m i l a n   s t i b i l j

M A V R I C A
T H E   R A I N B O W

glasba za magnetofonski trak
music for tape

realizacija
realisation

milan stibilj - jaap m. vink

studio voor elektronische muziek
van de rijksuniversiteit te utrecht

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Printed in Yugoslavia


Magnetonband

1.11

Microphone recordings:

a/ 6 different sounds of water-drops falling into the water /sounds d 1 - d 6/

b/ 11 different sounds of small pieces of metal falling into the water /sounds d 7 - d 17/

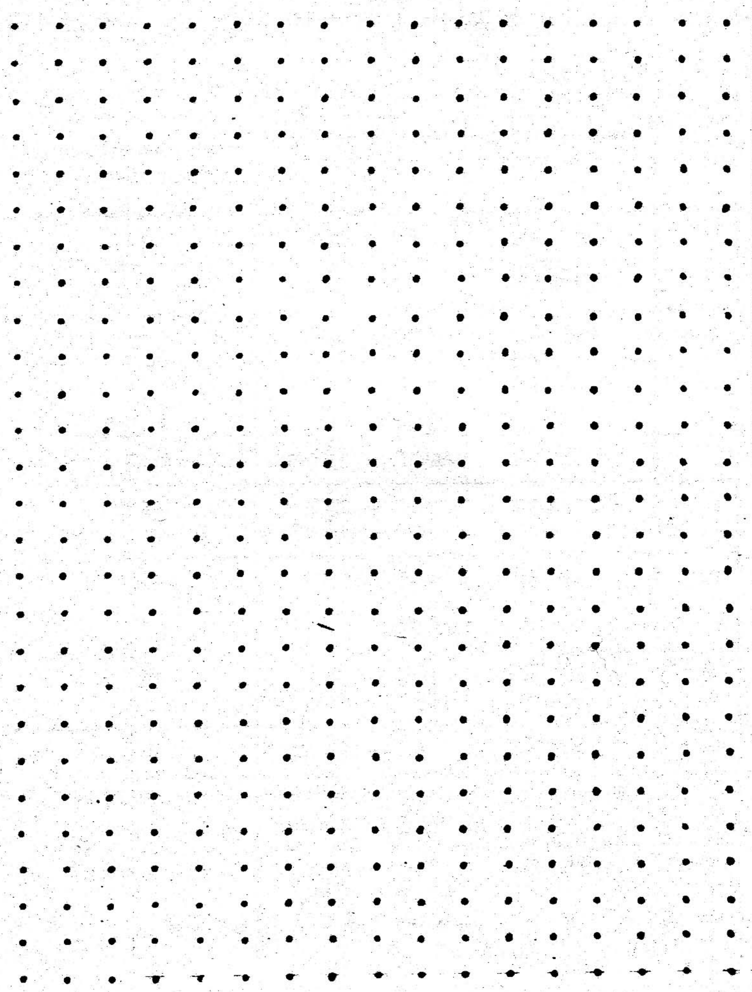
1.12

Transpositions T 1 - T 27 of the sound material d 1 - d 17 :

	tape-speed cm/sec	frequency Hz
original series	38,0	50,00
transpositions of the original series		
T 1	24,7	32,70
T 2	33,2	43,65
T 3	44,3	58,27
T 4	46,9	61,74
T 5	2 x 24,7	65,41
T 6	2 x 31,3	82,41
T 7	2 x 33,2	87,31
T 8	2 x 41,8	110,00
T 9	2 x 44,3	116,50
T10	2 x 46,9	123,50
T11	4 x 24,7	130,80
T12	4 x 29,5	155,60
T13	4 x 31,3	164,80
T14	4 x 33,2	174,60
T15	4 x 35,1	185,00
T16	4 x 37,2	196,00
T17	4 x 39,5	207,70
T18	4 x 41,8	220,00
T19	4 x 44,3	233,10
T20	4 x 46,9	246,90
T21	8 x 26,3	277,20
T22	8 x 29,5	311,10
T23	8 x 31,3	329,60
T24	8 x 35,1	370,00
T25	8 x 37,2	392,00
T26	8 x 39,5	415,30
T27	16 x 26,3	554,40

sound material d1 - d17

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17



1.21

Noise-like structure n has to be drawn with a magnetic pencil on the tape

1.22

Production of the sound material n 1 – n 19 with the noise-like structure n :

sound material n1 - n11	n +	** square wave generator Hz	third-octave filter * Hz	reverberation /seconds/
n 1	n +	65,41	40 - 200	5
n 2	n +	123,50	80 - 315	5
n 3	n +	196,00	100 - 500	5
n 4	n +	277,20	160 250 630 1000 - 1250	5
n 5	n +	220,00	200 - 250 800 - 1600	5
n 6	n +	116,50	100 - 200 1600 2500	5
n 7	n +	207,70	160 - 315 1250 - 2500	5
n 8	n +	87,31	63 - 16000	5
n 9	n +	155,60	125 - 315 1250 - 2000	5
n10	n +	185,00	63 - 400 1000 - 1600 4000 - 6300	5
n11	n +	164,80	80 - 250 630 - 1000	5

sound material n12 - n15	n +	** sinus wave generator Hz	third-octave filter* Hz	reverberation /seconds/
n12	n +	164,80	160 400 - 630 1000 - 1600	5
n13	n +	185,00	100 - 1000	5
n14	n +	155,60	125 - 500	5
n15	n +	87,31	80 - 100 160 250 - 800	5

sound material n16 - n19	n	Allison-filter Hz	reverberation /seconds/
n16	n	150 - 600	5
n17	n	300 - 1200	5
n18	n	600 - 2400	–
n19	n	900 - 10000	5

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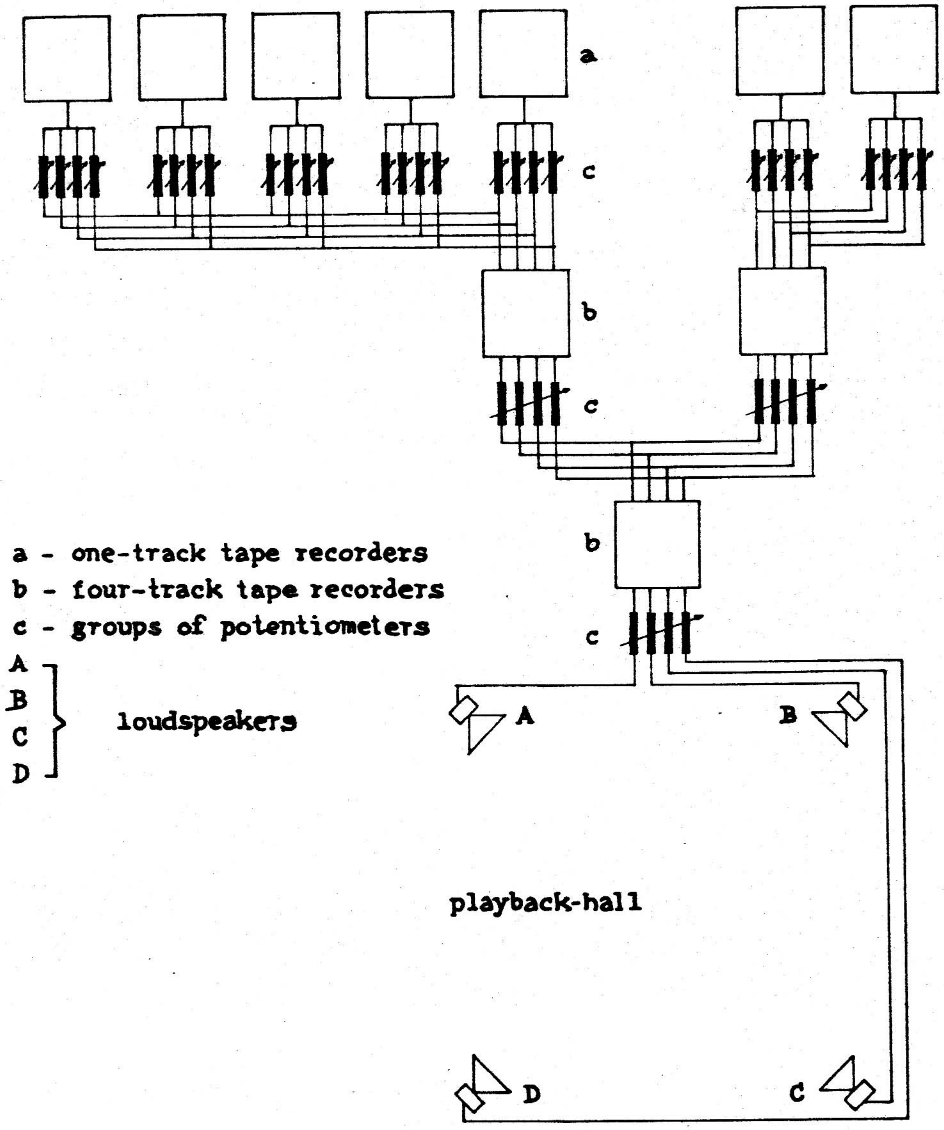
* middle frequencies between f_1 /lower limit frequency/ and f_2 /upper limit frequency/ are registered. With third-octave filter $f_2 = 1{,}25\, f_1$

** it has to be fused by the product modulator

2 FOUR-TRACK TECHNIQUE

2.1

Four-track production and playback scheme /from one-track sound material to the playback through four loudspeaker system/:



a - one-track tape recorders
b - four-track tape recorders
c - groups of potentiometers
A, B, C, D } loudspeakers

2.2

Space determination SD of sound signals for 49 squares of the playback hall

Below, relative intensities of the sound signal on 4 tracks A, B, C and D /these correspond to 4 loudspeakers A, B, C and D/ for each of the 49 squares of the playback-hall are registered:

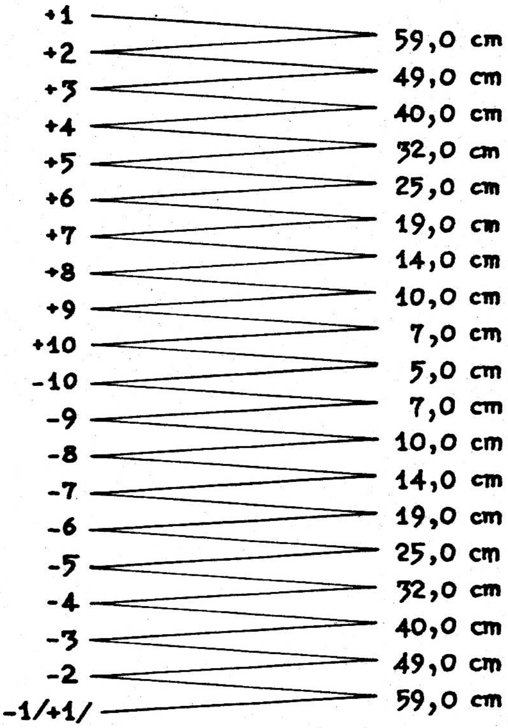
g	A 0 db B -∞ db C -∞ db D -∞ db	A 0 db B-12 db C -∞ db D -∞ db	A 0 db B -6 db C -∞ db D -∞ db	A -3 db B -3 db C -∞ db D -∞ db	A -6 db B 0 db C -∞ db D -∞ db	A-12 db B 0 db C -∞ db D -∞ db	A -∞ db B 0 db C -∞ db D -∞ db
f	A 0 db B -∞ db C -∞ db D-12 db	A 0 db B-12 db C-24 db D-12 db	A 0 db B -6 db C-18 db D-12 db	A -3 db B -3 db C-15 db D-15 db	A -6 db B 0 db C-12 db D-18 db	A-12 db B 0 db C-12 db D-24 db	A -∞ db B 0 db C-12 db D -∞ db
e	A 0 db B -∞ db C -∞ db D -6 db	A 0 db B-12 db C-18 db D -6 db	A 0 db B -6 db C-12 db D -6 db	A -3 db B -3 db C -9 db D -9 db	A -6 db B 0 db C -6 db D-12 db	A-12 db B 0 db C -6 db D-18 db	A -∞ db B 0 db C -6 db D -∞ db
d	A -3 db B -∞ db C -∞ db D -3 db	A -3 db B-15 db C-15 db D -3 db	A -3 db B -9 db C -9 db D -3 db	A -6 db B -6 db C -6 db D -6 db	A -9 db B -3 db C -3 db D -9 db	A-15 db B -3 db C -3 db D-15 db	A -∞ db B -3 db C -3 db D -∞ db
c	A -6 db B -∞ db C -∞ db D 0 db	A -6 db B-18 db C-12 db D 0 db	A -6 db B-12 db C -6 db D 0 db	A -9 db B -9 db C -3 db D -3 db	A-12 db B -6 db C 0 db D -6 db	A-18 db B -6 db C 0 db D-12 db	A -∞ db B -6 db C 0 db D -∞ db
b	A-12 db B -∞ db C -∞ db D 0 db	A-12 db B-24 db C-12 db D 0 db	A-12 db B-18 db C -6 db D 0 db	A-15 db B-15 db C -3 db D -3 db	A-18 db B-12 db C 0 db D -6 db	A-24 db B-12 db C 0 db D-12 db	A -∞ db B-12 db C 0 db D -∞ db
a	A -∞ db B -∞ db C -∞ db D 0 db	A -∞ db B -∞ db C-12 db D 0 db	A -∞ db B -∞ db C -6 db D 0 db	A -∞ db B -∞ db C -3 db D -3 db	A -∞ db B -∞ db C 0 db D -6 db	A -∞ db B -∞ db C 0 db D-12 db	A -∞ db B -∞ db C 0 db D -∞ db
	1	2	3	4	5	6	7

3 R H Y T H M I C A L   S T R U C T U R E

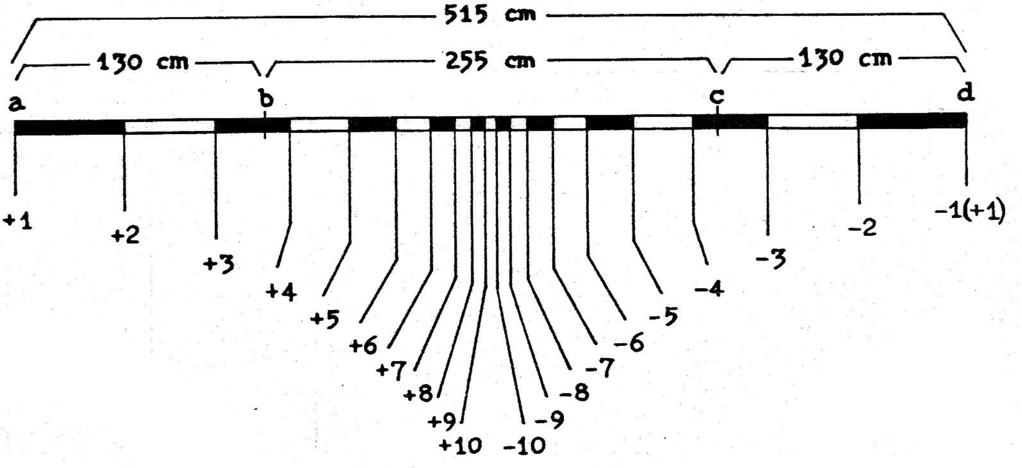
3.1 Basic element BE of the rhythmical structure:

tape /lenght: 515 cm/ with orientation points and points defining the limits of three segments /cf. picture/

orientation points: lenght of the tape between two orientation points



segment	lenght of the segment
a - b	130 cm
b - c	255 cm
c - d	130 cm



3.2

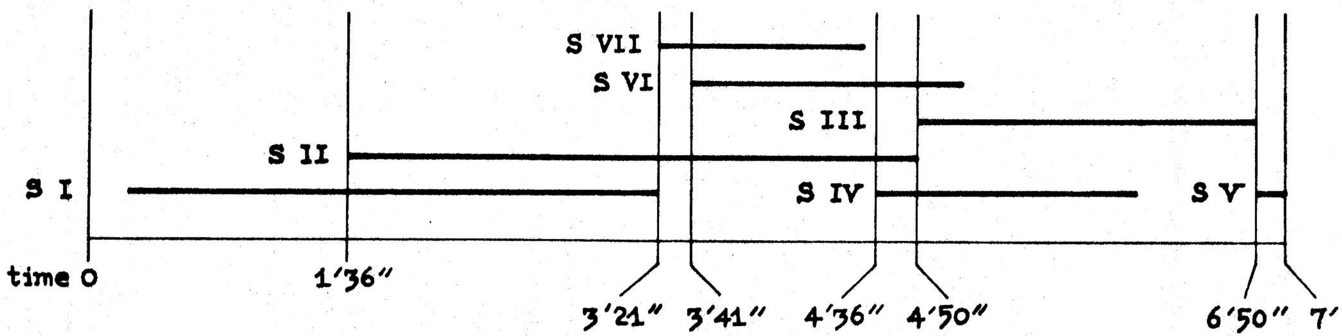
Transpositions of the basic element of the rhythmical structure:

	tape-speed	frequency
basic element BE	38,0 cm/sec	50,00 Hz
transpositions:		
BE I	46,9 cm/sec	61,71 Hz
BE II	2 x 31,3 cm/sec	82,41 Hz
BE III	2 x 41,8 cm/sec	110,00 Hz
BE IV	4 x 29,5 cm/sec	155,60 Hz
BE V	4 x 35,1 cm/sec	185,00 Hz
BE VI	4 x 39,5 cm/sec	207,70 Hz
BE VII	8 x 26,3 cm/sec	277,20 Hz
BE VIII	8 x 37,2 cm/sec	392,00 Hz
BE IX	16 x 26,3 cm/sec	554,40 Hz

4 GRAPHIC DEMONSTRATION OF THE COMPLETE COMPOSITION

4.1

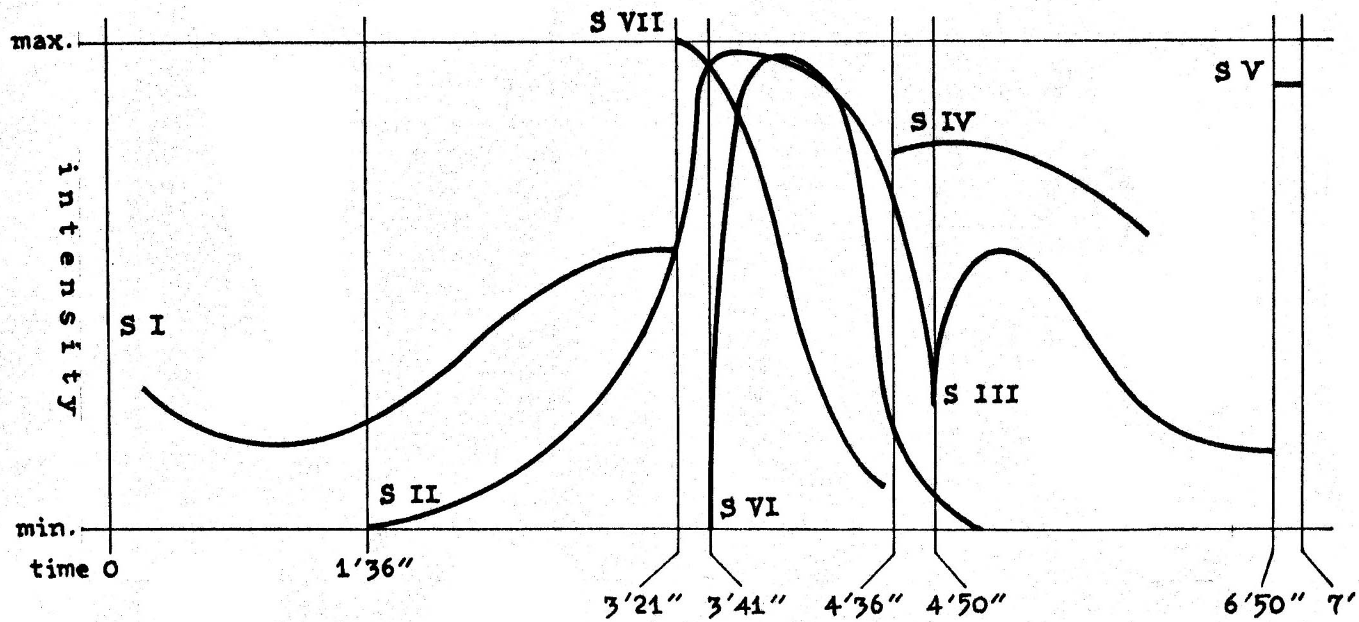
Position and lenght of seven four-track sections S I – S VII in the complete composition :



section	lenght of the section
I	variable
II	3'15"
III	2'
IV	variable
V	10"
VI	1'22"
VII	variable

4.2

Intensity relations between four-track sections S I - S VII in the complete composition:



5.1

Production of the segment S I

	BE	OP	SD	d / T
1/	I /b – c/	+ 4	4 d	d 15/T 16
		+ 7	3 f	d 12/T 21 * d 12/T 27
		+ 9	2 d	d 8/T 11
		+ 10	3 b	d 16/T 10 d 16/T 4
		– 10	5 a	d 17/T 19
		– 8	7 b	d 7/T 8
		– 6	6 d	d 11/T 17
		– 4	4 e	d 14/T 2 d 14/T 7
2/	II /c – d/	– 3	3 g	d 13/T 13
3/	III /a – b/	+ 1	5 f	d 10/T 12 d 10/T 22
		+ 2	7 e	d 17/T 15
4/	IV /b – d/	+ 4	6 c	d 8/T 20
		+ 8	4 b	d 15/T 16 d 15/T 25
		– 10	5 d	d 17/T 1 d 17/T 5
		– 9	3 e	d 16/T 21
		– 7	4 c	d 12/T 13 d 12/T 23
		– 6	5 e	d 11/T 12
		– 4	3 d	d 14/T 2 d 14/T 7
		– 2	2 f	d 7/T 15
5/	IV /a – b/	+ 1	4 g	d 9/T 9
		+ 3	5 e	d 17/T 8 d 17/T 18 d 17/T 17

	BE	OP	SD	d / T
6/	V /b - c/	+ 5	3 d	d 8/T 10 d 8/T 20
		+ 6	4 f	d 16/T 11
		+ 9	6 e	d 15/T 16 d 15/T 25
		+ 10	7 c	d 10/T 21
		- 9	5 b	d 12/T 17
		- 8	3 a	d 14/T 8
		- 7	1 b	d 13/T 19
		- 5	2 d	d 11/T 13
		- 4	3 f	d 17/T 15
7/	VI /c - d/	- 3	1 g	d 7/T 7 d 7/T 14
		- 2	2 e	d 9/T 12
8/	VII /a - b/	+ 2	3 c	d 12/T 8 d 12/T 17 d 12/T 26
		+ 3	5 d	d 8/T 9
9/	VIII /b - d/	+ 4	6 f	d 16/T 20
		+ 5	4 e	d 4/T 11
		+ 6	3 c	d 15/T 16
		+ 7	5 b	d 10/T 21
		+ 8	6 d	d 6/T 17
		+ 9	5 f	d 16/T 18
		+ 10	3 e	d 12/T 9
		- 10	5 d	d 4/T 13
		- 9	4 b	d 2/T 22
		- 8	3 d	d 17/T 15
		- 7	5 e	d 14/T 7 d 14/T 14
		- 6	4 c	d 8/T 19
		- 5	2 d	d 15/T 8
		- 4	3 b	d 11/T 17 d 11/T 26
		- 3	5 c	d 12/T 16
		- 2	6 e	d 8/T 5 d 8/T 11 d 8/T 21

	BE	OP	SD	d / T
10/	VIII /a - b/	+ 1	4 f	d 16/T 10
		+ 2	2 e	d 11/T 13
		+ 3	1 c	d 10/T 2 d 10/T 7
11/	VII /b - c/	+ 4	2 a	d 8/T 10 d 8/T 20
		+ 5	4 b	d 12/T 21 d 12/T 27
		+ 6	5 d	d 17/T 16
		+ 7	3 e	d 14/T 5 d 14/T 11
		+ 8	4 c	d 2/T 8 d 2/T 3 d 2/T 17
		+ 9	5 e	d 15/T 7 d 15/T 15 d 15/T 23
		- 8	6 b	d 7/T 2 d 7/T 14
		- 7	2 d	d 17/T 13 d 17/T 23
		- 6	3 f	d 8/T 22
		- 5	7 d	d 16/T 15 d 16/T 24
		- 4	5 g	d 15/T 8 d 14/T 9 d 14/T 19
12/	VI /c - d/	- 3	6 e	d 9/T 17
		- 2	5 c	d 12/T 16 d 12/T 25
13/	V /a - b/	+ 1	3 b	d 12/T 27 d 11/T 20 d 11/T 10 d 17/T 5
		+ 2	5 c	d 11/T 24 d 14/T 15
		+ 3	1 c	d 8/T 7 d 8/T 23 d 8/T 13 d 8/T 12

	BE	OP	SD	d / T
14/	IV /b - c/	+ 4	3 d	d 9/T 11 d 9/T 16 d 10/T 20 d 10/T 21
		+ 5	2 e	d 17/T 17 d 17/T 26
		+ 6	3 g	d 15/T 18 d 12/T 9
		+ 7	4 b	d 14/T 6
		+ 8	1 f	d 17/T 14
		+ 9	6 c	d 7/T 12
		+ 10	2 d	d 12/T 24
		- 10	7 e	d 16/T 18
		- 9	5 f	d 16/T 9
		- 8	3 f	d 16/T 17 d 16/T 26
		- 7	7 g	d 17/T 27 d 8/T 27 d 16/T 27 d 16/T 21
		- 6	5 e	d 16/T 20 d 10/T 10
		- 5	4 c	d 11/T 16 d 11/T 25
		- 4	6 e	d 11/T 11 d 11/T 5
15/	III /c - d/	- 3	5 c	d 8/T 5 d 8/T 11 d 15/T 16 d 16/T 10
		- 2	6 b	d 12/T 21 d 12/T 27

	BE	OP	SD	d / T
16/	III /a – b/	+ 1	5 d	d 9/T 8 d 9/T 18 d 11/T 17
		+ 2	3 b	d 17/T 9 d 12/T 12 d 12/T 22
		+ 3	1 c	d 7/T 13 d 10/T 14
17/	IV /b – d/	+ 4	6 f	d 10/T 7 d 11/T 15
		+ 5	2 a	d 8/T 10 d 14/T 11
		+ 6	4 e	d 7/T 16 d 7/T 25
		+ 7	4 b	d 7/T 21
		+ 8	3 g	d 12/T 4
		+ 9	5 f	d 12/T 26
		+ 10	6 c	d 17/T 19
		– 10	3 e	d 7/T 18
		– 9	4 c	d 7/T 8
		– 8	5 e	d 15/T 12
		– 7	7 d	d 16/T 14 d 11/T 13
		– 6	2 b	d 17/T 24 d 11/T 23
		– 5	3 d	d 14/T 8 d 14/T 18
		– 4	5 c	d 10/T 17 d 8/T 9
		– 3	6 e	d 8/T 22 d 7/T 13
		– 2	2 f	d 7/T 2 d 7/T 14 d 16/T 15

	BE	OP	SD	d / T
18/	IV /a - b/	+ 1	4 f	d 15/T 8 d 9/T 17
		+ 2	1 d	d 14/T 9] d 14/T 19]
		+ 3	3 c	d 11/T 10 d 17/T 5
19/	V /b - d/	+ 4	5 d	d 12/T 27 d 12/T 16] d 12/T 25]
		+ 5	2 g	d 11/T 24 d 14/T 15
		+ 6	4 f	d 8/T 7
		+ 7	3 e	d 8/T 12 d 8/T 13
		+ 8	1 f	d 8/T 23
		+ 9	2 e	d 9/T 16
		+ 10	1 g	d 10/T 20
		+ 10	3 g	d 9/T 11
		- 9	3 f	d 17/T 21
		- 7	5 f	d 10/T 19 d 12/T 9
		- 6	4 c	d 15/T 18 d 17/T 26
		- 5	2 b	d 7/T 12 d 14/T 6
		- 4	6 d	d 17/T 14 d 12/T 24
		- 3	4 e	d 16/T 9 d 16/T 17 d 16/T 18
		- 2	3 d	d 16/T 26 d 17/T 27 d 11/T 25

	BE	OP	SD	d / T
20/	VI /a – c/	+ 1	6 f	d 10/T 10 d 16/T 20 d 11/T 11
		+ 2	4 b	d 17/T 16 d 9/T 18
		+ 3	7 d	d 11/T 17 d 7/T 13 d 10/T 7
		+ 4	5 d	d 12/T 12 d 12/T 22
		+ 5	7 c	d 11/T 15 d 7/T 21
		+ 6	6 b	d 7/T 16 d 7/T 25
		+ 7	4 a	d 8/T 10 d 14/T 11
		+ 8	5 b	d 12/T 26
		+ 9	7 a	d 12/T 17
		+ 10	5 c	d 7/T 8
		– 10	6 c	d 10/T 19
		– 9	3 b	d 15/T 12
		– 8	5 a	d 11/T 23
		– 7	2 d	d 17/T 15 d 17/T 24
		– 6	3 f	d 16/T 14
		– 5	4 c	d 10/T 17 d 14/T 18 d 14/T 8
		– 4	5 g	d 8/T 9 d 8/T 22 d 17/T 13
21/	V /c – d/	– 3	5 e	d 16/T 15 d 16/T 24 d 7/T 14
		– 2	7 f	d 14/T 9] d 14/T 19] d 15/T 8

	BE	OP	SD	d / T
22/	V /a - c/	+ 1	4 g	d 9/T 17 d 12/T 16 d 12/T 25
		+ 2	6 d	d 12/T 27 d 11/T 20 d 17/T 5
		+ 3	4 c	d 8/T 7 d 8/T 12 d 8/T 13 d 8/T 23
		+ 4	2 b	d 11/T 15 d 14/T 24
		+ 5	5 e	d 9/T 11 d 9/T 16
		+ 6	7 f	d 10/T 20 d 10/T 17
		+ 7	3 d	d 12/T 9
		+ 8	1 c	d 14/T 6
		+ 9	3 b	d 15/T 18
		+ 10	5 g	d 17/T 14
		- 10	2 d	d 12/T 24
		- 9	6 e	d 16/T 26 d 16/T 17
		- 8	7 g	d 16/T 9
		- 7	5 a	d 16/T 18
		- 6	6 c	d 10/T 10 d 16/T 20
		- 5	5 f	d 16/T 21 d 16/T 27
		- 4	3 e	d 11/T 25 d 11/T 16 d 11/T 11
23/	VI /c - d/	- 3	1 d	d 14/T 12 d 8/T 9 d 10/T 17
		- 2	7 e	d 11/T 13 d 11/T 23 d 17/T 24

	BE	OP	SD	d / T
24/	VII /a – b/	+ 1	2 f	d 15/T 12 d 16/T 14 d 10/T 19
		+ 2	5 d	d 7/T 18 d 12/T 17 d 12/T 26
		+ 3	4 b	d 7/T 21 d 17/T 16
25/	VIII /b – c/	+ 4	6 c	d 14/T 11
		+ 5	3 d	d 11/T 20
		+ 6	7 a	d 17/T 24
		+ 7	4 f	d 10/T 14
		+ 8	5 b	d 12/T 22
		+ 9	2 g	d 1/T 23
		+ 10	6 d	d 1/T 24
		– 10	1 e	d 10/T 10
		– 9	4 c	d 11/T 16
		– 8	2 b	d 16/T 21
		– 7	3 f	d 8/T 27
		– 6	5 e	d 16/T 25 d 11/T 11
		– 5	1 d	d 16/T 17
		– 4	7 d	d 16/T 10 d 16/T 18
26/	VII /c – d/	– 3	6 f	d 7/T 12
		– 2	2 f	d 12/T 24 d 17/T 14
27/	VII /a – b/	+ 1	3 b	d 10/T 19 d 17/T 26
		+ 2	5 d	d 15/T 18 d 9/T 11
		+ 2	4 g	d 9/T 16 d 10/T 20

	BE	OP	SD	d / T
28/	VI /b - d/	+ 4	2 d	d 17/T 21
		+ 6	7 e	d 14/T 15
		+ 8	6 c	d 8/T 23
		+ 9	1 f	d 8/T 12
		- 10	4 b	d 7/T 14
		- 9	3 g	d 11/T 10
		- 7	6 f	d 12/T 16
		- 5	5 d	d 17/T 5
		- 3	4 g	d 12/T 27
		- 2	3 c	d 16/T 26
29/	VII /a - c/	+ 1	5 e	d 10/T 19
		+ 2	1 b	d 15/T 8
		+ 3	2 e	d 7/T 12
		+ 5	7 d	d 11/T 13
		+ 7	1 g	d 10/T 14
		+ 10	3 a	d 17/T 15
		- 9	6 b	d 12/T 17
		- 8	3 f	d 7/T 8
		- 6	4 c	d 16/T 9
		- 5	5 g	d 8/T 13
30/	VIII /c - d/	- 2	6 a	d 15/T 12
31/	IX /a - +5/	+ 2	7 g	d 10/T 7 d 10/T 14
		+ 4	1 c	d 17/T 15 d 17/T 24

*] = signals have to be synchronized

5.2

Production of the segment S II

5.21 Construction of three 4-track loops: LOOP I - III

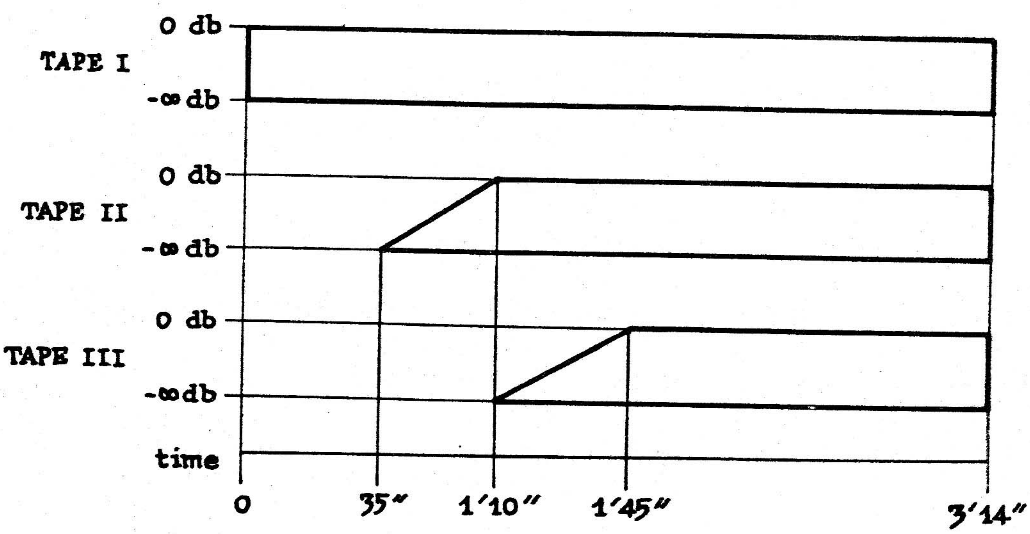
	d / T	loop I SD	loop II SD	loop III SD
1/	d 15/T 16	1 c	2 e	4 e
2/	d 16/T 10	7 f	6 b	3 c
3/	d 8/T 5 d 8/T 11	6 g	4 f	5 e
4/	d 12/T 21	7 c	6 e	3 d
5/	d 11/T 17	4 a	2 c	5 c
6/	d 9/T 8 d 9/T 18	5 g	3 f	3 e
7/	d 17/T 9	1 f	4 b	4 c
8/	d 7/T 13	6 a	6 f	5 d
9/	d 10/T 7 d 10/T 14	3 a	2 d	3 d
10/	d 12/T 12 d 12/T 22	7 g	5 b	5 e
11/	d 11/T 15	1 b	6 d	4 c
12/	d 8/T 10	2 g	2 f	3 e
13/	d 14/T 11	7 b	3 b	5 c
14/	d 7/T 21	1 e	5 f	3 c
15/	d 17/T 16 d 17/T 25	2 a	2 b	5 d
16/	d 17/T 9 d 17/T 19	7 a	6 c	4 e
17/	d 7/T 8 d 7/T 18	3 g	4 f	5 c
18/	d 12/T 17 d 12/T 26	1 d	2 c	3 d
19/	d 15/T 12	7 d	4 b	4 e
20/	d 17/T 15 d 17/T 24	1 g	6 f	5 d
21/	d 16/T 14	5 a	2 d	4 c
22/	d 11/T 13 d 11/T 23	4 g	6 c	3 e

23/	d 14/T 8 d 14/T 18]	1 a	2 f	5 e
24/	d 8/T 9	7 e	6 e	3 c
25/	d 10/T 17	3 g	5 b	4 e

5.22 Production of three 4-track tapes: TAPE I - III

	loop	transposition	
		cm/sec	db
TAPE I	LOOP I	28,0	50,00
TAPE II	LOOP I + LOOP II	2 x 33,2	87,51
TAPE III	LOOP I + LOOP II + LOOP III	2 x 27,9	73,42

5.23 Production of the segment S II



5.3

Production of the segment S III

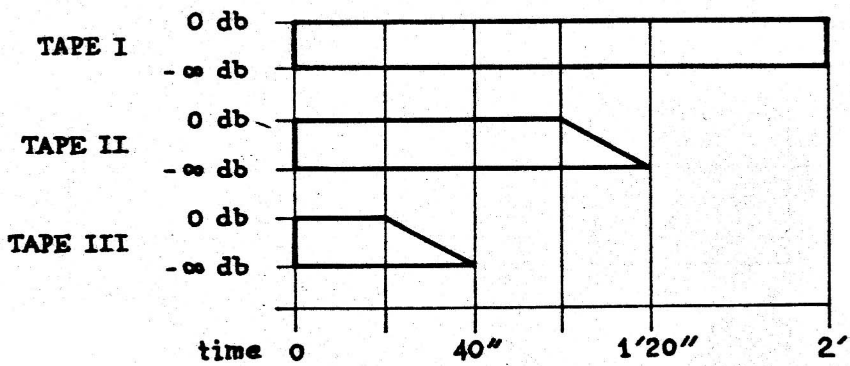
5.31 Construction of the 4-track loop /LOOP S III/:

	SD	d / T	remarks
1/	6 c	d 2/T 3 d 2/T 9	
2/	3 e	d 5/T 17	reverberation 3 sec
3/	4 b	d 3/T 8	
4/	5 f	d 1/T 12	
5/	2 c	d 6/T 6	rev. 2 sec.
6/	6 d	d 4/T 15	rev. 1 sec.
7/	4 f	d 5/T 10	
8/	5 b	d 2/T 16	rev. 4 sec.
9/	2 f	d 1/T 11	
10/	3 c	d 4/T 15	
11/	6 e	d 6/T 12 d 6/T 22	rev. 3 sec.
12/	4 c	d 5/T 7	
13/	1 e	d 3/T 19	
14/	5 c	d 2/T 17 d 2/T 26	
15/	3 f	d 4/T 8	rev. 5 sec.
16/	6 b	d 1/T 16	
17/	2 g	d 6/T 10	rev. 1 sec.
18/	3 b	d 4/T 21	
19/	5 g	d 3/T 10	rev. 2 sec.

5.32 **Production of three 4-track tapes : TAPE I - III**

	LOOP S III		
	transposition of the loop cm/sec.	db	changes of the 4-track disposition
1/ TAPE I	33,2	43,65	no change
2/ TAPE II	38,0	50,00	A → B B → C C → D D → A
3/ TAPE III	24,7	32,70	A → D B → A C → B D → C

5.33 **Production of the segment S III**



5.4

Production of the segment S IV

	BE	OP	SD	d / T	remarks
1/	VI /+7 – d/	+ 7	2 b	d 4/T 13	
		+ 8	3 d	d 2/T 7	
		+ 9	4 b	d 5/T 12	
		+ 10	3 a	d 3/T 34	
		– 10	2 c	d 17/T 23	
		– 9	5 b	d 6/T 15	
		– 7	3 c	d 2/T 19	
		– 6	2 b	d 4/T 17 d 4/T 18 d 4/T 26	rev. 2 sec.
		– 5	4 d	d 1/T 11 d 1/T 20 d 1/T 27	rev. 5 sec.
		↓ – 4	6 b	d 1/T 7	rev. 4 sec.: ↓ – ∞ db 0 db /– 4/ ↓ – ∞ db
		↓ – 3	5 f	d 1/T 23	rev. 5 sec.: ↓ – ∞ db 0 db /– 3/ ↓ – ∞ db
		↓ – 2	3 e	d 1/T 15	rev. 3 sec.: ↓ – ∞ db 0 db /– 2/ ↓ – ∞ db
2/	VI /a – b/	+ 1	4 d	d 4/T 12 d 4/T 17 d 4/T 18 d 4/T 9	rev. ↓ /+ 2/
		+ 2	4 d	d 4/T 20	
			2 b	d 4/T 2 d 4/T 10	rev. ↓ BE 3 /+ 4/
		+ 3	3 c	d 3/T 14	rev. ↓ BE 3 /+ 5/
				d 4/T 13 d 1/T 24	rev. 1 sec. /no rev./

	BE	OP	SD	d / T	remarks
3/	V /b - d/	+ 4	2 b	d 2/T 18 d 2/T 26 d 5/T 17	rev. /+ 7/
		+ 5	3 c	d 4/T 9	
				d 2/T 18 d 2/T 26 d 5/T 17	only rev.: $-\infty$ db 0 db /+ 6/
		+ 6	3 c	d 5/T 27 d 5/T 25 d 5/T 16	rev. 1 sec.
		+ 7	2 b	d 6/T 7 d 6/T 15	
		+ 8	6 b	d 2/T 23	rev. 2 sec.
		+ 9	4 d	d 3/T 14	rev. 1 sec.
		+ 10	3 f	d 5/T 12 d 5/T 22	
		- 9	4 d	d 4/T 17 d 1/T 26	rev. 3 sec.
		- 8	3 f	d 2/T 23	
		- 7	6 b	d 3/T 15	
		- 6	4 d	d 5/T 9 d 5/T 18	
			2 b	d 4/T 16	
		- 5	3 f	d 6/T 27 d 3/T 21 d 3/T 11	
		- 4	6 b	d 4/T 7	rev. 4 sec.
			4 d	d 6/T 14	rev.: $-\infty$db
		- 2			0 db
		- 1			$-\infty$db

	BE	OP	SD	d / T	remarks
4/	IV /a - c/	+ 1	4 d	d 4/T 13 d 1/T 15 d 1/T 23	
		+ 2	4 d	d 3/T 22	rev. 1 sec.
			3 b	d 15/T 8	
				d 6/T 18	only rev.: ↓ -∞ db 0 db
		+ 3	3 b	d 6/T 19 d 6/T 18	
		+ 4	6 e	d 6/T 17 d 3/T 21 d 1/T 25	
		+ 5	2 f	d 2/T 5 d 5/T 20	
		+ 6	6 e	d 4/T 2	
		+ 7	3 b	d 1/T 7	rev. 1 sec.
		+ 8	4 d	d 3/T 13	
		+ 9	6 f	d 6/T 12	
		+ 10	2 e	d 2/T 22	
		- 10	5 b	d 5/T 15	rev. 3 sec.
		- 9	4 d	d 1/T 24	
		- 8	2 c	d 4/T 21	rev. 1 sec.
		- 7	6 b	d 5/T 25	rev. 2 sec.
		- 6	5 f	d 3/T 20	
		- 5	4 d	d 1/T 11	
		- 4	6 c	d 7/T 2 d 4/T 8 d 1/T 19 d 2/T 17] d 2/T 26]	rev. 3 sec.
5/	III /c - d/	- 3	3 f	d 1/T 5] d 1/T 1]	
				d 4/T 4	only rev.: ↓ -∞ db 0 db
		- 2	2 b	d 1/T 16 d 3/T 21	

	BE	OP	SD	d / T	remarks
6/	II /a – c/	+ 1	6 c	d 5/T 14	
				d 5/T 22	
				d 5/T 13	
				d 4/T 6	only rev.: $-\infty$ db
		+ 2	3 e	d 4/T 13	0 db
				d 4/T 17	rev. 2 sec.
		+ 3	2 d	d 2/T 8	
				d 2/T 19	
		+ 4	4 c	d 1/T 17	
				d 1/T 18	
				d 1/T 26	
		+ 5	5 e	d 17/T 23	
				d 4/T 12	rev. 2 sec.
		+ 6	2 f	d 2/T 7	rev. 3 sec.
				d 6/T 7	
				d 4/T 7	
		+ 7	3 b	d 4/T 13	
				d 5/T 13	rev. 1 sec.
		+ 8	6 d	d 4/T 12	
				d 6/T 12	
				d 5/T 12	
		+ 9	4 e	d 2/T 23	rev. 2 sec.
		+ 10	5 c	d 3/T 15	
				d 6/T 15	
				d 4/T 15	rev. 4 sec.
		– 10	2 e	d 4/T 1	
		– 9	4 b	d 4/T 5	rev. 1 sec.
		– 8	6 f	d 3/T 20	
				d 5/T 20	
		– 7	3 c	d 4/T 16	rev. 1 sec.
				d 3/T 16	
		– 6	5 d	d 1/T 21	
				d 4/T 21	rev. 4 sec.
				d 3/T 21	
		– 5	3 e	d 2/T 17	
				d 5/T 17	
				d 1/T 17	
		– 4	6 b	d 4/T 18	

	BE	OP	SD	d / T	remarks
7/	III /c - d/	- 3	2 d	d 4/T 9 d 5/T 9	
		- 2	6 e	d 3/T 20	rev. 2 sec.
8/	III /a - b/	+ 1	4 d	d 2/T 16 d 3/T 21 d 1/T 5	
		+ 2	1 f	d 4/T 7	rev. 3 sec.
9/	IV /b - d/	+ 4	3 g	d 3/T 14 d 6/T 14	
		+ 5	2 e	d 1/T 23	
		+ 7	1 g	d 4/T 12	rev. 2 sec.
		+ 8	2 f	d 5/T 12	rev. 2 sec.
		- 10	1 e	d 6/T 15 d 2/T 15	
		- 9	2 g	d 4/T 15	
		- 3	1 f	d 1/T 21	rev. 1 sec.

5.5

Production of the segment S V

The following sound material has to be disposed within 10 seconds:

	SD	d / T	remarks
1/	5 e	d 1/T 10	rev. 5 sec.
2/	1 a	d 1/T 16	rev. 5 sec.
3/	2 d	d 1/T 3	rev. 5 sec.
4/	7 f	d 1/T 11	rev. 5 sec.
5/	6 c	d 1/T 26	rev. 5 sec.
6/	4 g	d 1/T 21	rev. 5 sec.
7/	4 d	d 1/T 18	rev. 5 sec.

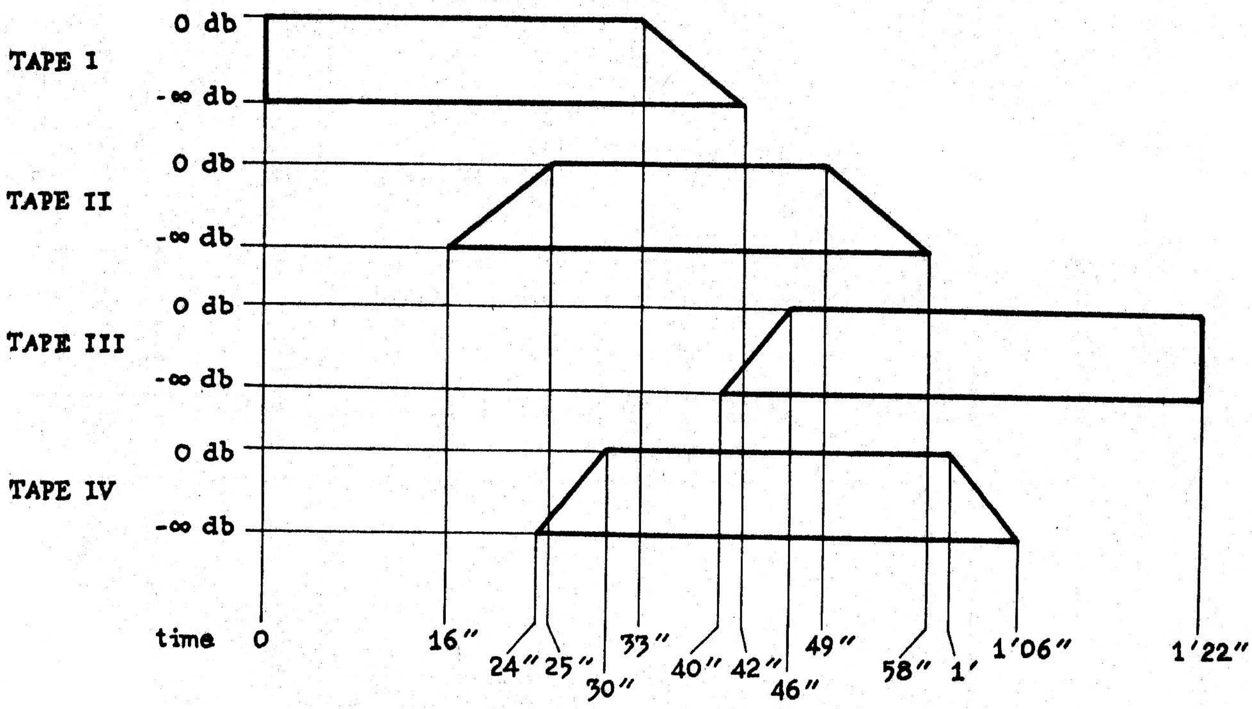
5.6

Production of the segment S VI

5.61 Construction of four 4-track tapes TAPE I - IV

	sound	SD	lenght /in sec./
tape I	n 16	3 a 3 b 3 c 3 d 3 e 3 f 3 g	6 6 6 6 6 6 6
tape II	n 18	1 e 2 e 3 e 4 e 5 e 6 e 7 e	6 6 6 6 6 6 6
tape III	n 17	7 f 6 f 5 f 4 f 3 f 2 f 1 f	6 6 6 6 6 6 6
tape IV	n 19	5 a 5 b 5 c 5 d 5 e 5 f 5 g	6 6 6 6 6 6 6

5.62 **Production of the segment S VI**



5.7

Production of the segment S VII

5.71 Production of five 4-track tapes : TAPE I – V

5.711 Production of the TAPE I *

	BE	OP	SD / n	SD / n	SD / n	SD / n
1/	V /+5 - c/	+ 5	4 d - 1			
		+ 6		3 e - 3		
		+ 7	4 b - 2			
		+ 8		5 e - 4		
		+ 9				
		+ 10	4 d - 7			
		- 10			2 d - 5	
		- 9				6 d - 6
		- 8				
		- 7				
		- 6				
		- 5	4 b - 16			
		- 4				
2/	IV /c - d/	- 3		3 e - 17		
		- 2				
3/	IV /a - c/	+ 1	5 e - 18		/small piece of tape/	
		+ 2	3 e - 19		/small piece of tape/	
		+ 3	4 b - 12			
		+ 4		3 e - 14	/small piece of tape/	
		+ 5				

	BE	OP	SD / n	SD / n	remarks
		+ 6	6 d - 13		
		+ 7		2 d - 15	
		+ 8			
		+ 9	4 d - 9		
		+ 10		5 e - 8	
		- 10			
		- 9	6 d - 10		small piece of tape
		- 8			
		- 7	2 d - 8		
		- 6		3 e - 11	small piece of tape
		- 5			
		- 4	4 b - 12		
4/	V /c - d/	- 3		5 e - 15	small piece of tape
		- 2			
5/	V /a - c/	+ 1	3 e - 14		
		+ 2		4 b - 13	
		+ 3	5 e - 14		small piece of tape
		+ 4	6 d - 1		
		+ 5		4 d - 2	
		+ 6			
		+ 7	2 d - 3		
		+ 8			
		+ 9		4 d - 4	
		+ 10			
		- 10			

* all sounds with reverberation 5 sec.

5.712 Production of the TAPE II

	BE	OP	SD /	n	n	remarks
1/	VI /+10 - c/	+ 10	$\boxed{4\ a}$	19		
		- 10			6	
		- 9		7		
		- 8			18	no reverb.
		- 7		5		
		- 6			17	
		- 5		16		
		- 4			1	small piece of tape rev. 3 sec.
2/	VI /b - d/	+ 4				
		+ 6		2		
		+ 7			4	
		+ 8		3		no reverb.
		+ 9			9	
		+ 10	$\boxed{4\ g}$	10		
		- 10	4 d		11	
		- 9		9		
		- 8			8	
		- 7		13		rev. 4 sec.*
		- 6			14	
		- 4		12		
		- 2			15	small piece of tape

	BE	OP	SD / n	SD / n	SD / n	remarks
3/	VI /a - c/	+ 1	4 b - 3			small piece of tape
		+ 2	3 e - 6			small piece of tape
		+ 3		6 e - 18		
		+ 4		2 d - 2		
		+ 5				
		+ 6	5 c - 17			
		+ 7				
		+ 8		3 c - 7		
		+ 9				
		+ 10				
		- 10	6 e - 19			
		- 9		4 b - 4		
		- 8				
		- 7	3 e - 1			
		- 6			6 e - 16	
		- 5				
		- 4				
4/	V /c - d/	- 3		4 b - 3		
		- 2	6 e - 2			
5/	IV /a - b/	+ 1				
		+ 2				
		+ 3				

	BE	OP	SD / n	SD / n	SD / n
6/	III /b - c/	+ 6	4 d 15		
		+ 7		7 d 6	
		+ 8			2 e 5
		+ 9			
		+ 10	3 b 14		
		- 10			
		- 9		4 d 12	
		- 8	2 e 7		
		- 7			

*all sounds to the end of the tape with reverberation 5 sec.

5.713 Production of the TAPE III

BE	OP	SD / n	SD / n	
V /b - c/	+ 4	5 f 13		reverberation 5 sec.
	+ 5		6 c 17	
	+ 6	3 e 18		
	+ 7		5 f 4	
	+ 8			
	+ 9	6 c 2		
	+ 10		3 e 19	
	- 10			
	- 9	5 f 3		
	- 8		6 c 2	
	- 7	3 e 1		
	- 6			

5.714 Production of the TAPE IV

BE	OP	SD / n	SD / n	SD / n	remarks
IV /b - c/	+ 8	4 c - 11			
	+ 9		7 g - 9		
	+ 10			2 d - 8	
	- 10	6 b - 9			
	- 9				
	- 8		5 e - 10	3 f - 19	small piece of tape
	- 6				

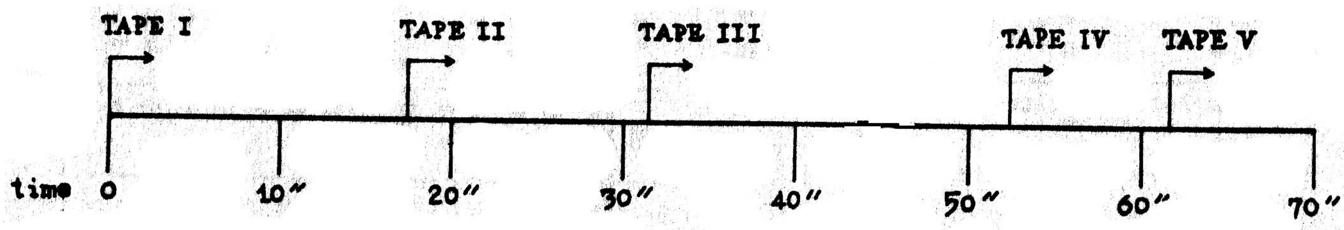
reverberation 5 sec.

5.715 Production of the TAPE V

BE	OP	SD / n	SD / n	remarks
V /b - d/	+ 5	3 e - 19		small piece of tape
	+ 6	5 e - 17		small piece of tape
	+ 7	4 c - 8		small piece of tape
	+ 8	3 e - 5		
	+ 9		5 e - 4	
	+ 10			
	- 10			
	- 9	3 e - 18		
	- 8		4 c - 10	
	- 7	5 e - 10		
	- 6			
	- 5	5 e - 10		small piece of tape
	- 4	4 c - 14		small piece of tape
	- 3	3 e - 2		small piece of tape

reverberation 5 sec.

5.72 Distribution of tapes TAPE I - V within the segment S VII



6 REMARKS

d / T	sound material "drop" /d 1 - d 17/ and its transposition /T 1 - T 27/
n1 - n 19	sound material made of a noise-like structure n
SD	space determination of the sound signal: relative intensities of a sound signal within one of 49 squares of the playback hall /1 a - 7 g/
S I - S VI	segments in the complete composition
BE I - BE IX /a - b - c - d/	transpositions and the used segment of the basic element BE of the rhythmical structure
OP	orientation point within the basic element of the rhythmical structure, where the sound signal begins or ends /one or more short sound signals have to be placed/
]	signals have to be synchronized
$-\infty$db	no sound signal on the track /tape/

Two 2-track /stereo/ versions of the 4-track composition are possible:

1st track /left/:	1/ tracks A + D	or 2/ tracks A + B
2nd track /right/:	tracks B + C	tracks C + D