

Mixtures

Mixtures are undoubtedly one of the most characteristic registers of the pipe organ. They are so-called compound voices. I.e. that on one key several pipes of different pitch are sounded. It is a basic fact that the composition of such a mix is different for certain zones on the keyboard. A mixture stop is normally used in combination with fundamental voices. For example as an extension of a plenum registration as prestant 8', octave 4' and octave 2'. The number of maximum sources (pipes) that sound on one key is indicated by a roman number. For example: Mixture III. The diagram below gives an example of how such a mixture can be composed over the entire size of the keyboard.

Mixture III	5 ^{1/3'}	4'	2 ^{2/3'}	2'	1 ^{1/3'}	1'	2/3'
octave 5	•	•	•				
octave 4		•	•	•			
octave 3			•	•	•		
octave 2				•	•	•	
octave 1					•	•	•

In this diagram we see a traditional octave fold back scheme. A point indicates which footage in which octave of the manual is active. This means that the composition changes for each octave on the keyboard. For example, we see that for every higher octave the whole jumps back a 'half octave'. This jumping back is called fold back. In practice this means that in the lowest octave a gain of the higher overtones of the fundamental voices occurs. This results in a beautiful clarity and transparency. Increasing in an octave manner gives it a reinforcement of increasingly lower overtones. This ensures that the sound in the higher octaves does not become shrieking and sharp. Traditionally, mixtures consist of pipes from the principal family, stacked in octave and fifth footages. Sometimes a tierce footage is also present in the composition. That is not a rule, however.

Sample schemes of mixtures:

Mixture III	5 ^{1/3'}	4'	2 ^{2/3'}	2'	1 ^{1/3'}	1'	2/3'
octave 5	•	•	•				
octave 4		•	•	•			
octave 3			•	•	•		
octave 2				•	•	•	
octave 1					•	•	•

Scharf IV	4'	2 ^{2/3'}	2'	1 ^{1/3'}	1'	2/3'	1/2'
octave 5	•	• •					
octave 4	•	•	•	•			
octave 3		•	•	•	•		
octave 2			•	•	•	•	
octave 1				•	•	•	•

Cymbale II	2'	1 ^{1/3'}	1'	2/3'	1/2'	1/3'
octave 5	•	•				
octave 4		•	•			
octave 3			•	•		
octave 2				•	•	
octave 1					•	•

Cymbale I	$1^{1/3'}$	$1'$	$4/5'$	$2/3'$	$1/2'$	$2/5'$	$1/3'$	$1/4'$	$1/5'$	$1/6'$
oct 5 F#- C	•									
oct 5 C-F		•								
oct 4 F#-B			•							
oct 4 C-F				•						
oct 3 F#-B					•					
oct 3 C-E						•				
oct 2 F#B							•			
oct 2 C-F1								•		
oct 1 F#-B									•	
oct 1 C-F										•

Carillon II

	$3^{1/5'}$	$2'$	$1^{3/5'}$	$1'$	$4/5'$	$1/2'$
octave 5		•	•			
octave 4			•	•		
octave 3				•	•	
octave 2					•	•
octave 1						•

Tierce mixture V

	$5^{1/3'}$	$4'$	$3^{1/5'}$	$2^{2/3'}$	$2'$	$1^{3/5'}$	$1^{1/3'}$	$1'$	$4/5''$
octave 5	•	•	•	•	•				
octave 4		•	•	•	•	•			
octave 3				•	•	•	•	•	
octave 2					•	•	•	•	•
octave 1					•	•	•	•	•

Tierce Scharf V

	$2^{2/3'}$	$2'$	$1^{3/5'}$	$1^{1/3'}$	$1'$	$4/5'$	$2/3'$	$1/2'$	$2/5'$
octave 5	•	•	•	•	•				
octave 4		•	•	•	•	•			
octave 3			•	•	•	•	•		
octave 2				•	•	•	•	•	
octave 1					•	•	•	•	•

Compound stops, non fold back footage combinations:

Carillon IV	$4'$	$1^{3/5'}$	$1'$	$2/3'$
Cornet IV	$4'$	$2^{2/3'}$	$2'$	$1^{3/5'}$
Tertiaan II	$1^{3/5'}$	$1^{1/3'}$		
Sesquialtera II	$2^{2/3'}$	$1^{3/5'}$		
Ruispijp II	$2^{2/3'}$	$2'$		
Ruispijp II	$2'$	$1^{1/3'}$		

Notice: E4 internationaal = MIDI note#60 = E3 Yamaha = c'''/c^3 Helmholtz

Foot sizes vs harmonics

16'	8'	4'	$2^{2/3'}$	$2'$	$1^{3/5'}$	$1^{1/3'}$	$1^{1/7'}$	$1'$	$8/9'$	$4/5'$	$8/11'$	$2/3'$	$8/13'$	$4/7'$	$8/15'$	Footages
0.5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Harmonics

Application on a XG Synthesizer module

These instruments often have a polyphony of 32 or 64 voices. In combination with 'Dynamic Voice Allocation' we can very well achieve mixtures on GM and XG instruments. An example of the working method on the XG instruments like my Yamaha MU80. For each footage in the mix we use one 'Part'. Starting from the above diagram Mixture III we use for example Parts 1 to 7 for the seven constituent foot sizes. All seven Parts are set to MIDI channel reception 1. As the basic tone for each Part we choose 'Flute', which now serves as a replacement for a principal pipe. Then we determine for each Part the footage number with the 'NoteShift' parameter. The column of vertical dots in the diagram, below each footage, shows on which part of the keyboard this footage is active. We set these active zones by means of the parameters 'NoteLimitL(ow)' and 'NoteLimitH(igh)'. It is also important that we edit each part: switching vibrato off, filter maximum open and switching off resonance.

Footages (Equal Tempered Tuning) vs Note Shift

16'	8'	$5^{1/3}$	4'	$2^{2/3}$	2'	$1^{3/5}$	$1^{1/3}$	$1^{1/7}$	1'	$4/5$	$2/3$	$8/13$	$4/7$	$1/2$	$2/5$	$1/3$
-12	0	+7	+12	+19	+24	+28	+31	+34	+36	+40	+43	+45	+46	+48	+52	+55

Internet

https://en.wikipedia.org/wiki/Organ_stop#Classifications_of_stops