Double-stops relatively easy to find and sustain.
3. Double-stops of medium difficulty to find and sustain.
4. Very unstable double-stops of medium difficulty to find.
5. Double-stops difficult to find but relatively easy to sustain.
6. Double-stops difficult to find and of medium difficulty to sustain.
7. Very unstable double-stops which are difficult to find.

Question of intonation

The tuning of flutes today is based on the equally tempered twelve-tone scale. Still, it is not easy to determine correctly tuned double-stops. At first while experimenting, I could only compare the pitches of multisounds to the equivalent pitches I normally play on the flute. This process is unique for each flutist, as the intonation tendencies in multiphonics depend on how high or low one generally plays the flute. Therefore it is possible that one will find well-tuned multiphonics to be a little too high or too flat compared to the habitual sounds produced since adjusting the intonation in most multiphonics is a lot less feasible than in individual tones, because they can be produced only in a certain position of the flute and on a certain pitch. The intonation of chords can be adjusted to some extent, partly in the traditional way, turning the flute in or out and slightly moving the jaw, or with the fingers if the fingering includes some holes on the keys (b, a, fs, f, or e). A fraction of these small holes may be covered even where I have not indicated it by crossing the letter, although doing so is very rarely necessary. If a small letter is crossed it always indicates halving the small opening. This is not precisely measurable, so it is essential that the player creatively experiment. With these *tunable multiphonics*, it is necessary to count on the pitch differing up to a half tone if the finger is moved but one or two millimeters. That is why sometimes I have given the same fingering for neighboring double-sounds.

The other question of intonation concerns what we hear or call a perfect interval. I myself found acoustic clarity more authoritative than equal temperament because the unavoidable combination tones will be in tune that way. I marked imperfect intonation with arrows. These misintonations never reach a quarter-tone but are already noticeable though they may not be important in solo flute compositions. Most multiphonics often sound out of tune at first, but, after a little searching, it is possible to play them in tune. In these cases, I have not used intonation marks. However, where the right intonation requires significant turning of the flute, I used the 'U' mark. The differences of individual flutes very rarely result in any difference in intonation.

Intonation marks:

- both voices are too high or too low: 
- the lower voice is in tune, the upper one is too high or too low: 
- the upper voice is in tune, the lower one is too high or too low: 
- the lower voice is too low, the upper one is too high: 
- the lower voice is too high, the upper one is too low: 
- the intonation is to be adjusted strongly down or up by blowing-in (turning in, turning out): 

Dynamics of multiphonics

It is very important to be aware of the dynamic tendencies of the multiphonics because a large number of them cannot be played on every dynamic level. The spectrum of the dynamic range of particular sounds can generally be widened with practice, but not beyond certain limits. If the sound is strictly limited in its dynamics, you will find a dynamic sign in the right upper corner of the cell. If the dynamic boundaries of the double-stop are not so narrow and can be extended with some practice, I have given dynamics in brackets with which it is the easiest to produce the particular chords. To those ones which can be played at any volume characteristic to the flute I have not associated any dynamic information.

Of course, I could utilize only my own judgment here. As all musicians know, dynamics are not only the intensity of resonation but quite a subjective impression as well. Therefore, when determining the dynamic level, I followed my feelings rather than exact measuring of volume. We also have to take into consideration the differences between certain. Still, we can take the given dynamic marks as a basis.

Generally, intervals smaller than an octave cannot be played louder than *forte*, we can only expect a real powerful *fortissimo* sound at larger intervals. Those ones, however, will never sound as a delicate *pianissimo*.

How to play double-stops?

This chart can be used by anyone in choosing fingerings, randomly or thematically, according to his or her purposes. In any case, I suggest that you pay great attention to the sound production, whether you begin studying the program as a way of developing your sound technique, or are searching for a way to produce an effect in a particular piece of music, or even if you are merely curious. At first, play the two chosen tones normally, then try to imagine them together. Only start to produce them as a double-stop after that, considering, of course, the dynamic marks and the advice given below.

At the beginning, multiphonic flute playing proves to be difficult, but with persistence it can be improved quickly. The flutist must take into account that he will need to bravely experiment with the ways of blowing-in. It is worthwhile to try out extreme flute position possibilities in addition to considering the form of the embouchure and the air-pressure. The sensations of chord-playing are so refined that it is impossible to describe them. Still, let me try to give some instructions.

It is not possible to separate classical and multiphonic sound production. Both require the same set of physical devices; the only difference is that in multiphonics a small physical change may change the entire sound by adding or losing certain pitches while, in classical playing, only a minor timbre change may occur. For this reason, the flutist must be far more controlled and conscious about the movements which influence sound production: lips, chin, exhalation and hands moving the instrument. The movements (s)he may be required to make will be more extreme in direction, and the combination of different parameters may seem very unusual in comparison to what is habitual.

The gained experience and control acquired in studying multiphonics, however, will make a clear benefit in the flutist's classical sound technique and hearing.

When speaking about extreme embouchure positions, do not think of any weird, asymmetrical ways to hold the flute. Just as in normal flute playing, the blow-in hole of the instrument must stay exactly under the lip aperture, parallel to it both horizontally and vertically so that the air stream hits the edge of the mouth piece symmetrically at a 90° angle. We have to find the proper height of the flute, meaning, where we place the instrument on the bottom lip. This should stay the same always in classical playing as well as in multiphonics. These parameters are hardly ever consciously studied and therefore often cause problems in normal playing, too. Watch yourself in the mirror very critically, checking the relationship between your embouchure and the flute. If your lips are asymmetrical, accept it and place the flute towards the side as far as your opening is. If the aperture between your lips is on the left side, push the flute forward with your right arm; if the hole is on the right, you must pull the flute back in order to adjust it to the air-stream coming out of your mouth, so that the flute is positioned tangential to the arc of your bottom teeth and perpendicular to the air-stream. It is a good sign to see one clear v-shaped line of condensation exactly under the middle of the blow-in hole of the flute resulting from the warm breath hitting the cold flute; if this line is less concrete (not in the middle of the hole or split into two branches), you have to correct either the position of the flute or your embouchure. Watch the angles and parallels very carefully and never smile while flute playing. In smiling, we tense our cheek muscles while the lips are passive and flat. In contrast, when working with the lip musculature, the lips will be more pulled together, they will be more forward as they lead the air in the right direction, like a tunnel or tube versus a hole open on a wall where the air can leave the body. Additionally, the forward-stretched lips will create a resonance space for the sound which will increase the volume, open the sound, and enrich it with overtones.

Besides the above mentioned, constant parameters, there are some others which one can change more or less independently from each other. This does not mean that they should always be changed independently. In fact, most of the time one change will not be enough to get the required result, many combinations of conscious or instinctive changes must be tried out till finding the right way of blowing in. This is the same as when playing one single note, but in double or triple-stops we have to be much more precise.

The parameters to be taken into account are the following:

1. Pressing the flute against the lower lip
2. Turning the flute in or outwards
3. Size of the lip-aperture
4. Hardness of the mouth
5. Position of the lip-hole a) forward or backward b) up or down
6. Relation between the upper and lower lip
7. The position of the jaw
8. Position of the tongue
9. The amount of the air[1]

Even these categories cannot describe the varying characteristics of the sound-production very precisely, it is so complex. To continue with helping in the first steps of playing double-stops, I would like to emphasize some basic tendencies important both in conventional playing and in multiphonics. The jaw and lower lip must move independently. Most of the time, the jaw should be pulled backwards and downwards while both lips feel forward, even slightly upward sometimes. In the corners, the lips should be pressed together, and all other muscles work to open the hole rather than close it. When pressing the flute against the lower lip, the instrument will push the lower lip back while the upper lip moves freely forward and stays over the blow-in hole. With this technique, you gain two important resonance spaces: one within the mouth cavity, the other one in the direct neighborhood of the point where the sound gets created, between the upper row of teeth and the upper lip. The lower lip should be as elastic as a piece of rubber so it will lean over the blow-in hole, shaping a round sill, and, in classical playing, covering about the 3rd of it. In multiphonic playing, the amount of the hole covered by the lower lip can vary between 0 to 80%, changed mostly by turning the flute. If the lower lip is working correctly, it will react very quickly to the changing pressure of the flute (directed by the left arm). If the flute is not pressed so much, the energy of the lower lip will push it automatically forward without needing to make any other change with the jaw or mouth. (This is a less used but very useful technique in classical flute playing for intonation and changing the timbre.)

Especially when playing smaller double-stop intervals, the lip-hole should be more open than usual. We must experience that, with the right diaphragm support and right position (most often turned in quite a lot), we can play relatively high and very soft pitches without any pressure between the lips; in fact, we have to work to open them and create an open resonance space in the previously mentioned locations. This may be the most difficult challenge when starting to play double-stops, and old ingrained habits are always very tempting. The association that "the more I open, the more pitches I can produce," may help. Pulling the tongue back and down in the mouth is also a device for opening the resonance spaces and slowing down the air. It is good to imagine that you are turning your lips outward, shaping a tube with them and using their inner side as the wall of this tunnel. The air has to go out slowly, blown as warm air instead of cold.

Since most of the partials of a flute chord are created as a muffled fingering, we have to follow this muffling with the embouchure, too. Sometimes, for small *pp* intervals the flute must be turned in so much that the upper-lip reaches the mouth-piece.

Still, there are double-stops which can be created easily following the normal blowing-in habits (signed with 1 or 2) or which don't need any specific combination of the mobile parameters, only very precisely controlled air-speed to keep the overlap between the two partials constant. For this, besides the strong breath-control, a very steady lip position is also indispensable, which might be called *lip-support* since it consists of pressure and counter-pressure just as in diaphragm support. This is an overall advisable sensation. The task is to keep your mouth hard and fixed without pressing them together or pulling them apart as in a big smile. Forget about the feeling of any resistance against the air. The air should be controlled by the breathing muscles while the lips direct it precisely and give it a nice resonance space for the sound being produced.

Sometimes a very forced air-stream is necessary. To speed up the air, you can press the tongue up against the roof of the mouth and create a narrow channel in the middle where the air can stream (like when saying a *y*, for example, in the word 'young'). When we need to play a very penetrating, strong multiphonic, this is the way to approach it. Additionally touch the lower lip with the tip of your tongue, just like when whistling the highest pitch you can.

When turning out is indicated, don't hesitate to turn out until the entire blow-in hole is uncovered. Try to blow far, speeding up the air with your lips and raising the air-stream like blowing over the flute. Press the flute hard against the under-lip so that the edge doesn't get too far from the lips.

According to my experience, for the big intervals (like and octave and a 6th for example) one must press the lips towards each other quite strongly. In fact, in these cases, the solution might be to pull the lips with the cheek muscles (smiling) and making a flat, thin embouchure with a small hole in it (which is not advisable otherwise).

In general, having found the desired pitches, one should try to gradually reduce special movements until the point where the motion between multiphonics is hardly visible, the changes rather happen inside.

---

[1] The air-speed will be determined by the embouchure, the lungs guarantee the basic pressure related to the amount of the air. The stronger the support is, the less the embouchure will change the amount instead of changing only the speed.

Learning the complicated fingerings is a special art. We must be very precise in this matter; we have to refine a special sensitivity in the fingers. Contrary to sound production, where we use the same motions as in traditional playing (only in a more extreme manner, and in different combinations), for multiphonic fingerings, we have to learn quite new movements. A big difference is that, while in classical playing fingers move only up and down and sometimes right and left (like for the trill keys or the right little finger for C#, C and low B), for the multiphonic positions, a back and forth motion must be added, too. To open a small hole on a ring key, we have to pull back the finger. In fact, we have to control this motion very much since often only a part of the small hole stays open; thus, you have to make subtle distinctions between finger positions. In these cases, a flutist can experience how string players may feel when controlling the intonation with their fingers, since sometimes one millimeter of motion causes a semitone difference on the flute. There are a lot of combinations which may be very uncomfortable for the hands. However, with some practice and relaxing, everyone can make his or her hand more flexible. It is important to let the fingers stretch independently; don't let them fight against each other.

The most problematic fingerings are the ones where trill-keys (d, ds) have to be pressed while also covering the small holes which are under the right hand. Stretch out your right hand fingers and try to touch the keys with the broadest part of them and then turn or pull the middle and/or the ring-finger to the appropriate trill-key and press it down. We should be very careful to continue covering the small holes. This may be uncomfortable but it can be done.[2]

Always make sure again and again whether you have found and are keeping the right finger position given by the chart. The hands might move a little bit while trying to play the sound; you should not expect yourself to produce the wanted sounds if you are playing fingering incorrectly. If you are not careful about your fingering, you will cheat yourself, get stiff, and do wrong things with the embouchure. However, try not to press the fingers either, even if you are afraid of losing the right position or not covering some of the small holes, etc. Pressing hard with the fingers will affect your whole body; and, if this is the way you feel generally instead of experiencing an exciting sense searching, you can end up unpleasantly struggling for the result.

When you are having difficulty producing one of the pitches in a double stop, which may often happen, especially in very muffled multiphonics, a good strategy for solving the problem is the following: open one or more holes directly to the left of one of the open holes on the tube (which will vary depending on the fingering of the desired pitch). This can help you produce a higher partial, from which you can slowly slide to the desired pitch as you gradually muffle the sound by blowing less and less air. You will need to experiment to discover exactly which holes to open in each individual case.

Beyond some acoustically and physically objective directions, any attempt to precisely describe any instrumental playing is a hopeless enterprise. Making music is always based on individual experience gained by oneself. We experience our physicality and imagination differently. Still, with some words, we can help others to imagine in advance what they should be aiming for. That is why I tried to give some advice. What I really would like to communicate to those colleagues who are not experienced multipart flute players, however, is the unique sensation of this technique. For me, it is always like adding one more dimension to the imaginary sound world of the flute, like stepping out from a linear plane into three-dimensional space, where our range of movement will immediately be infinitely freer. This experience will change our approach to all music, even to traditional one-part flute pieces. Double-stops offer us a special form of meditation, too. Close your eyes and try it!

Additional advice for composers

Hopefully the composer already has all the necessary information for using the chart correctly. If you are writing a piece which is not composed for flute solo, I must say that playing multiphonics is even more difficult when other instruments are also simultaneously playing because it is very important for the flutist to hear himself in every detail. It is easier if he can listen to his own part through headphones. You also have to take into account that, when flute multiphonics are used in thicker textures with other instruments, only the top note of the flute multiphonics may be audible, so it may not make sense to bother the flutist with such demands if the idea is unrealistic. Make sure that the resulting sound the flute produces is the effect you intended. As I mentioned before, the intonation of multiphonics may be quite insecure. Depending on the musical texture sometimes it does not matter, sometime it does. Make clear if you want the flutist to take care of the precise intonation (considering the intonation marks found in some of the cells). Otherwise some performers will just accept what comes out first.

The fingerings should be copied right into the score under the multiphonics. Be careful to copy preciously. If you choose the acoustic fingering notation used in the printed version of the chart, you have to enclose its explanation. You also can make an extra page of notes showing every used double-stop with both kinds of fingering signs. If there are not very many multiphonics in the work, it is more practical to use the graphic notation and not to bother the flutists by forcing them to learn the new system. Rather decode them to graphic notation.

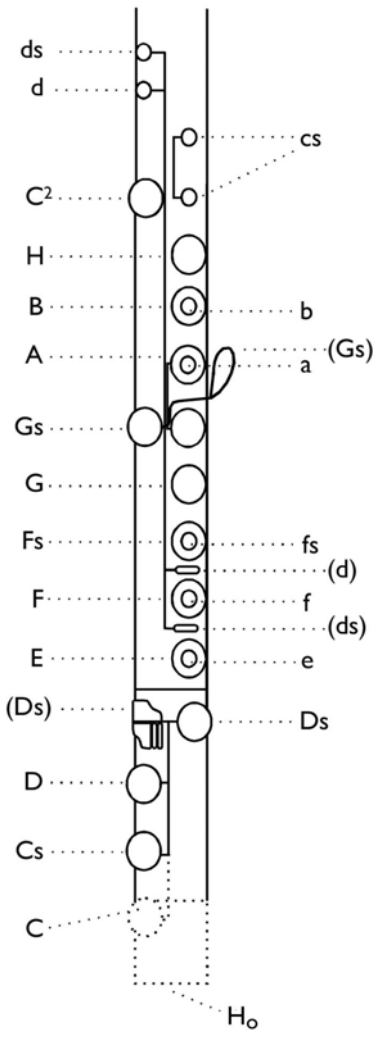
[2] Actually the right 3rd and 4th finger must control 64 positions altogether. They may both move the key under them which has 4 positions each: open, small hole open, half of the small hole open, and completely closed. However, the same fingers might have to press the neighbouring trill key at the same time as holding down the key in one of the variations mentioned. From this originates the 8 positions of each finger, the combination of which will be 64.

It is also good to ask several flutists with experience in contemporary music to check whether they can realize the chosen double-stops and how much effort it requires from them. For playing double-stops the flutist usually needs to train her/himself for a longer period of time. If your performer cannot realize what you want, don't come to the conclusion that either (s)he is untalented or the chart is wrong. We have to believe that with patience and work, more and more flutists will obtain the necessary knowledge and deftness in multipart playing as more and more composers acquire a taste for this side of the instrument.

I am always open to checking new compositions using Flouble. Don't hesitate to contact me with any questions or to send me your new composition.

Gergely Ittzés

(gregory@flouble.com, www.ittzesgergely.hu)



The fingering notation developed by **István Matuz** is a less known way of describing fingerings, however, this system is briefer than the others and very logical as well, and, for this reason, we use it. The basic difference is that **the open holes are indicated** with the appropriate ABC names, not the closed ones as in other systems. (These ABC names also contain acoustic information, therefore let us call this method the **ACOUSTIC FINGERING NOTATION**.) The signs have to be read from top to bottom. After the last indicated hole all the other holes stay open. At first, it is advised to play the note signed with the last letter, then find and open the holes indicated by the letters above that. (See the attached sketch of the flute.)

The opening of the hole at **ds**, **d**, **Gs** and **Ds** is achieved with the pressing of the appropriate arm (which is indicated on the sketch in brackets); in every other case, the sign indicates the opening of a hole by releasing the key above the indicated tone hole (or the arm which moves it).

At the signs ~~**b, a, fs, f, e,**~~ approximately half of the little hole on the key must be covered.

(Upon reading this system, be careful not to confuse the name of the hole with the name of the key above it. For example E-key is above the F hole, A-key above the B flat hole, etc.)

The ABC names are used according to the German pitch-name system.

Note that **H** means **B** ♮, **B** means **B** ♭ !

Some examples:

ds
d
F
=  = L1234
R2AB5

b
a
f
e
C
=  = L1234
R2345♮

cs
Gs
E
Ds
C
=  = L1345
R235+♮