

APPENDIX SECTION

APPENDIX A

MUSICAL MNEMONICS LISTING

- 1) Table 1: Alphabetical Order..... 54
- 2) Table 2: Numerical Order (Groups)..... 57

MUSICOL MNEMONICS

Table 1: Alphabetical Order

(Asterisks denote mnemonics not available in Version I.)

	OPERATION CODE	OCTAL REPRESENTATION	DECIMAL EQUIVALENT
1	A	0001	1
2	B	0003	3
3	C	0004	4
4	D	0006	6
5	E	0010	8
6	F	0011	9
7	G	0013	11
8	P	0123	83
9	-	0037	31
10	*	0040	32
11	/	0041	33
12	(	0042	34
13	)	0043	35
14	=	0044	36
15		0045	37
16	,	0046	38
17	.	0047	39
18	A+	0002	2
19	A-	0014	12
20	B-	0002	2
21	C+	0005	5
22	D+	0007	7
23	D-	0005	5
24	E-	0007	7
25	FF	0127	87
26	FP	0033	27
27	FT	0126	86
28	F+	0012	10
29	G+	0014	12
30	G-	0012	10
31	MF	0125	85
32	MP	0124	84
33	PP	0122	82
34	END	0311	201
35	FFF	0130	88
36	PPP	0121	81
37	* SAW *	0204	132
38	SFZ	0034	28
39	* SIN *	0202	130
40	* TRI *	0203	131
41	* AMOD *	0207	135
42	ARCO	0024	20
43	* FMOD *	0210	136
44	HALF	0111	73

OPERATION CODE	OCTAL REPRESENTATION	DECIMAL EQUIVALENT
45	HARP	55
46	OBOE	46
47	PIZZ	21
48	PLAY	110
49	REST	111
50	SFFZ	29
51	SLUR	23
52	TIME	120
53	TUBA	52
54	16TH	79
55	32ND	80
56	8VE1	91
57	8VE2	92
58	8VE3	93
59	8VE4	94
60	8VE5	95
61	8VE6	96
62	8VE7	97
63	ACCEL	112
64	CELLO	42
65	CRESC	89
66	DIMIN	90
67	FLUTE	45
68	GLISS	103
69	HALF+	72
70	MUTED	101
71	* NOISE *	134
72	PERC1	61
73	PERC2	62
74	PERC3	63
75	PERC4	64
76	PIANO	59
77	STACC	26
78	START	200
79	* TAPE1 *	138
80	* TAPE2 *	139
81	TRILL	30
82	VIOLA	41
83	WHOLE	71
84	XTRA1	140
85	XTRA2	141
86	XTRA3	142
87	XTRA4	143
88	XTRA5	144
89	XTRA6	145
90	XTRA7	146
91	XTRA8	147
92	XTRA9	148
93	16TH+	78
94	CHIMES	54
95	COLLEG	22
96	CYMBAL	53

OPERATION CODE	OCTAL REPRESENTATION	DECIMAL EQUIVALENT
97	EIGHTH	77
98	* FILTER *	137
99	* TICHING *	126
100	INSTR1	65
101	INSTR2	66
102	INSTR3	67
103	INSTR4	68
104	INSTR5	69
105	LEGATO	24
106	* LENGTH *	121
107	NORMAL	25
108	RANDOM	150
109	* RETROG *	116
110	RITARD	113
111	ROWGEN	127
112	* SQUARE *	133
113	* THEMPR *	117
114	TIMSIG	125
115	VIOLIN	40
116	WHOLE+	70
117	XTRA10	149
118	BASSOON	48
119	EIGHTH+	76
120	* INVERTP *	114
121	* INVERTR *	115
122	MARIMBA	57
123	NORMALT	105
124	NTRANGE	122
125	PICCOLO	44
126	QUARTER	75
127	SHUFFLE	128
128	SULPONT	100
129	TREMOLO	102
130	TRUMPET	49
131	TYMPANI	60
132	* VARIPIT *	118
133	* VARIRYT *	119
134	CLARINET	47
135	DYNRANGE	123
136	FRQRANGE	124
137	QUARTER+	74
138	TROMBONE	51
139	XYLOPHONE	56
140	CONTRABASS	43
141	FLUTTIERTGE	104
142	FRENCHHORN	50
143	VIBRAPHONE	58

Table 2: Numerical Order (Groups)

(Asterisks denote mnemonics not available in Version I.)

	OPERATION CODE	OCTAL REPRESENTATION	DECIMAL EQUIVALENT
1	A	0001	1
2	A+	0002	2
3	B-	0002	2
4	B	0003	3
5	C	0004	4
6	C+	0005	5
7 7	D-	0005	5
8	D	0006	6
9	D+	0007	7
10	E-	0007	7
11	E	0010	8
12	F	0011	9
13	F+	0012	10
14	G-	0012	10
15	G	0013	11
16	G+	0014	12
17	A-	0014	12
18	ARCO	0024	20
19	PIZZ	0025	21
20	COLLEG	0026	22
21	SLUR	0027	23
22	LEGATO	0030	24
23	NORMAL	0031	25
24	STACC	0032	26
25	FP	0033	27
26	SFZ	0034	28
27	SFFZ	0035	29
28	TRILL	0036	30
29	-	0037	31
30	*	0040	32
31	/	0041	33
32	(	0042	34
33	)	0043	35
34	=	0044	36
35		0045	37
36	,	0046	38
37	.	0047	39
38	VIOLIN	0050	40
39	VIOLA	0051	41
40	CELLO	0052	42
41	CONTRABASS	0053	43
42	PICCOLO	0054	44
43	FLUTE	0055	45
44	OBOE	0056	46
45	CLARINET	0057	47

OPERATION CODE	OCTAL REPRESENTATION	DECIMAL EQUIVALENT	
45	CLARINET	0057	47
46	BASSOON	0060	48
47	TRUMPET	0061	49
48	FRENCHHORN	0062	50
49	TROMBONE	0063	51
50	TUBA	0064	52
51	CYMBAL	0065	53
52	CHIMES	0066	54
53	HARP	0067	55
54	XYLOPHONE	0070	56
55	MARIMBA	0071	57
56	VIBRAPHONE	0072	58
57	PIANO	0073	59
58	TYMPANI	0074	60
59	PERC1	0075	61
60	PERC2	0076	62
61	PERC3	0077	63
62	PERC4	0100	64
63	INSTR1	0101	65
64	INSTR2	0102	66
65	INSTR3	0103	67
66	INSTR4	0104	68
67	INSTR5	0105	69
68	WHOLE+	0106	70
69	WHOLE	0107	71
70	HALF+	0110	72
71	HALF	0111	73
72	QUARTER+	0112	74
73	QUARTER	0113	75
74	EIGHTH+	0114	76
75	EIGHTH	0115	77
76	16TH+	0116	78
77	16TH	0117	79
78	32ND	0120	80
779	PPP	0121	81
80	PP	0122	82
81	P	0123	83
82	MP	0124	84
83	MF	0125	85
84	FT	0126	86
85	FF	0127	87
86	FFF	0130	88
87	CRESC	0131	89
88	DIMIN	0132	90
89	8VE1	0133	91
90	8VE2	0134	92
91	8VE3	0135	93
92	8VE4	0136	94
93	8VE5	0137	95

OPERATION CODE		OCTAL REPRESENTATION	DECIMAL EQUIVALENT
94	8VE6	0140	96
95	8VE7	0141	97
96	SULPONT	0144	100
97	MUTED	0145	101
98	TREMOLO	0146	102
99	GLISS	0147	103
100	FLUTTERTGE	0150	104
101	NORMALT	0151	105
102	PLAY	0156	110
103	REST	0157	111
104	ACCEL	0160	112
105	RITARD	0161	113
106	* INVERTP *	0162	114
107	* INVERTR *	0163	115
108	* RETROG *	0164	116
109	* THEMPR *	0165	117
110	* VARIPIT *	0166	118
111	* VARIRYT *	0167	119
112	TIME	0170	120
113	* LENGTH *	0171	121
114	NTRANGE	0172	122
115	DYNRANGE	0173	123
116	FRQRANGE	0174	124
117	TIMSIG	0175	125
118	* ICHING *	0176	126
119	ROWGEN	0177	127
120	SHUFFLE	0200	128
121	* SIN *	0202	130
122	* TRI *	0203	131
123	* SAW *	0204	132
124	* SQUARE *	0205	133
125	* NOISE *	0206	134
126	* AMOD *	0207	135
127	* FMOD *	0210	136
128	* FILTER *	0211	137
129	* TAPE1 *	0212	138
130	* TAPE2 *	0213	139
131	XTRA1	0214	140
132	XTRA2	0215	141
133	XTRA3	0216	142
134	XTRA4	0217	143
135	XTRA5	0220	144
136	XTRA6	0221	145
137	XTRA7	0222	146
138	XTRA8	0223	147

OPERATION CODE		OCTAL REPRESENTATION	DECIMAL EQUIVALENT
139	XTRA9	0224	148
140	XTRA10	0225	149
141	RANDOM	0226	150
142	START	0310	200
143	END	0311	201

APPENDIX B

MUSICOL SAMPLE PROGRAMS

- 1) Test Program..... 62
- 2) Homage to G. K. Zipf, complete program
with partial output listing..... 72

```

000000 START      MUSICAL TEST DECK NUMBER 1, MUSIC COMPOSITION, 16 MEASURES
*
* THE RANK ORDER PARAMETERS ARE BEING SET FIRST
*
ORDERS (PP PPP MP P MF FT FF FFF) (NORMAL ARCO PIZZ COLLEG SLUR SFFZ
SFZ) ROWGEN(0-12) (8VE1 8VE2 8VE3 8VE4 8VE5 8VE6 8VE7)
(NORMALT SULPONT MUTED XTRA1 GLISS FLUTTERIGE) (WHOLE HALF
QUARTER EIGHTH 16TH 32ND WHOLE+ HALF+ QUARTER+ EIGHTH+ 16TH+)
TIME=1.00 FLUTE(1)=3G - 7C VIOLA(2) BASSOON(1)
VIOLIN(2)=3G-7C .1 *2 =HALF*4=SULPONT*1 =PP*2
XTRA1 =SULPONT
VIOLA=3C-5G+ FLUTE = 4D - 7C BASSOON=2C-5A- VIOLIN=ARCO*1 VIOLA=ARCO*1
FRORANGE=3A-4F+ DYNRANGE=PP-MP NTRANGE=WHOLE-16TH HALF*1
PLAY* 85 NORMAL*7 QUARTER=120
TIME=6.9 FRORANGE=2C-5A+ FLUTE=4E-7B FLUTE=RANDOM VIOLIN=XTRA1 *2
VIOLIN=PIZZ*3 DYNRANGE=MP-FF NTRANGE=QUARTER-EIGHTH VIOLA=COLLEG. 8
BASSOON=EIGHTH*1 FLUTE=FLUTTERIGE *1 BASSOON=8VE2*1 VIOLIN = FF. 88
C VIOLIN SHOULD CRESC. UNTIL TIME=9.0
*
SHUFFLE(ARCO 7)
TIME = 9.0 FRORANGE=2C-7C FLUTE=GLISS.8 VIOLA=PIZZ.4 FLUTE
=16TH.96 BASSOON=RANDOM DIMIN=MP.122 RITARD=40.122 NTRANGE=HALF - 16TH
* CLIMAX OCCURS AT BAR 13, QUICKLY DIMINISHES
*
TIME=13.0 FRORANGE=2C-4F+ NTRANGE=WHOLE - HALF REST*45 QUARTER=60
INSTR1(1)=VIOLA2=3C- 4F+=SULPONT*1=PP*1=ARCO*4=8VE3*2
VIOLA = END BASSOON=CELLO(1) =2C-4C+
WHOLE*1 DIMIN=PP.86 VIOLIN=MUTED*1
* PIECE ENDS AFTER 19 BARS
*
TIME=16.00 DYNRANGE=PPP-PPP VIOLIN=PIZZ*1
FLUTE = NORMAL *1 CELLO =REST* 100
TIME=17.00
ROWGEN(0) SHUFFLE(SFZ 0) FLUTE=SFZ*0=E*0 VIOLIN=SFZ*0=E*0
INSTR1=SFZ*0=E*0
TIME=20.00
END MUSIC COMPOSITION P. GENA
TEST001
TEST002
TEST003
TEST004
TEST005
TEST006
TEST007
TEST008
TEST009
TEST010
TEST011
TEST012
TEST013
TEST014
TEST015
TEST016
TEST017
TEST018
TEST019
TEST020
TEST021
TEST022
TEST023
TEST024
TEST025
TEST026
TEST027
TEST028
TEST029
TEST030
TEST031
TEST032
TEST033
TEST034
TEST035
TEST036
TEST037

```

NUMBER OF CARDS
37

NUMBER OF STATEMENTS
94

ASSIGNED MNEMONICS

LJC DEF.	MNEMONIC	SYMBOL TAG	REFERENCES			
000101	INSTR1	VIOLA2	000102 000133	000103 000134	000104 000051	000105 000106 000107
100007	XTRA1	SULTASTO	000027	000030		

TOTAL COMPILATION TIME
1.039 SECONDS

MUSICAL LOADER - SIMULATOR.....VERSION 1.....LOADER CALLED
2.829

EXECUTION CONDITIONS

ROWGEN CALLED, LOCATION- 000004, PITCH RANK ORDERS CHANGED AS FOLLOWS
A D F A- C+ G- A+ E C
E- B

NO INITIAL TIME SIGNATURE SPECIFIED, 4/4 ASSUMED

FLUTE RANDOM-CLEARED, LOCATION 000050

SHUFFLE CALLED, LOCATION- 000062, PIZZ SLUR COLLEG ARCO
SFFZ NORMAL

BASSOON RANDOM-CLEARED, LOCATION 000070

VIOLA DELETED, LOCATION 000110

BASSOON REPLACED BY CELLO, LOCATION 000111

ROWGEN CALLED, LOCATION- 000125, PITCH RANK ORDERS DELETED

SHUFFLE CALLED, LOCATION- 000126, ATTACK RANK ORDERS DELETED

=====

TOTAL EXECUTION TIME = 2.215 SECONDS

=====

MUSICAL TEST DECK NUMBER 1, MUSIC COMPOSITION, 16 MEASURES

-65-

APPROXIMATE DURATION = 1 MINS. AND 8 SECS.

***** POSITION INSTR. NAME PITCH RANGE DURATION DYNAMICS ATTACK TIMBRE SPEC 1 SPEC 2 SPEC 3 SPEC 4 *****

* TIME SIGNATURE = 4/4 *

* M.M. - QUARTER = 120 *

BAR	1	BEAT	1 + 1	FLUTE	E	8VE4	HALF	MP	NORMAL	NORMALT
				VIOLA	B-	8VE4	QUARTER		ARCO	SULTASTO
				BASSOON	C+	8VE4	QUARTER			SULTASTO
				VIOLIN	REST		EIGHTH			
BAR	1	BEAT	1 + 5	BASSOON	D	8VE4	QUARTER	PP	NORMAL	SULTASTO
				VIOLIN	D	8VE3	QUARTER	P	ARCO	GLISS
				VIOLIN	E	8VE4	HALF	PP		SULTASTO
				VIOLIN	G	8VE3	HALF	P		GLISS
BAR	1	BEAT	2 + 1	VIOLA	A	8VE4	16TH	MP	NORMAL	FLUTTERIGE
BAR	1	BEAT	2 + 4	VIOLA	C+	8VE4	HALF			SULTASTO
BAR	1	BEAT	3 + 1	FLUTE	F+	8VE4	HALF			NORMALT
				BASSOON	B-	8VE3	16TH			
BAR	1	BEAT	3 + 3	BASSOON	G+	8VE3	HALF	PP	ARCO	MUTED
BAR	1	BEAT	3 + 5	VIOLIN	REST		HALF			
BAR	1	BEAT	4 + 4	VIOLA	F+	8VE4	16TH			
BAR	1	BEAT	4 + 7	VIOLA	REST		HALF			
BAR	2	BEAT	1 + 3	BASSOON	C	8VE4	HALF	MP	SFZ	FLUTTERIGE
BAR	2	BEAT	1 + 5	VIOLIN	F	8VE4	WHOLE	PP	ARCO	SULTASTO
				VIOLIN	D+	8VE4	WHOLE			
BAR	2	BEAT	2 + 1	FLUTE	REST		16TH			
PAR	2	BEAT	2 + 3	FLUTE	F+	8VE4	HALF	P	NORMAL	NORMALT
BAR	2	BEAT	2 + 7	VIOLA	A	8VE4	HALF	PP	ARCO	SULPONT
				VIOLA	F	8VE4	HALF			
BAR	2	BEAT	3 + 3	BASSOON	B	8VE4	WHOLE	MP	SFFZ	MUTED
PAR	2	BEAT	4 + 3	FLUTE	D	8VE4	WHOLE			
BAR	2	BEAT	4 + 7	VIOLA	REST		HALF			
BAR	3	BEAT	1 + 5	VIOLIN	REST		HALF			
BAR	3	BEAT	2 + 7	VIOLA	A	8VE4	EIGHTH		ARCO	SULPONT
				VIOLA	C	8VE4	EIGHTH			
BAR	3	BEAT	3 + 3	BASSOON	REST		HALF			
BAR	3	BEAT	3 + 5	VIOLA	REST		QUARTER			
BAR	3	BEAT	4 + 5	VIOLA	F	8VE4	HALF	PP		SULTASTO
BAR	4	BEAT	1 + 1	VIOLA	E	8VE3	EIGHTH	MP		SULPONT
				VIOLA	D	8VE4	HALF			
				VIOLA	F+	8VE3	HALF			
BAR	4	BEAT	1 + 3	BASSOON	A	8VE3	EIGHTH	PP	SFFZ	FLUTTERIGE
BAR	4	BEAT	1 + 5	VIOLIN	REST		QUARTER			
PAR	4	BEAT	1 + 7	BASSOON	B-	8VE4	HALF	MP		
BAR	4	BEAT	2 + 3	FLUTE	F+	8VE4	HALF	PP	NORMAL	MUTED
BAR	4	BEAT	2 + 5	VIOLIN	D+	8VE4	HALF	PP	ARCO	SULPONT
				VIOLIN	D+	8VE3	HALF	P		NORMALT
BAR	4	BEAT	3 + 1	VIOLA	G+	8VE3	32ND	PP		GLISS
				VIOLA	G	8VE3	32ND			
BAR	4	BEAT	3 + 2	VIOLA	G+	8VE4	WHOLE			
				VIOLA	C	8VE4	WHOLE	MP	SFZ	SULTASTO
BAR	4	BEAT	3 + 7	BASSOON	C	8VE4	HALF			

BAR	4	BEAT	4	+	3	FLUTE	F+	8VE4	WHOLE	PP	NORMAL	SULTASTO
BAR	4	BEAT	4	+	5	VIOLIN	D	8VE4	HALF		ARCO	SULPONT
BAR	5	BEAT	1	+	7	BASSOON	B	8VE4	HALF	MP	NORMAL	SULTASTO
PAR	5	BEAT	2	+	5	VIOLIN	G	8VE3	HALF	PP	ARCO	SULPONT
BAR	5	BEAT	3	+	2	VIOLA	C+	8VE4	HALF	MP		GLISS
BAR	5	BEAT	3	+	5	VIOLA	G	8VE3	QUARTER			SULTASTO
BAR	5	BEAT	3	+	5	VIOLA	C+	8VE4	QUARTER			SULTASTO
BAR	5	BEAT	3	+	7	BASSOON	E	8VE3	HALF		NORMAL	FLUTTERIGE
BAR	5	BEAT	4	+	3	FLUTE	F+	8VE4	EIGHTH+		ARCO	GLISS
BAR	5	BEAT	4	+	5	VIOLA	F+	8VE4	EIGHTH			SULPONT
						VIOLA	B	8VE4	EIGHTH			
						VIOLIN	E	8VE4	EIGHTH			
						VIOLIN	B	8VE4	EIGHTH			
BAR	6	BEAT	1	+	1	FLUTE	D	8VE4	QUARTER	MP	NORMAL	SULTASTO
PAR	6	BEAT	2	+	1	FLUTE	D	8VE4	32ND		SLUR	
BAR	6	BEAT	1	+	1	VIOLA	REST	8VE4	32ND			
						VIOLIN	B-	8VE4	EIGHTH	PP	ARCO	SULPONT
						VIOLA	D	8VE4	EIGHTH	MP		GLISS
						VIOLA	D	8VE4	16TH+			
						VIOLA	A	8VE4	16TH+			
BAR	6	BEAT	1	+	5	VIOLA	C+	8VE4	EIGHTH			NORMAL
BAR	6	BEAT	2	+	1	VIOLA	C+	8VE4	EIGHTH		SLUR	
						VIOLA	E	8VE3	32ND			
BAR	6	BEAT	1	+	5	VIOLIN	D	8VE4	16TH	PP	ARCO	SULPONT
						VIOLIN	B	8VE4	16TH			
PAR	6	BEAT	1	+	7	BASSOON	REST	8VE4	16TH+			
						VIOLIN	A	8VE4	16TH+			
BAR	6	BEAT	2	+	2	FLUTE	B-	8VE5	32ND	MP	NORMAL	FLUTTERIGE
						VIOLA	REST					
						BASSOON	REST					
						VIOLIN	REST					
						VIOLIN	G+	8VE3	HALF	CRESC	SFZ	GLISS
						FLUTE	REST					
PAR	6	BEAT	2	+	3	FLUTE	REST	8VE3	HALF+			
BAR	6	BEAT	2	+	6	VIOLA	D	8VE4	WHOLE	MF	ARCO	NORMAL
						BASSOON	B	8VE3	EIGHTH	MP	NORMAL	GLISS
BAR	6	BEAT	3	+	2	BASSOON	C+	8VE2	EIGHTH	MP	SFFZ	MUTED
BAR	6	BEAT	3	+	6	BASSOON	C	8VE2	EIGHTH	FF		
PAR	6	BEAT	4	+	2	BASSOON	B-	8VE3	EIGHTH	MP		
						BASSOON	G	8VE3	HALF		COLLEG	SULTASTO
BAR	6	BEAT	4	+	6	VIOLIN	F	8VE2	EIGHTH	MP	SLUR	MUTED
BAR	7	BEAT	1	+	2	BASSOON	REST	8VE5	EIGHTH			
BAR	7	BEAT	1	+	3	FLUTE	B-	8VE2	HALF		SFZ	FLUTTERIGE
BAR	7	BEAT	1	+	6	BASSOON	F+	8VE2	EIGHTH		SLUR	NORMAL
BAR	7	BEAT	2	+	2	BASSOON	F	8VE2	EIGHTH		SFFZ	SULTASTO
						VIOLIN	A	8VE4	HALF		PIZZ	MUTED
						VIOLIN	C	8VE4	HALF			
PAR	7	BEAT	2	+	6	VIOLA	F	8VE4	EIGHTH+	MP	ARCO	NORMAL
						BASSOON	C	8VE2	EIGHTH	FF	SFFZ	MUTED
BAR	7	BEAT	3	+	2	FLUTE	REST	8VE2	EIGHTH	MP		SULTASTO
BAR	7	BEAT	3	+	3	VIOLA	C	8VE3	QUARTER+			
BAR	7	BEAT	3	+	4	VIOLA	G+	8VE3	QUARTER+	FT	ARCO	NORMAL
PAR	7	BEAT	3	+	6	BASSOON	C+	8VE2	EIGHTH	FF	SFFZ	SULTASTO
BAR	7	BEAT	4	+	2	VIOLIN	D+	8VE4	HALF	MP	NORMAL	MUTED
						BASSOON	B	8VE3	EIGHTH		PIZZ	GLISS
BAR	7	BEAT	4	+	6	FLUTE	A	8VE5	WHOLE	MP	NORMAL	FLUTTERIGE
BAR	7	BEAT	4	+	7	FLUTE	A	8VE5	16TH		SLUR	
PAR	7	BEAT	4	+	8	VIOLA	G	8VE3	HALF	MF	ARCO	SULTASTO
BAR	8	BEAT	1	+	2	BASSOON	REST	8VE2	EIGHTH			
BAR	8	BEAT	1	+	6	BASSOON	D			MP	NORMAL	GLISS

*****	POSITION	INSTR. NAME	PITCH	RANGE	DURATION	DYNAMICS	ATTACK	TIMBRE	SPEC 1	SPEC 2	SPEC 3	SPEC 4
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
BAR	8 BEAT 2 + 2	BASSOON	REST	8VE4	EIGHTH	-	PIZZ					
		VIOLIN	F	8VE4	QUARTER							
BAR	8 BEAT 2 + 6	VIOLIN	F+	8VE4	QUARTER	MP	SFFZ	MUTED				
BAR	8 BEAT 2 + 8	BASSOON	C+	8VE2	EIGHTH							
BAR	8 BEAT 4 + 8	VIOLA	REST		HALF							
BAR	8 BEAT 3 + 2	VIOLA	REST		32ND							
		BASSOON	C	8VE2	EIGHTH	-	NORMAL	SULTASTO				
		VIOLIN	F+	8VE4	QUARTER		PIZZ	MUTED				
BAR	8 BEAT 3 + 6	VIOLIN	F+	8VE4	QUARTER	MP	SFFZ					
PAR	8 BEAT 4 + 2	BASSOON	E	8VE2	EIGHTH	FF						
		BASSOON	D	8VE2	EIGHTH	-	NORMAL	SULTASTO				
		VIOLIN	D+	8VE4	EIGHTH+		SLUR	MUTED				
BAR	8 BEAT 4 + 8	VIOLIN	D+	8VE4	32ND							
BAR	8 BEAT 4 + 2	VIOLIN	A	8VE5	EIGHTH+							
BAR	8 BEAT 4 + 8	VIOLIN	A	8VE5	32ND							
BAR	8 BEAT 4 + 6	VIOLIN	D+	8VE2	16TH+							
BAR	9 BEAT 1 + 1	FLUTE	G+	8VE6	16TH							
		VIOLA	A	8VE4	QUARTER							
		BASSOON	C	8VE5	4HOLE							
		VIOLIN	REST		HALF							
BAR	9 BEAT 1 + 3	FLUTE	F+	8VE4	16TH	MP	NORMAL	FLUTTERIGE				
BAR	9 BEAT 1 + 5	FLUTE	C+	8VE5	16TH		SFFZ	SULPONT				
BAR	9 BEAT 1 + 7	FLUTE	REST		16TH		PIZZ	FLUTTERIGE				
BAR	9 BEAT 2 + 1	FLUTE	C+	8VE5	16TH		SLUR					
		VIOLA	F+	8VE5	HALF+		ARCO	SULTASTO				
		VIOLA	F+	8VE3	HALF+			SULTASTO				
BAR	9 BEAT 2 + 3	FLUTE	F+	8VE4	16TH		SFFZ	FLUTTERIGE				
BAR	9 BEAT 2 + 5	FLUTE	F+	8VE4	16TH							
BAR	9 BEAT 2 + 7	FLUTE	E	8VE4	16TH		SLUR					
BAR	9 BEAT 3 + 1	FLUTE	A	8VE5	16TH							
BAR	9 BEAT 3 + 3	FLUTE	REST		16TH							
		VIOLIN	D+	8VE6	16TH		COLLEG	SULTASTO				
		FLUTE	C+	8VE5	16TH		SFFZ	FLUTTERIGE				
BAR	9 BEAT 3 + 5	VIOLIN	D+	8VE4	HALF		NORMAL	SULTASTO				
BAR	9 BEAT 3 + 7	FLUTE	REST		16TH		SFFZ	FLUTTERIGE				
BAR	9 BEAT 4 + 1	FLUTE	A	8VE5	16TH							
BAR	9 BEAT 4 + 3	FLUTE	A	8VE6	16TH							
BAR	9 BEAT 4 + 5	FLUTE	REST		16TH							
BAR	9 BEAT 4 + 7	FLUTE	G	8VE6	16TH							
PAR	9 BEAT 4 + 9	FLUTE	G	8VE5	16TH							
BAR	10 BEAT 1 + 1	FLUTE	A	8VE6	16TH							
		VIOLA	REST		16TH							
		BASSOON	G+	8VE5	HALF+							
BAR	10 BEAT 1 + 3	FLUTE	G	8VE4	16TH		ARCO	SULTASTO				
		VIOLA	A	8VE5	WHOLE+							
		VIOLA	D+	8VE5	WHOLE+							
		VIOLA	F+	8VE5	EIGHTH		COLLEG	SULTASTO				
BAR	10 BEAT 1 + 5	FLUTE	C	8VE6	16TH		SFFZ	FLUTTERIGE				
BAR	10 BEAT 1 + 7	FLUTE	E	8VE4	16TH		SFFZ					
		VIOLIN	G	8VE6	16TH		PIZZ	MUTED				
		VIOLIN	F+	8VE4	EIGHTH							
BAR	10 BEAT 2 + 1	FLUTE	C	8VE5	16TH		SLUR	FLUTTERIGE				
BAR	10 BEAT 2 + 3	FLUTE	B	8VE5	16TH		SFFZ					
		VIOLIN	F+	8VE4	16TH		PIZZ	SULTASTO				
		VIOLIN	C+	8VE4	16TH			SULTASTO				
BAR	10 BEAT 2 + 5	FLUTE	D	8VE6	16TH		SFFZ	FLUTTERIGE				
BAR	10 BEAT 2 + 7	FLUTE	B-	8VE5	WHOLE		PIZZ	SULTASTO				
		VIOLIN	E	8VE4	16TH		NORMAL	FLUTTERIGE				
BAR	10 BEAT 3 + 1	FLUTE	G	8VE5	16TH		SFFZ					

***** POSITION ***** INSTR. NAME ***** PITCH ***** RANGE ***** DURATION ***** DYNAMICS ***** ATTACK ***** TIMBRE ***** SPEC 1 ***** SPEC 2 ***** SPEC 3 ***** SPEC 4 *****

* M.M. - QUARTER = 60 *

BAR	13 BEAT	1 + 1	FLUTE	REST	8VE2	16TH	SFFZ	SULTASTO	DIMIN
			CELO	D	8VE4	EIGHTH	SLUR	MUTED	-
			VIOLIN	D	8VE4	HALF			-
			VIOLIN	D+	8VE4	HALF			-
			VIOLA2	B-	8VE4	WHOLE			-
BAR	13 BEAT	1 + 3	FLUTE	F+	8VE4	16TH	ARCO	SULPONT	-
BAR	13 BEAT	1 + 5	FLUTE	E	8VE4	16TH	SFFZ	FLUTTERIGE	-
			CELO	D+	8VE3	WHOLE+	COLLEG	GLISS	-
			FLUTE	F+	8VE4	16TH	SFZ	FLUTTERIGE	-
BAR	13 BEAT	1 + 7	FLUTE	REST		16TH			-
BAR	13 BEAT	2 + 1	FLUTE	REST		16TH			-
BAR	13 BEAT	2 + 3	FLUTE	F+	8VE4	16TH			-
BAR	13 BEAT	2 + 5	FLUTE	E	8VE4	16TH			-
BAR	13 BEAT	2 + 7	FLUTE	F+	8VE4	16TH			-
BAR	13 BEAT	3 + 1	FLUTE	F+	8VE4	16TH			-
			VIOLIN	C	8VE4	QUARTER	PIZZ	MUTED	-
BAR	13 BEAT	3 + 3	FLUTE	F+	8VE4	16TH	SFZ	FLUTTERIGE	-
BAR	13 BEAT	3 + 5	FLUTE	F	8VE4	16TH			-
BAR	13 BEAT	3 + 7	FLUTE	F+	8VE4	16TH	SFFZ		-
BAR	13 BEAT	4 + 1	FLUTE	REST		16TH			-
			VIOLIN	REST		WHOLE			-
BAR	13 BEAT	4 + 3	FLUTE	REST		16TH			-
BAR	13 BEAT	4 + 5	FLUTE	F	8VE4	16TH			-
BAR	13 BEAT	4 + 7	FLUTE	F+	8VE4	16TH			-
BAR	13 BEAT	1 + 1	FLUTE	REST		16TH			-
BAR	14 BEAT	1 + 1	VIOLA2	D	8VE3	QUARTER	ARCO	SULPONT	-
			FLUTE	E	8VE4	16TH	SFZ	FLUTTERIGE	-
BAR	14 BEAT	1 + 3	FLUTE	REST		16TH			-
BAR	14 BEAT	1 + 5	FLUTE	E	8VE4	16TH	SFFZ		-
BAR	14 BEAT	1 + 7	FLUTE	F+	8VE4	16TH			-
BAR	14 BEAT	2 + 1	FLUTE	REST		16TH	SLUR		-
			VIOLA2	REST	8VE4	HALF			-
BAR	14 BEAT	2 + 3	FLUTE	F+	8VE4	16TH			-
BAR	14 BEAT	2 + 5	FLUTE	F+	8VE4	16TH			-
BAR	14 BEAT	2 + 7	FLUTE	REST		16TH			-
BAR	14 BEAT	3 + 1	FLUTE	REST		16TH			-
BAR	14 BEAT	3 + 3	FLUTE	REST		16TH			-
BAR	14 BEAT	3 + 5	FLUTE	REST		16TH			-
BAR	14 BEAT	3 + 7	CELO	REST		HALF			-
BAR	14 BEAT	3 + 1	FLUTE	REST	8VE4	16TH	SFZ		-
BAR	14 BEAT	4 + 1	FLUTE	E		16TH			-
			VIOLIN	REST		EIGHTH			-
			VIOLA2	REST		WHOLE			-
BAR	15 BEAT	4 + 1	VIOLA2	REST	8VE4	QUARTER			-
BAR	14 BEAT	4 + 3	FLUTE	E		16TH			-
BAR	14 BEAT	4 + 5	FLUTE	REST	8VE4	16TH			-
			VIOLIN	C+	8VE4	QUARTER		MUTED	-
BAR	14 BEAT	4 + 7	FLUTE	REST		16TH			-
BAR	15 BEAT	1 + 1	FLUTE	REST		16TH			-
BAR	15 BEAT	1 + 3	FLUTE	REST		16TH			-
BAR	15 BEAT	1 + 5	FLUTE	REST		16TH			-
			CELO	REST	8VE4	HALF	SLUR	FLUTTERIGE	-
			VIOLIN	C	8VE4	16TH	NORMAL	SULPONT	-
BAR	15 BEAT	1 + 7	FLUTE	E		16TH	SLUR		-
			CELO	R-	8VE4	HALF			-
BAR	15 BEAT	2 + 1	FLUTE	REST	8VE4	16TH			-
BAR	15 BEAT	2 + 3	FLUTE	REST		16TH			-

PP

MP

BAR	15	BEAT	2 +	5	FLUTE	F	8VE4	16TH	FF	SFZ	FLUTTERTGE
BAR	15	BEAT	2 +	7	FLUTE	E	8VE4	16TH	MF		
BAR	15	BEAT	3 +	1	FLUTE	F+	8VE4	16TH	MP		
BAR	15	BEAT	3 +	3	FLUTE	E	8VE4	16TH	FF		
BAR	15	BEAT	3 +	5	FLUTE	REST		16TH			
					VIOLIN	G+	8VE3	QUARTER+	MP	PIZZ	MUTED
					VIOLIN	B-	8VE4	QUARTER+			
BAR	15	BEAT	3 +	7	FLUTE	F	8VE4	16TH		SLUR	FLUTTERTGE
					CELLO	G+	8VE3	QUARTER		NORMAL	SULPONT
BAR	15	BEAT	4 +	7	CELLO	G+	8VE3	16TH		SLUR	FLUTTERTGE
BAR	15	BEAT	4 +	1	FLUTE	E	8VE4	16TH			
BAR	15	BEAT	4 +	3	FLUTE	REST		16TH			
BAR	15	BEAT	4 +	5	FLUTE	REST		16TH			
BAR	15	BEAT	4 +	7	FLUTE	E	8VE4	16TH			
BAR	16	BEAT	1 +	1	FLUTE	F+	8VE4	HALF	PPP	NORMAL	
					CELLO	REST		EIGHTH			
					VIOLIN	B	8VE4	EIGHTH		PIZZ	MUTED
					VIOLIN	A	8VE4	EIGHTH			
					VIOLA2	F	8VE3	WHOLE			SULPONT
BAP	15	BEAT	1 +	5	CELLO	REST		32ND			MUTED
					VIOLIN	F	8VE4	EIGHTH			
					VIOLIN	E	8VE4	EIGHTH			
BAR	16	BEAT	1 +	6	CELLO	REST		HALF+			
BAR	16	BEAT	4 +	6	CELLO	REST		16TH+			
BAR	16	BEAT	2 +	1	VIOLIN	REST		16TH			
BAR	16	BEAT	2 +	3	VIOLIN	REST		EIGHTH			
BAR	16	BEAT	2 +	7	VIOLIN	B	8VE4	HALF		SLUR	
BAR	16	BEAT	4 +	7	VIOLIN	B	8VE4	16TH			
BAR	16	BEAT	3 +	1	FLUTE	REST		EIGHTH+			
BAR	16	BEAT	3 +	7	FLUTE	REST		EIGHTH+		NORMAL	FLUTTERTGE
BAR	16	BEAT	4 +	5	FLUTE	E	8VE4	EIGHTH		SFZ	
BAR	17	BEAT	1 +	1	FLUTE	F+	8VE4	HALF+			
					CELLO	REST		HALF			
					VIOLIN	REST		WHOLE		NORMAL	SULPONT
					VIOLA2	C	8VE3	16TH		SLUR	FLUTTERTGE
PAR	17	BEAT	1 +	3	FLUTE	F+	8VE4	16TH		FP	
BAR	17	BEAT	1 +	5	FLUTE	E	8VE4	16TH		STACC	
BAR	17	BEAT	1 +	7	FLUTE	E	8VE4	16TH		FRILL	
BAR	17	BEAT	2 +	1	FLUTE	F+	8VE4	16TH			
BAR	17	BEAT	2 +	3	FLUTE	F+	8VE4	16TH		SLUR	
BAR	17	BEAT	2 +	5	FLUTE	F+	8VE4	16TH		STACC	
BAR	17	BEAT	2 +	7	FLUTE	F+	8VE4	16TH			
BAR	17	BEAT	3 +	1	FLUTE	F+	8VE4	16TH			
					VIOLIN	REST		16TH			
					VIOLIN	REST		16TH			
BAR	17	BEAT	3 +	3	VIOLIN	REST		HALF		TRILL	
BAR	17	BEAT	3 +	5	FLUTE	E	8VE4	16TH			
BAR	17	BEAT	3 +	7	FLUTE	REST		16TH		LEGATO	
BAR	17	BEAT	4 +	1	FLUTE	F+	8VE4	16TH			
					CELLO	REST		WHOLE+		SFZ	
BAR	17	BEAT	4 +	3	FLUTE	F	8VE4	16TH			
BAR	17	BEAT	4 +	5	FLUTE	E	8VE4	16TH		SLUR	
BAR	17	BEAT	4 +	7	FLUTE	E	8VE4	16TH			
BAR	18	BEAT	1 +	1	FLUTE	F	8VE4	16TH		STACC	SULPONT
					VIOLA2	F	8VE3	QUARTER+			
BAR	18	BEAT	1 +	3	FLUTE	REST		16TH			
					VIOLIN	REST		WHOLE		SLUR	FLUTTERTGE
BAR	18	BEAT	1 +	5	FLUTE	F+	8VE4	16TH			
BAR	18	BEAT	1 +	7	FLUTE	REST		16TH			
BAR	18	BEAT	2 +	1	FLUTE	REST		16TH			
BAR	18	BEAT	2 +	3	FLUTE	F	8VE4	16TH			

*****	POSITION	*****	INSTR. NAME	PITCH	RANGE	DURATION	DYNAMICS	ATTACK	TIMBRE	SPEC 1	SPEC 2	SPEC 3	SPEC 4
BAR	18 BEAT 2 + 5		FLUTE	E	8VE4	16TH		LEGATO					
			VIOLA2	REST		EIGHTH+							
BAR	18 BEAT 2 + 7		FLUTE	REST		16TH							
BAR	18 BEAT 3 + 1		FLUTE	REST		16TH							
BAR	18 BEAT 3 + 3		FLUTE	E	8VE4	16TH		STACC					
			VIOLA2	F	8VE3	16TH		SFZ	SULPONT				
BAR	18 BEAT 3 + 5		FLUTE	REST		16TH+							
			VIOLA2	REST		16TH+							
BAR	18 BEAT 3 + 7		FLUTE	REST		16TH							
BAR	18 BEAT 3 + 8		VIOLA2	REST		16TH							
BAR	18 BEAT 4 + 1		FLUTE	F+		16TH							
BAR	18 BEAT 4 + 2		VIOLA2	REST		WHOLE							
BAR	19 BEAT 4 + 2		VIOLA2	REST		EIGHTH+							
BAR	19 BEAT 4 + 4		VIOLA2	REST		32ND							
BAR	18 BEAT 4 + 3		FLUTE	REST		16TH							
BAR	18 BEAT 4 + 5		FLUTE	E	8VE4	16TH		NORMAL					
BAR	18 BEAT 4 + 7		FLUTE	REST		16TH							
BAR	19 BEAT 1 + 1		FLUTE	F+		16TH		SFFZ					
BAR	19 BEAT 1 + 3		FLUTE	E	8VE4	16TH							
			VIOLIN	G+	8VE3	EIGHTH		SLUR	MUTED				
BAR	19 BEAT 1 + 5		FLUTE	REST		16TH							
PAR	19 BEAT 1 + 7		FLUTE	F+	8VE4	16TH		FP	FLUTTERIGE				
			VIOLIN	E	8VE4	EIGHTH		TRILL	MUTED				
			VIOLIN	B-	8VE4	EIGHTH							
BAR	19 BEAT 2 + 1		FLUTE	REST		16TH							
			CELLO	REST		EIGHTH							
BAR	19 BEAT 2 + 3		FLUTE	F	8VE4	16TH							
			VIOLIN	REST		HALF							
BAR	19 BEAT 2 + 5		FLUTE	E	8VE4	16TH							
			CELLO	REST		16TH							
BAR	19 BEAT 2 + 7		FLUTE	REST		16TH							
			CELLO	REST		HALF							
PAR	19 BEAT 4 + 7		CELLO	REST		16TH							
BAR	19 BEAT 3 + 1		FLUTE	E	8VE4	16TH							
BAR	19 BEAT 3 + 3		FLUTE	E	8VE4	16TH							
PAR	19 BEAT 3 + 5		FLUTE	F	8VE4	16TH							
BAR	19 BEAT 3 + 7		FLUTE	F+		16TH		STACC					
BAR	19 BEAT 4 + 1		FLUTE	REST		16TH							
BAR	19 BEAT 4 + 3		FLUTE	F+	8VE4	16TH		SLUR					
			VIOLIN	REST		EIGHTH+							
BAR	19 BEAT 4 + 5		FLUTE	E	8VE4	16TH							
BAR	19 BEAT 4 + 7		FLUTE	E	8VE4	16TH		SFZ					

000000 START HOMAGE TO G.K. ZIPF P. GENA
000000 ORDERS(PP PPP)(SLUR) (SULPONT NORMAL MUTED)
000003 {G A- A B- B C) (8VE7 8VE6 8VE2 8VE3) (WHOLE+ WHOLE HALF+ HALF)
CONTINUUM BEGINNING, SOFT, SUSTAINED. START WITH 6 INSTRUMENTS
TIME=1.00 FLUTE(1)=6G-7C CLARINET(1)=6A-6G+ BASSOON(1)=2B--3G+
VIOLIN(2) =6G-7E CELLO(2)=2C-3A- CONTRABASS(2)=2E-3A-
PLAY *100 B- *1
QUARTER=30 TIMSIG=5/2 NTRANGE=WHOLE-16TH FRQRANGE=2B-7C ,-----
FLUTE=HALF+*3 =NORMAL+*1=8VE7*2 CLARINET=WHOLE+*4 =NORMAL+*1=8VE6*1
BASSOON=WHOLE+*3 =NORMAL+*1=8VE3*2
VIOLIN=HALF+*4 .1*2 =SULPONT*1=8VE7*2 CELLO=HALF+*3 .1*2 =SULPONT*1
CONTRABASS=HALF *4 .1 *2 =SULPONT *1=8VE3*2 CELLO= 8VE3*2
* COMMENT-----ONE SHORT LOUD UNISON D, ADD 2 MORE INSTRUMENTS
TIME =4.00 ORDERS (FF)(SFFZ)(NORMAL)(D)(8VE4)(QUARTER)
RANDOM *6 VIOLA(2) .1 *1=3C - 6D
VIBRAPHONE(2) .1*1=3C -7C VIOLIN.1*1 CELLO.1*1
VIOLIN=3G-7E VIOLA=3G-6G- FLUTE=4C-7C CLARINET=3G-6G BASSOON=2C-4F
CELLO=2C-4A- CONTRABASS=2E-4E .1 *1
* COMMENT-----MORE CONTINUUM, MIDDLE RANGE
TIME =4.8 ORDERS(PPP PP P MP) (SULPONT GLISS NORMAL)
(A B- B C C* D E- E F G- G A-) (WHOLE+ WHOLE HALF+ HALF)
(SLUR LEGATO NORMAL) RANDOM* 8
SULPONT *1 PP *1 D *1 FRQRANGE=4A - 5A ,-----
* C-----EIGHTH = HALF, ACCEL. TO 120, CRESC. TO FF
TIME=7.00 ORDERS(D- D E- E F F+) (EIGHTH) (SLUR)
(TREMOLO NORMAL FLUTTERGE) (FF) (8VE5 8VE4 8VE3)
CRESC=FF .232 ACCEL=120 .232 E*1 NORMAL *1 EIGHTH=30
FLUTE = FLUTTERGE *2 FRQRANGE=3A - 5G+ DYNRANGE=FF-MF ,-----
* C-----SIX BARS OF ZERO ORDER PITCH, ATTACK, TIMBRE,
DYNAMICS. QUARTER = EIGHTH
TIME=10.00 ORDERS(HALF+ HALF QUARTER+ QUARTER EIGHTH+ EIGHTH)
(SULPONT TREMOLO NORMAL FLUTTERGE)
(8VE6 8VE2) (PP P MP MF FT FF) TIMSIG =4/2 HALF = 60
RONGEN(D+ 12) FRQRANGE = 2C - 7E ,-----
PESI*100 FLUTE=RANDOM =8VE6 *1=PLAY*75 DYNRANGE=PP-FF
BASSOON = RANDOM =8VE2*1=PLAY*65 NTRANGE=HALF+ - EIGHTH
CONTRABASS = RANDOM =8VE2 *1=PLAY * 100 = HALF+ *2
* C-----TWO PIZZ NOTES EXTREME REGISTERS
TIME=17.00 RANDOM* 8 ORDERS(NORMAL) (PIZZ) (8VE7 8VE2)
VIOLIN =PLAY*100 =D*1=8VE7*1=HALF*1
CONTRABASS =PLAY*100 =E *1=8VE2*1=HALF*1=FF*1
* TIME =17.32 ORDERS(WHOLE+) VIOLIN=RANDOM CONTRABASS=RANDOM REST*100
NTRANGE = WHOLE+ - 16TH ,-----
* C-----AS IN BAR 4 BUT TREMOLO FOR 2 WHOLE NOTES
TIME=18.00 ORDERS(FFF)(SFFZ)(TREMOLO)(D)(8VE4)(WHOLE) RANDOM*8 PLAY*100
* C-----SOFT, HIGH QUICK NOTES
TIME=19.00 ORDERSIG G+ A+ B C) (8VE7 8VE6 8VE2 8VE3) (PP)
(SULPONT GLISS NORMAL) (COLLEG STACC) (EIGHTH+ QUARTER EIGHTH)

000251 8VE3*1 B- *1 VIOLIN=8VE7*2 =COLLEG.32 =SULPONT*3 EIGHTH*1
000257 VIOLA= 8VE6*1 =SULPONT*3 =COLLEG.32 FLUTE=8VE7*2
000263 VIBRAPHONE =8VE6*1 =NORMALT*2 CELLO= SULPONT*3 =COLLEG.32
000267 CONTRABASS = RANDOM =COLLEG.32 =NORMALT*1 =SULPONT*3
*
000273 C-----AS BEFORE
TIME=19.32 ORDERS(FFF)(SFFZ)(TREMOLLO)(D- D E-)(8VE4)(WHOLE)(RANDOM*8 D*1
*
000304 C-----AS IN MEASURE 19
TIME= 21.00 ORDERS(G A- A+ B C) (8VE7 8VE6 8VE2 8VE3) (PP)
000312 (GLISS NORMALT) (STACC) (EIGHTH+ QUARTER EIGHTH) SHUFFLE(G 6)
000316 SHUFFLE(EIGHTH 3) NORMALT*1 FLUTE=8VE7*2 CLARINET =8VE6*1
000322 BASSOON =8VE3 *2 VIBRAPHONE =8VE6*1
*
000324 C-----AS IN 19.32
000334 TIME=22.00 ORDERS(FFF)(SFFZ)(TREMOLLO)(B C C+ D E- E F)(8VE4)(WHOLE)
RANDOM *8
D *1
*
000336 C-----VIOLIN RESTS AND PLACES ON MUTE
TIME=25.00 VIOLIN = REST *100
*
000340 C-----SOLO VIOLIN WITH MUTE
TIME=26.00 ORDERS(F+ G A- A B-) (MUTED) (SLUR NORMAL LEGATO PIZZ)
000346 (8VE7 8VE6 8VE5 8VE3 8VE2 8VE1) (PPP PP P MP) (MUTED)
000353 REST * 100 TIMSIG= 5/2 QUARTER = 30
000356 VIOLIN =B- *1 =8VE7*1 =PLAY*100 =PPP*1 = SLUR * 1
*
000363 C-----MUTED VIOLA AND CELLO JOIN IN
TIME= 27.16 ORDERS(WHOLE HALF+ HALF QUARTER) VIOLIN=WHOLE*1 HALF*1
000370 VIOLA =F+ *5 =8VE6 *1 = PLAY * 100 = PP * 2 = SLUR *4
000375 CELLO =A *1 =8VE3 *1 = PLAY * 100 =PP *3 = SLUR * 4
*
000402 C-----CELLO AND VIOLA REST, CONTRABASS ENTERS
TIME=29.00 ORDERS(E G F A- F+ A B-) CELLO = REST*100 VIOLA=PLAY*0
000407 CONTRABASS = WHOLE *1 =8VE2 *1 =E *1 =SLUR *1 =PLAY * 100 = PPP *1
*
000415 C-----VIOLIN RESTS, FLUTE AND BASSOON ENTER
TIME=30.00 ORDERS(SLUR NORMAL STACC LEGATO) VIOLIN=REST *100
000421 FLUTE = PLAY *100 =8VE6 *1 = NORMAL *3
000424 BASSOON =PLAY *100 = 8VE2 *1 = NORMAL *3
*
000427 C-----G.P. FOR ONE BEAT (4 SECS.)
TIME=31.64 RANDOM *8 ORDERS(HALF)
*
000432 C-----TUTTI, ALL ZERO-ORDER, LOUDLY
TIME=32.00 ORDERS(8VE6 8VE5 8VE4 8VE3) (FT FF FFF) ROWGEN(CARCO 11)
000437 ROWGEN(E- 12) (WHOLE+ WHOLE HALF+ HALF QUARTER+ QUARTER 16TH EIGHTH)
000442 SHUFFLE(WHOLE 8) (SULPONT TREMOLO GLISS FLUTTERTGE NORMALT)
000445 PLAY * 70 QUARTER = 60 TIMSIG= 6/4 SHUFFLE(GLISS 5)
*
000451 C-----CONTINUE, BUT DIMIN AND RITARD
TIME=38.00 ORDERS(G A- A B- B C) (TREMOLLO NORMAL FLUTTERTGE)
000455 (EIGHTH) (SLUR) (PP)
000460 EIGHTH= 120 RITARD=30 * 232 DIMIN=PP.232 PLAY*100
*
000464 C-----REDUCE RANGE AND ORDER PITCHES
TIME=40.00 ORDERS(8VE5 8VE4 8VE3) B- *1
*
000467 C-----NARROWING OF PITCH SELECTION
TIME=42.00 ORDERS(A- A B- B) B- *1
*

HOM 059
HOM 060
HOM 061
HOM 062
HOM 063
HOM 064
HOM 065
HOM 066
HOM 067
HOM 068
HOM 069
HOM 070
HOM 071
HOM 072
HOM 073
HOM 074
HOM 075
HOM 076
HOM 077
HOM 078
HOM 079
HOM 080
HOM 081
HOM 082
HOM 083
HOM 084
HOM 085
HOM 086
HOM 087
HOM 088
HOM 089
HOM 090
HOM 091
HOM 092
HOM 093
HOM 094
HOM 095
HOM 096
HOM 097
HOM 098
HOM 099
HOM 100
HOM 101
HOM 102
HOM 103
HOM 104
HOM 105
HOM 106
HOM 107
HOM 108
HOM 109
HOM 110
HOM 111
HOM 112
HOM 113
HOM 114
HOM 115
HOM 116
HOM 117
HOM 118
HOM 119

000473 C-----CELLO AND BASSOON ONLY, 8VE2
000500 TIME=43.00 ORDERS(8VE5 8VE3 8VE2 8VE7) (SLUR) (HOLE+ WHOLE HALF)
000505 (SULPONT NORMAL TREMOLO GLISS) (E F E- D F G C C) RANDOM*8
000513 WHOLE+*1 TIMING=6/2 QUARTER=30 REST*100 CELLO=PLAY*100 =8VE2*1
000522 CELLO .1*2 =E*8 =SULPONT*4 BASSOON =PLAY*100 =8VE2*1 =F*5 =NORMALT*3
000537 *
000544 C-----ADD 3 INSTRUMENTS 8VE5 AND 8VE3
000552 TIME=44.32 WHOLE+*1 VIOLA =8VE5*1 =C*8 =SULPONT*4 =PLAY*100 .1*2
000563 CLARINET =8VE3*1 =G*6 =NORMALT*3 =PLAY*100 VIBRAPHONE =REST*0 =8VE5*2
000570 VIBRAPHONE =E- * 5 .2 *1 = NORMALT * 3 CLARINET=3E-6G FLUTE=4C-7D
000577 *
000604 C-----ADD FLUTE 8VE7
000607 TIME=45.48 WHOLE+*1 FLUTE =PLAY*100=8VE7*1=D*1=NORMALT*1
000615 *
000623 C-----8VE3 AND 8VE5 REST, 8VE2 AND 8VE7 SOLO
000632 TIME=45.64 WHOLE*1 VIBRAPHONE=REST*100 CLARINET=PLAY*0 VIOLA=P_A*0
000637 *
000644 C-----CELLO AND BASSOON REST, FLUTE SOLO (8VE7)
000651 TIME=46.00 WHOLE+*1 CELLO=REST*100 BASSOON = REST*100
000656 *
000663 C-----VIOLIN AND BASS ENTER AT 8VE6 AND 8VE1
000670 TIME=47.16 WHOLE+*1 ORDERS(C+ D C B E- E B- A F G- A- A)
000677 (8VE7 8VE6 8VE4 8VE1) VIOLIN=8VE6*1=C*3=SULPONT*1=PLAY*100 .1 * 1
000684 CONTRABASS = 8VE1 * 1 = F * 1 = SULPONT * 1 = PLAY * 100 . 1 * 1
000691 *
000700 C-----FLUTE (8VE7) RESTS
000707 TIME=47.48 WHOLE+*1 FLUTE = REST * 100
000714 *
000722 C-----ALL INSTRUMENTS EXCEPT VIOLIN AND BASS ENTER (8VE4)
000729 TIME=48.32 ORDERS(MUTED SULPONT) (PP PPP) C+ *1 PPP *1 PLAY*100
000736 RANDOM*8 VIOLIN=PP*1 CONTRABASS=PP*1 CELLO=PPP*1=8VE4*1 .1*1
000743 FLUTE=MUTED*1 CLARINET=MUTED*1 BASSOON=MUTED*1 VIOLA=MUTED*1
000750 VIBRAPHONE=MUTED*1 = 8VE4 * 1 CELLO = MUTED *1
000757 *
000764 CONTRABASS = 8VE1 * 1 = F * 1 = SULPONT * 1 = PLAY * 100 . 1 * 1
000771 VIOLA .1*1=8VE4*1=PPP*1 CLARINET=8VE4*1=PPP*1 FLUTE=8VE4*1=PPP*1=4C-4G+
000778 BASSOON = 8VE4 * 1 = PP*1
000785 *
000792 C-----VIOLIN AND BASS (8VE6 AND 8VE1) REST, 8VE4 SOLO
000799 TIME=48.64 VIOLIN =REST * 100 CONTRABASS =REST*100 C+*1 PPP*1
000806 *
000813 C-----VIOLIN AND BASS ENTER 8VE4, REDUCED PITCH ORDERS
000820 TIME=49.00 ORDERS(C+ D C B E- E B- A) (8VE4) (PPP) (MUTED) RANDOM*8
000827 VIBRAPHONE .1*1 CELLO .1*1 VIOLA .1*1 CONTRABASS .1*1 VIOLIN .1*1 C+*1
000834 *
000841 C-----REDUCE PITCH ORDERS SIZE TO FOUR
000848 TIME=49.48 ORDERS(C+ D C B) C+ * 1
000855 *
000862 C-----TUTTI, SOLO 8VE4 C+ TO THE END OF THE PIECE
000869 TIME=49.80 ORDERS(C+)
000876 TIME=50.16
000883 END
000890 DURATION ABOUT TEN MINUTES
000897 *
000904 *
000911 *
000918 *
000925 *
000932 *
000939 *
000946 *
000953 *
000960 *
000967 *
000974 *
000981 *
000988 *
000995 *
001002 *
001009 *
001016 *
001023 *
001030 *
001037 *
001044 *
001051 *
001058 *
001065 *
001072 *
001079 *
001086 *
001093 *
001100 *
001107 *
001114 *
001121 *
001128 *
001135 *
001142 *
001149 *
001156 *
001163 *
001170 *
001177 *
001184 *
001191 *
001198 *
001205 *
001212 *
001219 *
001226 *
001233 *
001240 *
001247 *
001254 *
001261 *
001268 *
001275 *
001282 *
001289 *
001296 *
001303 *
001310 *
001317 *
001324 *
001331 *
001338 *
001345 *
001352 *
001359 *
001366 *
001373 *
001380 *
001387 *
001394 *
001401 *
001408 *
001415 *
001422 *
001429 *
001436 *
001443 *
001450 *
001457 *
001464 *
001471 *
001478 *
001485 *
001492 *
001499 *
001506 *
001513 *
001520 *
001527 *
001534 *
001541 *
001548 *
001555 *
001562 *
001569 *
001576 *
001583 *
001590 *
001597 *
001604 *
001611 *
001618 *
001625 *
001632 *
001639 *
001646 *
001653 *
001660 *
001667 *
001674 *
001681 *
001688 *
001695 *
001702 *
001709 *
001716 *
001723 *
001730 *
001737 *
001744 *
001751 *
001758 *
001765 *
001772 *
001779 *
001786 *
001793 *
001800 *
001807 *
001814 *
001821 *
001828 *
001835 *
001842 *
001849 *
001856 *
001863 *
001870 *
001877 *
001884 *
001891 *
001898 *
001905 *
001912 *
001919 *
001926 *
001933 *
001940 *
001947 *
001954 *
001961 *
001968 *
001975 *
001982 *
001989 *
001996 *
002003 *
002010 *
002017 *
002024 *
002031 *
002038 *
002045 *
002052 *
002059 *
002066 *
002073 *
002080 *
002087 *
002094 *
002101 *
002108 *
002115 *
002122 *
002129 *
002136 *
002143 *
002150 *
002157 *
002164 *
002171 *
002178 *
002185 *
002192 *
002199 *
002206 *
002213 *
002220 *
002227 *
002234 *
002241 *
002248 *
002255 *
002262 *
002269 *
002276 *
002283 *
002290 *
002297 *
002304 *
002311 *
002318 *
002325 *
002332 *
002339 *
002346 *
002353 *
002360 *
002367 *
002374 *
002381 *
002388 *
002395 *
002402 *
002409 *
002416 *
002423 *
002430 *
002437 *
002444 *
002451 *
002458 *
002465 *
002472 *
002479 *
002486 *
002493 *
002500 *
002507 *
002514 *
002521 *
002528 *
002535 *
002542 *
002549 *
002556 *
002563 *
002570 *
002577 *
002584 *
002591 *
002598 *
002605 *
002612 *
002619 *
002626 *
002633 *
002640 *
002647 *
002654 *
002661 *
002668 *
002675 *
002682 *
002689 *
002696 *
002703 *
002710 *
002717 *
002724 *
002731 *
002738 *
002745 *
002752 *
002759 *
002766 *
002773 *
002780 *
002787 *
002794 *
002801 *
002808 *
002815 *
002822 *
002829 *
002836 *
002843 *
002850 *
002857 *
002864 *
002871 *
002878 *
002885 *
002892 *
002899 *
002906 *
002913 *
002920 *
002927 *
002934 *
002941 *
002948 *
002955 *
002962 *
002969 *
002976 *
002983 *
002990 *
002997 *
003004 *
003011 *
003018 *
003025 *
003032 *
003039 *
003046 *
003053 *
003060 *
003067 *
003074 *
003081 *
003088 *
003095 *
003102 *
003109 *
003116 *
003123 *
003130 *
003137 *
003144 *
003151 *
003158 *
003165 *
003172 *
003179 *
003186 *
003193 *
003200 *
003207 *
003214 *
003221 *
003228 *
003235 *
003242 *
003249 *
003256 *
003263 *
003270 *
003277 *
003284 *
003291 *
003298 *
003305 *
003312 *
003319 *
003326 *
003333 *
003340 *
003347 *
003354 *
003361 *
003368 *
003375 *
003382 *
003389 *
003396 *
003403 *
003410 *
003417 *
003424 *
003431 *
003438 *
003445 *
003452 *
003459 *
003466 *
003473 *
003480 *
003487 *
003494 *
003501 *
003508 *
003515 *
003522 *
003529 *
003536 *
003543 *
003550 *
003557 *
003564 *
003571 *
003578 *
003585 *
003592 *
003599 *
003606 *
003613 *
003620 *
003627 *
003634 *
003641 *
003648 *
003655 *
003662 *
003669 *
003676 *
003683 *
003690 *
003697 *
003704 *
003711 *
003718 *
003725 *
003732 *
003739 *
003746 *
003753 *
003760 *
003767 *
003774 *
003781 *
003788 *
003795 *
003802 *
003809 *
003816 *
003823 *
003830 *
003837 *
003844 *
003851 *
003858 *
003865 *
003872 *
003879 *
003886 *
003893 *
003900 *
003907 *
003914 *
003921 *
003928 *
003935 *
003942 *
003949 *
003956 *
003963 *
003970 *
003977 *
003984 *
003991 *
003998 *
004005 *
004012 *
004019 *
004026 *
004033 *
004040 *
004047 *
004054 *
004061 *
004068 *
004075 *
004082 *
004089 *
004096 *
004103 *
004110 *
004117 *
004124 *
004131 *
004138 *
004145 *
004152 *
004159 *
004166 *
004173 *
004180 *
004187 *
004194 *
004201 *
004208 *
004215 *
004222 *
004229 *
004236 *
004243 *
004250 *
004257 *
004264 *
004271 *
004278 *
004285 *
004292 *
004299 *
004306 *
004313 *
004320 *
004327 *
004334 *
004341 *
004348 *
004355 *
004362 *
004369 *
004376 *
004383 *
004390 *
004397 *
004404 *
004411 *
004418 *
004425 *
004432 *
004439 *
004446 *
004453 *
004460 *
004467 *
004474 *
004481 *
004488 *
004495 *
004502 *
004509 *
004516 *
004523 *
004530 *
004537 *
004544 *
004551 *
004558 *
004565 *
004572 *
004579 *
004586 *
004593 *
004600 *
004607 *
004614 *
004621 *
004628 *
004635 *
004642 *
004649 *
004656 *
004663 *
004670 *
004677 *
004684 *
004691 *
004698 *
004705 *
004712 *
004719 *
004726 *
004733 *
004740 *
004747 *
004754 *
004761 *
004768 *
004775 *
004782 *
004789 *
004796 *
004803 *
004810 *
004817 *
004824 *
004831 *
004838 *
004845 *
004852 *
004859 *
004866 *
004873 *
004880 *
004887 *
004894 *
004901 *
004908 *
004915 *
004922 *
004929 *
004936 *
004943 *
004950 *
004957 *
004964 *
004971 *
004978 *
004985 *
004992 *
005000 *
005007 *
005014 *
005021 *
005028 *
005035 *
005042 *
005049 *
005056 *
005063 *
005070 *
005077 *
005084 *
005091 *
005098 *
005105 *
005112 *
005119 *
005126 *
005133 *
005140 *
005147 *
005154 *
005161 *
005168 *
005175 *
005182 *
005189 *
005196 *
005203 *
005210 *
005217 *
005224 *
005231 *
005238 *
005245 *
005252 *
005259 *
005266 *
005273 *
005280 *
005287 *
005294 *
005301 *
005308 *
005315 *
005322 *
005329 *
005336 *
005343 *
005350 *
005357 *
005364 *
005371 *
005378 *
005385 *
005392 *
005399 *
005406 *
005413 *
005420 *
005427 *
005434 *
005441 *
005448 *
005455 *
005462 *
005469 *
005476 *
005483 *
005490 *
005497 *
005504 *
005511 *
005518 *
005525 *
005532 *
005539 *
005546 *
005553 *
005560 *
005567 *
005574 *
005581 *
005588 *
005595 *
005602 *
005609 *
005616 *
005623 *
005630 *
005637 *
005644 *
005651 *
005658 *
005665 *
005672 *
005679 *
005686 *
005693 *
005700 *
005707 *
005714 *
005721 *
005728 *
005735 *
005742 *
005749 *
005756 *
005763 *
005770 *
005777 *
005784 *
005791 *
005798 *
005805 *
005812 *
005819 *
005826 *
005833 *
005840 *
005847 *
005854 *
005861 *
005868 *
005875 *
005882 *
005889 *
005896 *
005903 *
005910 *
005917 *
005924 *
005931 *
005938 *
005945 *
005952 *
005959 *
005966 *
005973 *
005980 *
005987 *
005994 *
006001 *
006008 *
006015 *
006022 *
006029 *
006036 *
006043 *
006050 *
006057 *
006064 *
006071 *
006078 *
006085 *
006092 *
006099 *
006106 *
006113 *
006120 *
006127 *
006134 *
006141 *
006148 *
006155 *
006162 *
006169 *
006176 *
006183 *
006190 *
006197 *
006204 *
006211 *
006218 *
006225 *
006232 *
006239 *
006246 *
006253 *
006260 *
006267 *
006274 *
006281 *
006288 *
006295 *
006302 *
006309 *
006316 *
006323 *
006330 *
006337 *
006344 *
006351 *
006358 *
006365 *
006372 *
006379 *
006386 *
006393 *
006400 *
006407 *
006414 *
006421 *
006428 *
006435 *
006442 *
006449 *
006456 *
006463 *
006470 *
006477 *
006484 *
006491 *
006498 *
006505 *
006512 *
006519 *
006526 *
006533 *
006540 *
006547 *
006554 *
006561 *
006568 *
006575 *
006582 *
006589 *
006596 *
006603 *
006610 *
006617 *
006624 *
006631 *
006638 *
006645 *
006652 *
006659 *
006666 *
006673 *
006680 *
006687 *
006694 *
006701 *
006708 *
006715 *
006722 *
006729 *
006736 *
006743 *
006750 *
006757 *
006764 *
006771 *
006778 *
006785 *
006792 *
006799 *
006806 *
006813 *
006820 *
006827 *
006834 *
006841 *
006848 *
006855 *
006862 *
006869 *
006876 *
006883 *
006890 *
006897 *
006904 *
006911 *
006918 *
006925 *
006932 *
006939 *
006946 *
006953 *
006960 *
006967 *
006974 *
006981 *
006988 *
006995 *
007002 *
007009 *
007016 *
007023 *
007030 *
007037 *
007044 *
007051 *
007058 *
007065 *
007072 *
007079 *
007086 *
007093 *
007100 *
007107 *
007114 *
007121 *
007128 *
007135 *
007142 *
007149 *
007156 *
007163 *
007170 *
007177 *
007184 *
007191 *
007198 *
007205 *
007212 *
007219 *
007226 *
007233 *
007240 *
007247 *
007254 *
007261 *
007268 *
007275 *
007282 *
007289 *
007296 *
007303 *
007310 *
007317 *
007324 *
007331 *
007338 *
007345 *
007352 *
007359 *
007366 *
007373 *
007380 *
007387 *
007394 *
007401 *
007408 *
007415 *
007422 *
007429 *
007436 *
007443 *
007450 *
007457 *
007464 *
007471 *
007478 *
007485 *
007492 *
007499 *
007506 *
007513 *
007520 *
007527 *
007534 *
007541 *
007548 *
007555 *
007562 *
007569 *
007576 *
007583 *
007590 *
007597 *
007604 *
007611 *
007618 *
007625 *
007632 *
007639 *
007646 *
007653 *
007660 *
007667 *
007674 *
007681 *
007688 *
007695 *
007702 *
007709 *
007716 *
007723 *

NUMBER OF CARDS
 171

NUMBER OF STATEMENTS
 455

ASSIGNED MNEMONICS

LOC DEF. MNEMONIC SYMBOL TAG REFERENCES

TOTAL COMPILATION TIME
 4.564 SECONDS

MUSICOL LOADER - SIMULATOR.....VERSION 1.....LOADER CALLED
 6.318

EXECUTION CONDITIONS

NO INITIAL GENERAL DYNAMICS RANGE SPECIFIED, FULL DYNAMICS RANGE ASSUMED

FLUTE RANDOM-CLEARED, LOCATION 000071
 CLARINET RANDOM-CLEARED, LOCATION 000071
 BASSOON RANDOM-CLEARED, LOCATION 000071
 VIOLIN RANDOM-CLEARED, LOCATION 000071
 CELLO RANDOM-CLEARED, LOCATION 000071
 CONTRABASS RANDOM-CLEARED, LOCATION 000071
 FLUTE RANDOM-CLEARED, LOCATION 000124
 CLARINET RANDOM-CLEARED, LOCATION 000124
 BASSOON RANDOM-CLEARED, LOCATION 000124
 VIOLIN RANDOM-CLEARED, LOCATION 000124
 CELLO RANDOM-CLEARED, LOCATION 000124
 CONTRABASS RANDOM-CLEARED, LOCATION 000124

PITCH RANK ORDERS CHANGED AS FOLLOWS		A+	G-	G	E	C
A	D	F	A-	C+		
E-	B					
VIOLA RANDOM-CLEARED, LOCATION	000124					
VIBRAPHONE RANDOM-CLEARED, LOCATION	000124					
RONGEN CALLED, LOCATION- 000163,						
FLUTE RANDOM-CLEARED, LOCATION	000166					
BASSOON RANDOM-CLEARED, LOCATION	000172					
CONTRABASS RANDOM-CLEARED, LOCATION	000176					
FLUTE RANDOM-CLEARED, LOCATION	000203					
CLARINET RANDOM-CLEARED, LOCATION	000203					
BASSOON RANDOM-CLEARED, LOCATION	000203					
VIOLIN RANDOM-CLEARED, LOCATION	000203					
CELLO RANDOM-CLEARED, LOCATION	000203					
CONTRABASS RANDOM-CLEARED, LOCATION	000203					
VIOLA RANDOM-CLEARED, LOCATION	000203					
VIBRAPHONE RANDOM-CLEARED, LOCATION	000203					
VIOLIN RANDOM-CLEARED, LOCATION	000223					
CONTRABASS RANDOM-CLEARED, LOCATION	000224					
FLUTE RANDOM-CLEARED, LOCATION	000236					
CLARINET RANDOM-CLEARED, LOCATION	000236					
BASSOON RANDOM-CLEARED, LOCATION	000236					
VIOLIN RANDOM-CLEARED, LOCATION	000236					
CELLO RANDOM-CLEARED, LOCATION	000236					
CONTRABASS RANDOM-CLEARED, LOCATION	000236					
VIOLA RANDOM-CLEARED, LOCATION	000236					
VIBRAPHONE RANDOM-CLEARED, LOCATION	000236					
CONTRABASS RANDOM-CLEARED, LOCATION	000267					
FLUTE RANDOM-CLEARED, LOCATION	000302					
CLARINET RANDOM-CLEARED, LOCATION	000302					
BASSOON RANDOM-CLEARED, LOCATION	000302					
VIOLIN RANDOM-CLEARED, LOCATION	000302					

CELLO RANDOM-CLEARED, LOCATION 000302
 CONTRABASS RANDOM-CLEARED, LOCATION 000302
 VIOLA RANDOM-CLEARED, LOCATION 000302
 VIBRAPHONE RANDOM-CLEARED, LOCATION 000302

SHUFFLE CALLED, LOCATION- 000315, PITCH RANK ORDERS CHANGED AS FOLLOWS
 B A+ C A A-

SHUFFLE CALLED, LOCATION- 000316, DURATION RANK ORDERS CHANGED AS FOLLOWS
 QUARTER EIGHTH EIGHTH

FLUTE RANDOM-CLEARED, LOCATION 000334
 CLARINET RANDOM-CLEARED, LOCATION 000334
 BASSOON RANDOM-CLEARED, LOCATION 000334
 VIOLIN RANDOM-CLEARED, LOCATION 000334
 CELLO RANDOM-CLEARED, LOCATION 000334
 CONTRABASS RANDOM-CLEARED, LOCATION 000334
 VIOLA RANDOM-CLEARED, LOCATION 000334
 VIBRAPHONE RANDOM-CLEARED, LOCATION 000334

FLUTE RANDOM-CLEARED, LOCATION 000430
 CLARINET RANDOM-CLEARED, LOCATION 000430
 BASSOON RANDOM-CLEARED, LOCATION 000430
 VIOLIN RANDOM-CLEARED, LOCATION 000430
 CELLO RANDOM-CLEARED, LOCATION 000430
 CONTRABASS RANDOM-CLEARED, LOCATION 000430
 VIOLA RANDOM-CLEARED, LOCATION 000430
 VIBRAPHONE RANDOM-CLEARED, LOCATION 000430

CELLO RANDOM-CLEARED, LOCATION 000430
 CONTRABASS RANDOM-CLEARED, LOCATION 000430
 VIOLA RANDOM-CLEARED, LOCATION 000430
 VIBRAPHONE RANDOM-CLEARED, LOCATION 000430
 RUMGEN CALLED, LOCATION- 000436, ATTACK RANK ORDERS CHANGED AS FOLLOWS
 SLUR SFZ SFFZ ARCO PIZZ STACC TRILL FP LEGATO
 COLLEG

POJGEN CALLED, LOCATION- 000437, PITCH RANK ORDERS CHANGED AS FOLLOWS
 C C+ A- D E- B G A+
 F

SHUFFLE CALLED, LOCATION- 000442, DURATION RANK ORDERS CHANGED AS FOLLOWS
 HALF+ HALF QUARTER EIGHTH WHOLE+ QUARTER+ 16TH WHOLE

SHUFFLE CALLED, LOCATION- 000450, TIMBRE RANK ORDERS CHANGED AS FOLLOWS
 TREMOLO SJLPONT GLISS FLUTTERIGE NORMAL

FLUTE RANDOM-CLEARED, LOCATION 000504

CLARINET RANDOM-CLEARED, LOCATION 000504
BASSOON RANDOM-CLEARED, LOCATION 000504
VIOLIN RANDOM-CLEARED, LOCATION 000504
CELLO RANDOM-CLEARED, LOCATION 000504
CONTRABASS RANDOM-CLEARED, LOCATION 000504
VIOLA RANDOM-CLEARED, LOCATION 000504
VIBRAPHONE RANDOM-CLEARED, LOCATION 000504
FLUTE RANDOM-CLEARED, LOCATION 000615
CLARINET RANDOM-CLEARED, LOCATION 000615
BASSOON RANDOM-CLEARED, LOCATION 000615
VIOLIN RANDOM-CLEARED, LOCATION 000615
CELLO RANDOM-CLEARED, LOCATION 000615
CONTRABASS RANDOM-CLEARED, LOCATION 000615
VIOLA RANDOM-CLEARED, LOCATION 000615
VIBRAPHONE RANDOM-CLEARED, LOCATION 000615
FLUTE RANDOM-CLEARED, LOCATION 000671
CLARINET RANDOM-CLEARED, LOCATION 000671
BASSOON RANDOM-CLEARED, LOCATION 000671
VIOLIN RANDOM-CLEARED, LOCATION 000671
CELLO RANDOM-CLEARED, LOCATION 000671
CONTRABASS RANDOM-CLEARED, LOCATION 000671
VIOLA RANDOM-CLEARED, LOCATION 000671
VIBRAPHONE RANDOM-CLEARED, LOCATION 000671

TOTAL EXECUTION TIME = 10.192 SECONDS

APPROXIMATE DURATION = 9 MINS. AND 50 SECS.

[illegible]

```
*****  
* TIME SIGNATURE = 5 / 2 *  
*****  
  
*****  
* M.M - QUARTER = 30 *  
*****
```

[illegible]

BAR	3 BEAT	1 +	9	CELLO	G	8VE2	HALF	PPP	NORMALT
BAR	3 BEAT	2 +	1	CONTRABASS	B-	8VE3	HALF	PP	SULPONT
				FLUTE	G+	8VE6	HALF+		
				VIOLIN	B-	8VE7	HALF+	PPP	
				CELLO	G+	8VE3	HALF+		
BAR	3 BEAT	2 +	9	CONTRABASS	A	8VE3	WHOLE		
				CONTRABASS	B	8VE3	WHOLE	PP	NORMALT
BAR	3 BEAT	3 +	9	FLUTE	B-	8VE7	HALF	PPP	SULPONT
				VIOLIN	B-	8VE7	HALF		
				CELLO	B-	8VE3	WHOLE		
BAR	3 BEAT	5 +	9	CELLO	B-	8VE3	QUARTER		
BAR	3 BEAT	3 +	9	CELLO	G	8VE2	WHOLE		
BAR	3 BEAT	5 +	9	CELLO	G	8VE2	WHOLE		NORMALT
BAR	3 BEAT	4 +	1	CLARINET	B-	8VE6	WHOLE		
				BASSOON	G	8VE3	WHOLE	PP	
BAR	3 BEAT	4 +	9	FLUTE	A	8VE7	HALF+	PPP	SULPONT
				VIOLIN	B	8VE7	HALF		
				VIOLIN	B	8VE7	HALF		
				CONTRABASS	B-	8VE3	HALF		
				CONTRABASS	B-	8VE3	HALF		
BAR	3 BEAT	5 +	9	VIOLIN	G+	8VE6	QUARTER		
				VIOLIN	B-	8VE7	QUARTER	PP	
				CONTRABASS	B	8VE3	QUARTER		
				CONTRABASS	G	8VE3	QUARTER	FF	NORMALT
BAR	4 BEAT	1 +	1	FLUTE	D	8VE4	QUARTER		
				CLARINET	D	8VE4	QUARTER		
				BASSOON	D	8VE4	QUARTER		
				VIOLIN	D	8VE4	QUARTER		
				CELLO	D	8VE4	QUARTER		
				CONTRABASS	D	8VE4	QUARTER		
				VIOLA	D	8VE4	QUARTER		
BAR	4 BEAT	1 +	9	FLUTE	F	8VE4	HALF	MP	NORMAL
				CLARINET	C+	8VE4	WHOLE	PP	SLUR
				BASSOON	B-	8VE4	HALF	NORMAL	LEGATO
				VIOLIN	C	8VE4	HALF+	PPP	
				VIOLIN	C+	8VE4	HALF+		
				CELLO	D	8VE4	WHOLE	P	GLISS
				CONTRABASS	E	8VE4	HALF	PP	LEGATO
				VIOLA	C	8VE4	HALF	P	SLUR
BAR	4 BEAT	2 +	9	FLUTE	C+	8VE4	HALF	PP	NORMALT
				FLUTE	C+	8VE4	HALF		
				BASSOON	D	8VE4	HALF+	MP	GLISS
				CONTRABASS	D	8VE4	WHOLE+	PP	SULPONT
				VIOLA	C	8VE4	WHOLE	PP	NORMALT
				VIBRAPHONE	D	8VE4	WHOLE+	MP	GLISS
BAR	4 BEAT	3 +	1	VIOLIN	B-	8VE4	HALF+	PP	SLUR
BAR	4 BEAT	3 +	9	FLUTE	D+	8VE4	WHOLE+	PP	NORMALT
				CLARINET	D	8VE4	HALF+		
				CELLO	D	8VE4	WHOLE	P	GLISS
BAR	4 BEAT	4 +	1	BASSOON	F	8VE4	HALF+	PP	LEGATO
BAR	4 BEAT	4 +	9	VIOLIN	D	8VE4	HALF	PP	SLUR
				VIOLA	E	8VE4	HALF	MP	GLISS
BAR	4 BEAT	5 +	1	CLARINET	D	8VE4	HALF	PP	NORMALT
BAR	4 BEAT	5 +	9	BASSOON	C+	8VE4	WHOLE+	PP	LEGATO
				VIOLIN	D	8VE4	HALF	P	GLISS
				CELLO	D	8VE4	WHOLE	PP	SULPONT
				CONTRABASS	D	8VE4	HALF+	PP	NORMALT
				VIBRAPHONE	D+	8VE4	WHOLE+	PP	GLISS
BAR	5 BEAT	1 +	1	CLARINET	D	8VE4	WHOLE+	PP	NORMALT

BAR	5 BEAT	1 +	9	FLUTE VIOLIN	D	8VE4	HALF + WHOLE	MP PP	LEGATO	GLISS SULPONT
PAR	5 BEAT	2 +	1	VIOLA CELLO	G +	8VE4	HALF	PPP	NORMAL	GLISS
BAR	5 BEAT	2 +	9	VIBRAPHONE CONTRABASS	D	8VE4	HALF	MP	LEGATO	GLISS
PAR	5 BEAT	3 +	1	VIOLA FLUTE	C +	8VE4	WHOLE	P	SLUR	NORMAL
BAR	5 BEAT	3 +	9	VIBRAPHONE BASSOON	A	8VE4	HALF	MP	SLUR	GLISS
BAR	5 BEAT	4 +	1	VIOLIN FLUTE	D	8VE4	HALF +	PP	NORMAL	NORMAL
BAR	5 BEAT	4 +	1	CLARINET	D	8VE4	WHOLE +	LEGATO	SLUR	GLISS
BAR	5 BEAT	4 +	9	VIBRAPHONE	C +	8VE4	WHOLE	MP	SLUR	GLISS
BAR	5 BEAT	5 +	1	VIOLA FLUTE	D	8VE4	HALF +	PP	LEGATO	GLISS
BAR	5 BEAT	5 +	1	BASSOON CELLO	C	8VE4	HALF +	PPP	SLUR	GLISS
BAR	5 BEAT	5 +	9	CONTRABASS	D	8VE4	HALF	PP	LEGATO	GLISS
BAR	6 BEAT	1 +	9	VIOLA BASSOON	A	8VE4	WHOLE	PP	SLUR	GLISS
BAR	6 BEAT	1 +	9	VIBRAPHONE	E	8VE4	HALF	MP	NORMAL	NORMAL
BAR	6 BEAT	1 +	9	VIOLIN	D	8VE4	HALF +	PP	LEGATO	SULPONT
BAR	6 BEAT	2 +	1	CELLO	D	8VE4	WHOLE	PP	LEGATO	SULPONT
BAR	6 BEAT	2 +	9	CONTRABASS	B	8VE4	HALF	PPP	NORMAL	NORMAL
BAR	6 BEAT	2 +	9	CLARINET	D	8VE4	HALF +	P	NORMAL	SULPONT
BAR	6 BEAT	2 +	9	BASSOON	D	8VE4	WHOLE +	PP	SLUR	NORMAL
BAR	6 BEAT	3 +	1	CONTRABASS	C	8VE4	WHOLE	MP	NORMAL	GLISS
BAR	6 BEAT	3 +	1	FLUTE	D	8VE4	HALF +	PPP	SLUR	GLISS
BAR	6 BEAT	3 +	9	VIOLIN	C	8VE4	HALF	MP	SLUR	GLISS
BAR	6 BEAT	3 +	9	VIBRAPHONE	G +	8VE4	HALF +	MP	SLUR	GLISS
BAR	6 BEAT	3 +	9	CLARINET	D	8VE4	WHOLE	PP	LEGATO	SULPONT
BAR	6 BEAT	4 +	1	CELLO	D	8VE4	HALF	PP	SLUR	GLISS
BAR	6 BEAT	4 +	1	VIOLA	D +	8VE4	HALF +	MP	NORMAL	GLISS
BAR	6 BEAT	4 +	9	CONTRABASS	C	8VE4	HALF	PP	LEGATO	NORMAL
BAR	6 BEAT	4 +	9	CELLO	B	8VE4	HALF +	MP	NORMAL	GLISS
BAR	6 BEAT	4 +	9	VIBRAPHONE	D	8VE4	HALF	P	SLUR	SULPONT
BAR	6 BEAT	5 +	1	VIOLA	G	8VE4	HALF	PP	LEGATO	GLISS
BAR	6 BEAT	5 +	9	CLARINET	D +	8VE4	QUARTER	PP	LEGATO	GLISS
BAR	6 BEAT	5 +	9	BASSOON	F	8VE4	QUARTER	MP	NORMAL	NORMAL
BAR	6 BEAT	5 +	9	VIOLIN	D	8VE4	QUARTER	PPP	LEGATO	GLISS
BAR	6 BEAT	5 +	9	CONTRABASS	D +	8VE4	QUARTER	PP	SLUR	SULPONT
BAR	6 BEAT	5 +	9	VIBRAPHONE	C	8VE4	QUARTER	P	LEGATO	GLISS
BAR	7 BEAT	1 +	1	FLUTE	F +	8VE5	EIGHTH	ACCEL	FLUTTER	TREMOLO
BAR	7 BEAT	1 +	1	CLARINET	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	BASSOON	F	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	VIOLIN	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	CELLO	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	CONTRABASS	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	VIOLA	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	VIBRAPHONE	E	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	FLUTE	D +	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER
BAR	7 BEAT	1 +	1	CLARINET	D	8VE5	EIGHTH	FLUTTER	FLUTTER	FLUTTER

CLARINET	F	8VE4	EIGHTH	NORMAL
BASSOON	E	8VE4	EIGHTH	
VIOLIN	E	8VE4	EIGHTH	
CELLO	E	8VE4	EIGHTH	
CONTRABASS	F	8VE3	EIGHTH	
VIOLA	F+	8VE5	EIGHTH	TREMOLO
VIBRAPHONE	C+	8VE3	EIGHTH	NORMAL
FLUTE	F	8VE4	EIGHTH	
CLARINET	E	8VE4	EIGHTH	
BASSOON	D	8VE4	EIGHTH	
VIOLIN	E	8VE5	EIGHTH	TREMOLO
CELLO	E	8VE4	EIGHTH	NORMAL
CONTRABASS	C+	8VE3	EIGHTH	
VIOLA	F	8VE5	EIGHTH	
VIBRAPHONE	C+	8VE4	EIGHTH	
FLUTE	E	8VE4	EIGHTH	FLUTTERIGE
CLARINET	D+	8VE4	EIGHTH	NORMAL
BASSOON	C+	8VE4	EIGHTH	
VIOLIN	C+	8VE4	EIGHTH	
CELLO	E	8VE3	EIGHTH	
CONTRABASS	D	8VE4	EIGHTH	
VIOLA	D	8VE4	EIGHTH	
VIBRAPHONE	E	8VE4	EIGHTH	
FLUTE	E	8VE4	EIGHTH	FLUTTERIGE
CLARINET	E	8VE5	EIGHTH	NORMAL
BASSOON	F	8VE4	EIGHTH	
VIOLIN	D+	8VE5	EIGHTH	TREMOLO
CELLO	F+	8VE4	EIGHTH	NORMAL
CONTRABASS	D	8VE4	EIGHTH	
VIOLA	C+	8VE4	EIGHTH	
VIBRAPHONE	D	8VE3	EIGHTH	
FLUTE	D+	8VE5	EIGHTH	FLUTTERIGE
CLARINET	F+	8VE5	EIGHTH	NORMAL
BASSOON	F	8VE4	EIGHTH	
VIOLIN	E	8VE4	EIGHTH	
CELLO	F	8VE4	EIGHTH	TREMOLO
CONTRABASS	D+	8VE4	EIGHTH	NORMAL
VIOLA	E	8VE4	EIGHTH	
VIBRAPHONE	E	8VE4	EIGHTH	
FLUTE	D	8VE5	EIGHTH	
CLARINET	C+	8VE5	EIGHTH	FLUTTERIGE
BASSOON	F	8VE4	EIGHTH	TREMOLO
VIOLIN	C+	8VE4	EIGHTH	NORMAL
CELLO	E	8VE4	EIGHTH	
CONTRABASS	D	8VE4	EIGHTH	
VIOLA	F	8VE4	EIGHTH	
VIBRAPHONE	E	8VE4	EIGHTH	FLUTTERIGE
FLUTE	C+	8VE4	EIGHTH	TREMOLO
CLARINET	F	8VE4	EIGHTH	NORMAL
BASSOON	D+	8VE3	EIGHTH	
VIOLIN	E	8VE4	EIGHTH	
CELLO	F	8VE3	EIGHTH	
CONTRABASS	F	8VE3	EIGHTH	TREMOLO
VIOLA	E	8VE5	EIGHTH	FLUTTERIGE
VIBRAPHONE	E	8VE4	EIGHTH	NORMAL
FLUTE	D	8VE5	EIGHTH	
CLARINET	F	8VE5	EIGHTH	TREMOLO
BASSOON	F+	8VE3	EIGHTH	NORMAL
VIOLIN	C+	8VE4	EIGHTH	
CELLO	E	8VE4	EIGHTH	
CONTRABASS	E	8VE4	EIGHTH	

*****	POSITION	*****	INSTR. NAME	*****	PITCH	*****	RANGE	*****	DURATION	*****	DYNAMICS	*****	ATTACK	*****	TIMBRE	*****	SPEC 1	*****	SPEC 2	*****	SPEC 3	*****	SPEC 4	*****
BAR	8 BEAT 2 + 1		VIOLA		E		8VE4		EIGHTH						FLUTTERIGE		-		-					
			VIBRAPHONE		F		8VE5		EIGHTH						NORMALT		-		-					
			CLARINET		F+		8VE4		EIGHTH						TREMOLO		-		-					
			BASSOON		F		8VE5		EIGHTH						NORMALT		-		-					
			VIOLIN		F		8VE4		EIGHTH								-		-					
			CELLO		E		8VE5		EIGHTH								-		-					
			CONTRABASS		C+		8VE4		EIGHTH						TREMOLO		-		-					
			VIOLA		E		8VE4		EIGHTH						NORMALT		-		-					
BAR	8 BEAT 2 + 5		VIBRAPHONE		F		8VE3		EIGHTH						FLUTTERIGE		-		-					
			FLUTE		E		8VE4		EIGHTH								-		-					
			CLARINET		E		8VE4		EIGHTH						TREMOLO		-		-					
			BASSOON		E		8VE4		EIGHTH						NORMALT		-		-					
			VIOLIN		E		8VE4		EIGHTH								-		-					
			CELLO		E		8VE4		EIGHTH								-		-					
			CONTRABASS		E		8VE4		EIGHTH								-		-					
			VIOLA		E		8VE5		EIGHTH								-		-					
			VIBRAPHONE		D		8VE4		EIGHTH								-		-					
BAR	8 BEAT 2 + 9		FLUTE		F		8VE4		EIGHTH						TREMOLO		-		-					
			CLARINET		F		8VE5		EIGHTH						NORMALT		-		-					
			BASSOON		G+		8VE4		EIGHTH								-		-					
			VIOLIN		E		8VE5		EIGHTH								-		-					
			CELLO		E		8VE3		EIGHTH								-		-					
			CONTRABASS		F+		8VE3		EIGHTH								-		-					
			VIOLA		E		8VE4		EIGHTH								-		-					
			VIBRAPHONE		E		8VE4		EIGHTH								-		-					
BAR	8 BEAT 2 + 13		FLUTE		E		8VE5		EIGHTH								-		-					
			CLARINET		D+		8VE4		EIGHTH						TREMOLO		-		-					
			BASSOON		F+		8VE3		EIGHTH						NORMALT		-		-					
			VIOLIN		E		8VE4		EIGHTH						TREMOLO		-		-					
			CELLO		E		8VE3		EIGHTH								-		-					
			CONTRABASS		F		8VE3		EIGHTH						FLUTTERIGE		-		-					
			VIOLA		E		8VE4		EIGHTH						NORMALT		-		-					
BAR	8 BEAT 3 + 1		VIBRAPHONE		D+		8VE5		EIGHTH						TREMOLO		-		-					
			FLUTE		D		8VE4		EIGHTH								-		-					
			CLARINET		E		8VE5		EIGHTH						NORMALT		-		-					
			BASSOON		E		8VE3		EIGHTH						TREMOLO		-		-					
			VIOLIN		E		8VE5		EIGHTH								-		-					
			CELLO		E		8VE3		EIGHTH						TREMOLO		-		-					
			CONTRABASS		E		8VE4		EIGHTH								-		-					
			VIOLA		F		8VE3		EIGHTH						NORMALT		-		-					
BAR	8 BEAT 3 + 5		VIBRAPHONE		E		8VE4		EIGHTH						FLUTTERIGE		-		-					
			FLUTE		C+		8VE5		EIGHTH						NORMALT		-		-					
			CLARINET		E		8VE4		EIGHTH								-		-					
			BASSOON		E		8VE3		EIGHTH								-		-					
			VIOLIN		E		8VE4		EIGHTH								-		-					
			CELLO		E		8VE3		EIGHTH								-		-					
			CONTRABASS		C+		8VE3		EIGHTH						TREMOLO		-		-					
			VIOLA		D		8VE4		EIGHTH						NORMALT		-		-					
BAR	8 BEAT 3 + 9		VIBRAPHONE		D+		8VE5		EIGHTH						FLUTTERIGE		-		-					
			FLUTE		F+		8VE5		EIGHTH						NORMALT		-		-					
			CLARINET		F		8VE5		EIGHTH								-		-					
			BASSOON		F		8VE3		EIGHTH								-		-					
			VIOLIN		D		8VE4		EIGHTH						NORMALT		-		-					
			CELLO		D		8VE4		EIGHTH								-		-					
			CONTRABASS		E		8VE4		EIGHTH						TREMOLO		-		-					
			VIOLA		D+		8VE5		EIGHTH								-		-					

POSITION	INSR. NAME	PITCH	RANGE	DURATION	DYNAMICS	ATTACK	TIMBRE	SPEC 1	SPEC 2	SPEC 3	SPEC 4
BAR	8 BEAT 5 + 13										
	CONTRABASS	D+	8VE4	EIGHTH			TREMOLO	-	-	-	-
	VIOLA	E	8VE4	EIGHTH			NORMAL	-	-	-	-
	VIBRAPHONE	E	8VE3	EIGHTH				-	-	-	-
	FLUTE	E	8VE4	EIGHTH			FLUTTERIGE	-	-	-	-
	CLARINET	E	8VE5	EIGHTH			NORMAL	-	-	-	-
	BASSOON	F+	8VE3	EIGHTH			FLUTTERIGE	-	-	-	-
	VIOLIN	E	8VE4	EIGHTH			NORMAL	-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	E	8VE3	EIGHTH			TREMOLO	-	-	-	-
	VIOLA	O+	8VE5	EIGHTH			NORMAL	-	-	-	-
BAR	9 BEAT 1 + 1							-	-	-	-
	VIBRAPHONE	E	8VE4	EIGHTH				-	-	-	-
	FLUTE	F+	8VE5	EIGHTH			FLUTTERIGE	-	-	-	-
	CLARINET	F+	8VE4	EIGHTH			TREMOLO	-	-	-	-
	BASSOON	F	8VE4	EIGHTH			NORMAL	-	-	-	-
	VIOLIN	D	8VE4	EIGHTH				-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	C+	8VE4	EIGHTH				-	-	-	-
	VIOLA	D+	8VE5	EIGHTH				-	-	-	-
BAR	9 BEAT 1 + 5							-	-	-	-
	VIBRAPHONE	F	8VE5	EIGHTH			FLUTTERIGE	-	-	-	-
	FLUTE	F	8VE5	EIGHTH			TREMOLO	-	-	-	-
	CLARINET	C+	8VE4	EIGHTH			NORMAL	-	-	-	-
	BASSOON	D+	8VE4	EIGHTH				-	-	-	-
	VIOLIN	E	8VE4	EIGHTH				-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	C+	8VE4	EIGHTH				-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-
BAR	9 BEAT 1 + 9							-	-	-	-
	VIBRAPHONE	F+	8VE5	EIGHTH			FLUTTERIGE	-	-	-	-
	FLUTE	C+	8VE4	EIGHTH			NORMAL	-	-	-	-
	CLARINET	D+	8VE5	EIGHTH				-	-	-	-
	BASSOON	E	8VE4	EIGHTH				-	-	-	-
	VIOLIN	E	8VE5	EIGHTH				-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	D	8VE3	EIGHTH				-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-
BAR	9 BEAT 1 + 13							-	-	-	-
	VIBRAPHONE	E	8VE3	EIGHTH			FLUTTERIGE	-	-	-	-
	FLUTE	E	8VE4	EIGHTH			NORMAL	-	-	-	-
	CLARINET	E	8VE5	EIGHTH				-	-	-	-
	BASSOON	D+	8VE4	EIGHTH				-	-	-	-
	VIOLIN	E	8VE5	EIGHTH				-	-	-	-
	CELLO	F+	8VE4	EIGHTH			TREMOLO	-	-	-	-
	CONTRABASS	E	8VE3	EIGHTH				-	-	-	-
	VIOLA	D+	8VE4	EIGHTH				-	-	-	-
BAR	9 BEAT 2 + 1							-	-	-	-
	VIBRAPHONE	F	8VE3	EIGHTH			NORMAL	-	-	-	-
	FLUTE	C+	8VE4	EIGHTH				-	-	-	-
	CLARINET	F	8VE4	EIGHTH				-	-	-	-
	BASSOON	C+	8VE4	EIGHTH				-	-	-	-
	VIOLIN	D	8VE5	EIGHTH				-	-	-	-
	CELLO	E	8VE4	EIGHTH			TREMOLO	-	-	-	-
	CONTRABASS	C+	8VE3	EIGHTH			NORMAL	-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-
BAR	9 BEAT 2 + 5							-	-	-	-
	VIBRAPHONE	E	8VE4	EIGHTH			TREMOLO	-	-	-	-
	FLUTE	E	8VE5	EIGHTH			NORMAL	-	-	-	-
	CLARINET	E	8VE4	EIGHTH				-	-	-	-
	BASSOON	D+	8VE5	EIGHTH			TREMOLO	-	-	-	-
	VIOLIN	E	8VE4	EIGHTH			NORMAL	-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	C+	8VE3	EIGHTH				-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-
BAR	9 BEAT 2 + 5							-	-	-	-
	VIBRAPHONE	E	8VE4	EIGHTH			TREMOLO	-	-	-	-
	FLUTE	E	8VE5	EIGHTH			NORMAL	-	-	-	-
	CLARINET	E	8VE4	EIGHTH				-	-	-	-
	BASSOON	D+	8VE5	EIGHTH			TREMOLO	-	-	-	-
	VIOLIN	E	8VE4	EIGHTH			NORMAL	-	-	-	-
	CELLO	E	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	C+	8VE3	EIGHTH				-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-

POSITION	INSTR. NAME	PITCH	RANGE	DURATION	DYNAMICS	ATTACK	TIMBRE	SPEC 1	SPEC 2	SPEC 3	SPEC 4
BAR 9 BEAT 4 + 9	CELLO	E	8VE4	EIGHTH			TREMOLO	-	-	-	-
	CONTRABASS	E	8VE3	EIGHTH			NORMAL	-	-	-	-
	VIOLA	E	8VE5	EIGHTH				-	-	-	-
	VIBRAPHONE	E	8VE5	EIGHTH				-	-	-	-
	FLUTE	E	8VE5	EIGHTH			FLUTTERIGE	-	-	-	-
	CLARINET	D	8VE4	EIGHTH			TREMOLO	-	-	-	-
	BASSOON	C+	8VE4	EIGHTH			NORMAL	-	-	-	-
	VIOLIN	F	8VE4	EIGHTH				-	-	-	-
	CELLO	F	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	E	8VE3	EIGHTH			TREMOLO	-	-	-	-
	VIOLA	F	8VE4	EIGHTH			NORMAL	-	-	-	-
BAR 9 BEAT 4 + 13	VIBRAPHONE	D+	8VE4	EIGHTH				-	-	-	-
	FLUTE	E	8VE4	EIGHTH				-	-	-	-
	CLARINET	F	8VE4	EIGHTH				-	-	-	-
	BASSOON	F	8VE3	EIGHTH				-	-	-	-
	VIOLIN	E	8VE4	EIGHTH				-	-	-	-
	CELLO	F+	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	E	8VE4	EIGHTH			TREMOLO	-	-	-	-
	VIOLA	C+	8VE4	EIGHTH			NORMAL	-	-	-	-
	VIBRAPHONE	F	8VE3	EIGHTH				-	-	-	-
	FLUTE	E	8VE4	EIGHTH				-	-	-	-
	CLARINET	D+	8VE4	EIGHTH				-	-	-	-
	BASSOON	C+	8VE3	EIGHTH				-	-	-	-
	VIOLIN	D	8VE5	EIGHTH				-	-	-	-
	CELLO	D+	8VE4	EIGHTH				-	-	-	-
	CONTRABASS	E	8VE4	EIGHTH				-	-	-	-
	VIOLA	E	8VE4	EIGHTH				-	-	-	-
	VIBRAPHONE	F+	8VE5	EIGHTH				-	-	-	-
	FLUTE	D+	8VE4	EIGHTH				-	-	-	-
	CLARINET	C+	8VE4	EIGHTH				-	-	-	-
	BASSOON	E	8VE4	EIGHTH				-	-	-	-
	VIOLIN	E	8VE4	EIGHTH				-	-	-	-
	CELLO	D	8VE4	EIGHTH			TREMOLO	-	-	-	-
	CONTRABASS	D+	8VE4	EIGHTH			NORMAL	-	-	-	-
	VIOLA	F	8VE4	EIGHTH				-	-	-	-
	VIBRAPHONE	E	8VE4	EIGHTH				-	-	-	-
BAR 9 BEAT 5 + 9	FLUTE	F+	8VE4	EIGHTH			FLUTTERIGE	FF	120		
	CLARINET	E	8VE4	EIGHTH			NORMAL				
	BASSOON	C+	8VE3	EIGHTH							
	VIOLIN	F	8VE4	EIGHTH							
	CELLO	D	8VE3	EIGHTH							
	CONTRABASS	F+	8VE3	EIGHTH							
	VIOLA	F	8VE4	EIGHTH							
	VIBRAPHONE	C+	8VE4	EIGHTH			TREMOLO				
	FLUTE	E	8VE4	EIGHTH			FLUTTERIGE				
	CLARINET	F	8VE5	EIGHTH			TREMOLO				
	BASSOON	F	8VE3	EIGHTH			NORMAL				
	VIOLIN	E	8VE4	EIGHTH							
	CELLO	F+	8VE4	EIGHTH			TREMOLO				
	CONTRABASS	C+	8VE4	EIGHTH			NORMAL				
	VIOLA	D	8VE4	EIGHTH							
	VIBRAPHONE	F	8VE4	EIGHTH							
BAR 9 BEAT 5 + 13	FLUTE	F+	8VE4	EIGHTH			FLUTTERIGE	FF	120		
	CLARINET	E	8VE4	EIGHTH			NORMAL				
	BASSOON	C+	8VE3	EIGHTH							
	VIOLIN	F	8VE4	EIGHTH							
	CELLO	D	8VE3	EIGHTH							
	CONTRABASS	F+	8VE3	EIGHTH							
	VIOLA	F	8VE4	EIGHTH			TREMOLO				
	VIBRAPHONE	C+	8VE4	EIGHTH			FLUTTERIGE				
	FLUTE	E	8VE4	EIGHTH			TREMOLO				
	CLARINET	F	8VE5	EIGHTH			TREMOLO				
	BASSOON	F	8VE3	EIGHTH			NORMAL				
	VIOLIN	E	8VE4	EIGHTH							
	CELLO	F+	8VE4	EIGHTH			TREMOLO				
	CONTRABASS	C+	8VE4	EIGHTH			NORMAL				
	VIOLA	D	8VE4	EIGHTH							
	VIBRAPHONE	F	8VE4	EIGHTH							

* M.M. - EIGHTH = 120 *

* TIME SIGNATURE = 4/2 *

APPENDIX C

MUSICOL DIAGNOSTICS

1) Compilation Errors.....	92
2) Simulation Errors.....	94

MUSICOL COMPTILATION DIAGNOSTICS

All compilation error indicators are defined in the following reference list:

*****FATAL ERROR, NO OBJECT CODE DETECTED*****

No object code submitted, or system control cards are incorrect, preventing object code detection.

*****FATAL ERROR, ILLEGAL HEADER CARD
*****OBJECT CODE PRINT ABORTED*****

First statement other than control instructions is not a START operation.

*****ERROR NO. 1 *****UNKNOWN OPERATION CODE- (code) *****

The code is not found in the MUSICOL mnemonics table (Appendix A) as spelled.

*****ERROR NO. 2 *****EXPRESSION (code) USED ILLEGALLY,
LOCATION- (octal location) *****

The MUSICOL expression used is not allowable with the preceding mnemonic type.

*****ERROR NO. 3 *****ILLEGAL OPERAND- (code) *****

The operand used is not compatible with the previous members of the instruction.

*****ERROR NO. 4 *****INEXECUTABLE INSTRUCTION, LOCATION-
(octal location) *****

The code in the third field is not compatible with both of the first two fields.

*****ERROR NO. 5 *****ATTEMPT TO REPLACE (code) WITH AN
EXISTING OP. CODE (code)*****
OR (code) NOT PREVIOUSLY ASSIGNED *****

Assigned mnemonics cannot be replaced with existing MUSICOL mnemonics, nor can they be used before they are assigned a replacement code.

*****ERROR NO. 6 *****ILLEGAL PARAMETER FOR RANK ORDERS -
(code)*****

Only codes pertaining to the pitch, attack, duration, dynamics, range, and timbre parameters can be used as rank order elements.

*****ERROR NO. 7 *****ILLEGAL USE OF RANGE OPERAND WITH
EXPRESSION (code) *****

The given expression is not allowed to be used with pitch
range specifiers, as it is not an equal sign or a dash.

*****ERROR NO. 8 *****ILLEGAL OPERAND - (code) FOR A
RANDOM-CLEAR INSTRUCTION, LOCATION- (octal location) *****

The operand is not within the acceptable range of 1 to
16, for a random-clear instruction.

MUSICOL SIMULATION DIAGNOSTICS

All simulation-execution indicators are defined in the following reference list:

***** (code) IS NOT THE SAME RANK CLASSIFICATION AS OTHERS,
LOCATIONS (octal locations)

The specified code does not belong to the same parameter class as the others in the string.

***** INSTRUMENT NOT PREVIOUSLY DEFINED, LOCATION (octal loc.)

Attempt to use an instrument before declaring its voice number.

***** ATTEMPT TO EXCEED MAXIMUM ALLOWED NUMBER OF VOICES,
LOCATION (octal location)

The instrument's voice declaration number exceeds 4.

***** ILLEGAL VALUE IN A VOICE-ORDER FIELD, LOCATION (octal location)

The voice rank-order number is either greater than the amount of declared voices, or less than 0.

***** VOICE PARAMETER EXCEEDS INITIALLY SPECIFIED AMOUNT,
LOCATION (octal location)

The voice number to be the first order is greater than the declared amount of voices.

***** (code) RANK ORDERS IMPLIED, BUT NOT DECLARED, LOCATION (octal location)

Overall rank orders specified by the cited instruction, but rank orders for the given parameter are ~~not~~ declared by an ORDERS, ROWGEN, or SHUFFLE operation.

***** ATTEMPT TO SPECIFY UNDECLARED (type) RANK ORDERS FOR
(instrument) TIME= () . ()

A declared list for the parameter specified by the given instrument does not exist.

***** NO PITCH RANGE SPECIFIED FOR (instrument)

The mandatory pitch range declaration was not implemented for the specified instrument.

***** (instrument) PITCH RANGE CONTRADICTS THE GENERAL PITCH RANGE, TIME= () . () TO TIME () . ()

The general range and the instrumental range are such that ~~the limits expressed by~~ their values combine to eliminate a feasible range, inclusive of all ~~restriction~~ restrictions.

***** ILLEGAL VALUE (integer) FOR A SHUFFLE OR ROWGEN OPERATION, LOCATION (octal location)

The specified number of elements exceeds the ~~maximum~~ amount for the desired parameter (see individual lists in table 2 of Appendix A) in a ROWGEN operation. Or, the number exceeds the number of elements in the declared list for which the SHUFFLE operation has been called.

***** (type) RANK ORDERS UNDECLARED, SHUFFLE ABORTED, LOCATION (octal location)

Attempt to SHUFFLE a string of parametric elements which were not previously declared.

***** EXCLUSIVE USE OF XTRAS, RANK CLASSIFICATION IMPOSSIBLE, LOCATIONS (octal locations)

Assigned XTRA mnemonics are used exclusively in a parametric string. The simulator cannot ascertain whether intended class is attack or timbre.

***** UNDECLARED RANK ORDER PARAMETER (code), LOCATION (octal location)

The element designated in the instruction as the first order cannot be found in the declared list.

***** UNDECLARED RANK ORDER PARAMETER (code) FOR (instrument), TIME = () . ()

The element designated in the instruction for the instrument cited as the first order cannot be found in the declared list.

***** IMPLEMENTATION OF (instrument) EXCEEDS THE MAXIMUM NUMB
NUMBER OF ALLOWED INSTRUMENTS, LOCATION (octal location)

An attempt is made to use more than 16 instruments simultaneously.

***** ATTEMPT TO SET TIME SIGNATURE BEFORE THE COMPLETION
OF A FULL MEASURE

A new time signature is declared in a time block that intersects a measure, which is governed by a previously declared time signature.

***** ILLOGICAL TIME SEQUENCE, TIME = () . ()

The time values for this new block represent a measure position which is less than the values represented in the previous block. Or, both time declarations are identical.

***** MEMORY OVERFLOW IN LITERALS LIST FOR (instrument),
PROBABLE REDUNDANCY, LOCATION (octal location)

Addition of this literals declaration for the instrument indicated is not possible because it would exceed the number of allowed simultaneous literals (6) for a single instrument. Since there are only 6 parameters, aa redundancy is evident in the programming.

***** ATTEMPT TO IMPLEMENT (assigned mnemonic) IN (type)
RANK ORDERS, LOCATIONS (octal locations)

Assigned mnemonics (XTRA) can only be included in the attack, or timbre parameter types.

***** IMPLEMENTATION OF (code) BEGINS RANK STORAGE OVERFLOW,
LOCATION (octal location)

The number of elements in the declared parametric string exceeds 24, commencing with the indicated code.

APPENDIX D

MUSICOL DEBUGGING

- 1) MUSICOL Sample Program with Compilation Errors.. 98
- 2) MUSICOL Sample Program with Simulation Errors
and Memory-Dump..... 102

TEST101
TEST102
TEST103
TEST104
TEST105
TEST106
TEST107
TEST108
TEST109
TEST110

START MUSICAL TEST DECK NUMBER 1, MUSIC COMPOSITION, 16 MEASURES

THE RANK ORDER PARAMETERS ARE BEING SFT FIRST

ORDERS (PP PPP MP P MF FT FF FFF) INORMAL ARCO PIZZ COLLEG SLUR SFFZ
SFT) ROWGEN(12) (AVE1 AVE2 8VE3 AVE4 8VE5 8VE6 8VE7)
(NORMAL) SULPONT MUTED XTRA1 GLISS FLUTTERIGE) (WHOLE HALF
QUARTER EIGHTH 16TH 32ND WHOLE+ HALF+ QUARTER+ EIGHTH+ 16TH+)
TIME=1.00 FLUTE(1) = 3G - 7C VIOLA(2) BASSOON(1)
VIOLON(2)=3G-7C 1 *2 =HALF*4=SULPONT*1 =PP*2

*****UNKNOWN OPERATION CODE- VIOLON *****

*****ERROR NO. 1 *****EXPRESSON (USED ILLEGALLY, LOCATION- 000021 *****

*****ERROR NO. 2 *****EXPRESSON) USED ILLEGALLY, LOCATION- 000022 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000022 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- 3G *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON - USED ILLEGALLY, LOCATION- 000023 *****

*****ERROR NO. 7C *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON . USED ILLEGALLY, LOCATION- 000024 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000025 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000026 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- HALF *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000027 *****

*****ERROR NO. 77777770000000000000 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000030 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- SULPONT *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000031 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000032 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- PP *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000033 *****

*****ERROR NO. 77777700000000000000 *****

XTRA1 =SULTASTO VIOLON=XTRA1.88

VIOLA=3C-5G+ FLUTE = 4D - 7C BASSOON=2C-5A- VIOLIN=ARCO*1 VIOLA=ARCO*1

FRORANGE=3A-4F+ DYNRANGE=PP-MP NTRANGE=WHOLE-16TH HALF*1

PLAY* 85 NORMAL*7 QUARTER=120

TIME=6.9 FRORANGE=2C-5A+ FLUTE=4E-7B FLUTE=RANDOM VIOLIN=XTRA1 *2

000000

000000

000003

000007

000011

000014

000021

*****ERROR NO. 1 *****EXPRESSON (USED ILLEGALLY, LOCATION- 000021 *****

*****ERROR NO. 2 *****EXPRESSON) USED ILLEGALLY, LOCATION- 000022 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000022 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- 3G *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON - USED ILLEGALLY, LOCATION- 000023 *****

*****ERROR NO. 7C *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON . USED ILLEGALLY, LOCATION- 000024 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000025 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000026 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- HALF *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000027 *****

*****ERROR NO. 77777770000000000000 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000030 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- SULPONT *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000031 *****

*****ERROR NO. 2 *****EXPRESSON = USED ILLEGALLY, LOCATION- 000032 *****

*****ERROR NO. 3 *****ILLEGAL OPERAND- PP *****

*****ERROR NO. 77777777770000000000 *****

*****ERROR NO. 2 *****EXPRESSON * USED ILLEGALLY, LOCATION- 000033 *****

*****ERROR NO. 77777700000000000000 *****

000034

000036

000043

000047

000052

TEST111

TEST112

TEST113

TEST114

TEST115

000057 017044000647000110000
01744400203700620000
005544000543701130000
005344002260000000000
005044002144000002000
005044002540000030000
017344001243701270000
017244001133701150000
005144000264700100000
0060440011540000010000
0055440015040000010000
0060440013440000010000
005044001274701300000
000063 0060440011540000010000
0055440015040000010000
0060440013440000010000
005044001274701300000
000067 72007042702470077043
000070 0170440001147000000000
017444002037001140000
005544001474700100000
00514400254700040000
000074 005544001174701140000
006044002260000000000
0132440012447011720000
016144000547011720000
017244001113701170000
000101 017044000154700000000
017444002037000560000
017244001073701110000
01574000550000000000
011344000740000000000
000106 010142000100000000000
010144000100000000000
010144000437000560000
0101440014440000010000
0101440022400000010000
010144002440000004000
010144001354000002000
000115 005144003110000000000
006044000520000000000
005242000100000000000
005244002037000510000
000121 010740000100000000000
013244001224701260000
0050440014540000010000
000124 017044000204700000000
01734400121701210000
0050440025400000010000

VIOLIN=PIZZ*3 DYNRANGE=MP-FF NTRANGE=QUARTER-EIGHTH VIOLA=COLLEG. 8 TEST116

BASSOON=EIGHTH*1 FLUTE=FLUTTERIGE * 1 BASSOON=8VE2*1 VIOLIN = FF. 88 TEST117

C * VIOLIN SHOULD CRESC. UNTIL TIME=9.0
SHUFFLE (ARCO 7)

TIME = 9.0 FRQRANGE=20-70 FLUTE=GLISS. 8 VIOLA=PIZZ.4 FLUTE TEST118
TEST119
TEST120

=16TH. 96 BASSOON=RANDOM DIMIN=MP.122 RITARDO=40.122 NTRANGE=HALF - 16TH TEST122

* CLIMAX OCCURS AT BAR 13, QUICKLY DIMINISHES
* TIME=13.0 FRQRANGE=20-4F+ NTRANGE=WHOLE - HALF REST*45 QUARTER=60
TEST123
TEST124
TEST125

INSTRI(1)=VIOLA2=3C- 4F+=SULPONT*1=PP*1=ARCO*4=8VE3*2 TEST126

VIOLA = END BASSOON=CELLO(1) =2C-4C+ TEST127

WHOLE*1 DIMIN=PP.86 VIOLIN=MUTED*1 TEST128

* PIECE ENDS AFTER 19 BARS
* TIME=16.00 DYNRANGE=PPP-PPP VIOLIN=PIZZ*1
TEST129
TEST130
TEST131

TEST032
TEST033
TEST034
TEST035
TEST036
TEST037

FLUTE = NORMAL *1 CELLO =REST* 100
TIME=17.00
ROWGENIE 0) SHUFFLE(SFZ 0) FLUTE=SFZ*0=E*0 VIOLIN=SFZ*0=E*0
INSTR1=SFZ*0=E*0
TIME=20.00
END MUSIC COMPOSITION P. GENA

000127 005544003140000010000
000131 0052440015740001440000
000132 017044002147000000000
71777042701070007043
72037042703470007043
005544003440000000000
005544001040000000000
005044003440000000000
005044001040000000000
010144003440000000000
010144001040000000000
017044002447000000000
000140
000142
000143

MUSCOPOL COMPILER VERSION 1, 1972.....CALLED.....EXIT.....PROGRAM LENGTH
1.414 2.703 000113

NUMBER OF CARDS
37

NUMBER OF STATEMENTS
59

NUMBER OF COMPILATION ERRORS
18

***** LOADER ABORTED *****

ASSIGNED MNEMONICS

LOC DEF.	MNEMONIC	SYMBOL	TAG	REFERENCES
000106	INSTR1	VIOLA2		000107 000119 000111 000112 000113 000114
				000140 000141 000141 000035
000007	XTRAI	SULTASTO		000034 000056

TOTAL COMPILATION TIME
1.289 SECONDS

SIMULATOR DUMP. STRUCTURAL WORD-BREAKDOWN

The Simulator Dump is interpreted with the aid of Appendix A. The following is a description of the word configuration.

- 1) Specific Declarations (All numbers are represented in 4-digit groups).
 - A) INSTRUMENT: Only the rightmost 4 digits are filled with the octal number representing the mnemonic.
 - B) VOICES: The declared voice-number is found in the second 4-digit group, from the right. When rank orders for multiple-voiced instruments are present, the three rightmost groups are filled with the voice number, first order number, and the possible orders number, respectively.
 - C) PITCH, ATTACK, DURATION, DYNAMICS, OCT RANGE, and TIMBRE: The rightmost two groups contain the mnemonic code, and the possible orders number.
 - D) SP ACTION: Not implemented in Version 1.
 - E) INS PI RNG: The two pitch limits are represented numerically, that is, the octave number -1, is multiplied by 12, and added to the octal equivalent of the pitch mnemonic. They are located in two 4-digit groups.

- F) PLAY REST: The mnemonic and percentage number are located octally in the two rightmost groups.
- G) LIT ACT...: Each instrument has 3 words reserved for literal actions. Each word holds two complete instructions (8 digits each). An instruction uses two 4-digit groups.

2) General Declarations

- A) PITCH RNGE, DYN RANGE, NOTE RANGE, TIME SIG: The word is split into two 8-digit groups.
- B) PLAY/REST: Represented exactly as the specific play/rest (see 1F, above).
- C) SP LIT ACT: Represented exactly as LIT ACT, above (see 1G).
- D) METRONOMIC: The note-value and number are located octally in the two rightmost 4-digit groups.

3) Pitch Orders Strings

Parametric elements are located in the rightmost 4 digits of each word. If rank orders are in effect at the moment of the occurrence of the error, the numbers are located in the rightmost 4 digits of each word. The element is then shifted 4 digits inward.

000000 START MUSICOL TEST DECK NUMBER 1, MUSIC COMPOSITION, 16 MEASURES
* THE RANK ORDER PARAMETERS ARE BEING SET FIRST
*
ORDERS (PP PPP MP P MF FT FF FFF# (NORMAL ARCO PIZZ COLLEG SLUR SFFZ)
ROWGEN(0- 12) (8VE1 8VE2 8VE3 8VE4 8VE5 8VE6 8VE7)
(NORMALT SULPONT MUTED XIRA1 GLISS FLUTTERIGE) (WHOLE HALF
QUARTER EIGHTH 16TH 32ND WHOLE+ HALF+ QUARTER+ EIGHTH+ 16TH+)
TIME=1.00 FLUTE(1) =3G - 7C VIOLA(2) BASSOON(1)
VIOLIN(2)=3G-7C .1 *2 =HALF*4=SULPONT*1 =PP*2
XIRA1 =SULTASTO VIOLIN=XIRA1.88
VIOLA=3C-5G+ FLUTE = 40 - 7C BASSOON=2C-5A- VIOLIN=ARCO*1 VIOLA=ARCO*1
FRQRANGE=3A-4F+ DYNRANGE=PP-MP NTRANGE=WHOLE-16TH HALF*1
PLAY* 35 NORMAL*6 QUARTER=120
TIME=6.9 FRQRANGE=2C-5A+ FLUTE=4E-7B FLUTE-RANDOM VIOLIN=XTRA1 *2
VIOLIN= SFZ*3 DYNRANGE=MP-FF NTRANGE=QUARTER-EIGHTH VIOLA=COLLEG. 8
BASSOON=EIGHTH*1 FLUTE=FLUTTERIGE * 1 3ASSOON=8VE2*1 VIOLIN = FF. 88
C VIOLIN SHOULD CRESC. UNTIL TIME=9.0
*
SHUFFLE(ARCO 6)
TIME = 9.0 FRQRANGE=2C-7C FLUTE=GLISS.8 VIOLA=PIZZ.4 FLUTE
=16TH.96 BASSOON=RANDOM DIMIN=MP.122 RITARD=40.122 NTRANGE=HALF - 16TH
CLIMAX OCCURS AT BAR 13, QUICKLY DIMINISHES
*
TIME=13.0 FRQRANGE=2C-4F+ NTRANGE=WHOLE - HALF REST*45 QUARTER=60
INSTR1(1)=VIOLA2=3C -4F+=SULPONT*1=PP*1=ARCO*4=8VE3*2
VIOLA = END BASSOON=CELLO(1) =2G-4C+
WHOLE*1 DIMIN=PP.86 VIOLIN=4UTED*1
PIECE ENDS AFTER 19 BARS
*
TIME=16.00 DYNRANGE=PPP-PPP VIOLIN=PIZZ*1
FLUTE = NORMAL *1 CELLO =REST* 130 SHUFFLE (PIZZ 8)
TIME=17.00
ROWGENIE 0) SHUFFLE(SFZ 0) FLUTE=SFZ*0=E*0 VIOLIN=SFZ*0=E*0
INSTR1=SFZ*0=E*0 =E*7 = 5G - 6A
TIME=20.00
END MUSIC COMPOSITION P. 3ENA

TEST001
TEST002
TEST003
TEST004
TEST005
TEST006
TEST007
TEST008
TEST009
TEST010
TEST011
TEST012
TEST013
TEST014
TEST015
TEST016
TEST017
TEST018
TEST019
TEST020
TEST021
TEST022
TEST023
TEST024
TEST025
TEST026
TEST027
TEST028
TEST029
TEST030
TEST031

TEST033
TEST034
TEST035
TEST036
TEST037

NUMBER OF CARDS
37

NUMBER OF STATEMENTS
97

ASSIGNED MNEUMONICS

LOC DEF.	MNEUMONIC	SYMBOL TAG	REFERENCES			
000101	INSTR1	VIOLA2	000102 000134	000103 000135	000104 000136	000107
000007	XTRA1	SULTASIO	000027	000030	000051	

TOTAL COMPILATION TIME
1.057 SECONDS

-105-

MUSICOL LOADER - SIMULATOR.....VERSION 1.....LOADER CALLED
2.833

EXECUTION CONDITIONS

ROMGEN CALLED, LOCATION- 000004, PITCH RANK ORDERS CHANGED AS FOLLOWS
A F A- C+ G E G
E- B

NO INITIAL TIME SIGNATURE SPECIFIED, 4/4 ASSUMED

FLUTE RANDOM-CLEARED, LOCATION 000050

SHUFFLE CALLED, LOCATION- 000062, ATTACK RANK ORDERS CHANGED AS FOLLOWS
SLUR COLLES SFFZ NORMAL PIZZ ARCO

***** SIMULATION ERRORS *****

***** UNDECLARED RANK ORDER PARAMETER SFZ FOR VIOLIN, TIME = 6. 9

BASSOON RANDOM-CLEARED, LOCATION 000070

VIOLA DELETED, LOCATION 000110

BASSOON REPLACED BY CELLO, LOCATION 000111
***** ILLEGAL VALUE, 8 FOR A SHUFFLE OR ROMGEN OPERATION, LOCATION 000124

ROWGEN CALLED, LOCATION- 000126, PITCH RANK ORDERS DELETED
SHUFFLE CALLED, LOCATION- 000127, ATTACK RANK ORDERS DELETED
INSR1 PITCH RANGE CONTRADICTS THE GENERAL PITCH RANGE, TIME= 17. 0 TO TIME= 20. 0

TOTAL EXECUTION TIME = .997 SECONDS
=====

MUSICAL TEST DECK NUMBER 1, MUSIC COMPOSITION, 16 MEASURES

APPROXIMATE DURATION = 0 MINS. AND 16 SECS.

POSITION INSTR. NAME PITCH RANGE DURATION DYNAMICS ATTACK TIMBRE SPEC 1 SPEC 2 SPEC 3 SPEC 4

BAR	1	BEAT	1	+	1	FLUTE	E	8VE4	HALF	MP	NORMAL	NORMALT
						VIOLA	B-	8VE4	QUARTER		ARCO	SULTASTO
						VIOLA	C+	8VE4	QUARTER			SULTASTO
						BASSOON	REST					
BAR	1	BEAT	1	+	5	VIOLIN	D	8VE4	EIGHTH	PP	NORMAL	SULTASTO
						BASSOON	D	8VE3	QUARTER+	P	ARCO	GLISS
						VIOLIN	E	8VE4	HALF	PP	ARCO	SULTASTO
						VIOLIN	G	8VE3	HALF	P		GLISS
BAR	1	BEAT	2	+	1	VIOLA	A	8VE4	16TH+	MP	NORMAL	FLUTTERIGE
BAR	1	BEAT	2	+	4	VIOLA	C+	8VE4	HALF			SULTASTO
BAR	1	BEAT	3	+	1	FLUTE	F+	8VE4	HALF+			NORMALT
						BASSOON	3-	8VE3	16TH			FLUTTERIGE
BAR	1	BEAT	3	+	3	BASSOON	G+	8VE3	HALF	PP	ARCO	SULTASTO
BAR	1	BEAT	3	+	5	VIOLIN	REST		HALF			NORMALT
BAR	1	BEAT	4	+	4	VIOLA	F+	8VE4	16TH+	PP	ARCO	MUTED
BAR	1	BEAT	4	+	7	VIOLA	REST		HALF			FLUTTERIGE
BAR	2	BEAT	1	+	3	BASSOON	C	8VE4	HALF	MP	SFFZ	SULTASTO
BAR	2	BEAT	1	+	5	VIOLIN	F	8VE4	WHOLE	PP	ARCO	SULTASTO
						VIOLIN	D+	8VE4	WHOLE			SULTASTO
BAR	2	BEAT	2	+	1	FLUTE	REST		16TH	P	NORMAL	NORMALT
BAR	2	BEAT	2	+	3	FLUTE	F+	8VE4	HALF	PP	ARCO	SULPONT
BAR	2	BEAT	2	+	7	VIOLA	A	8VE4	HALF	MP	SLUR	MUTED
						BASSOON	B	8VE4	WHOLE	NORMAL		SULTASTO
BAR	2	BEAT	3	+	3	FLUTE	D	8VE4	WHOLE+			SULPONT
BAR	2	BEAT	4	+	3	VIOLA	REST		HALF			
BAR	3	BEAT	1	+	5	VIOLIN	REST		HALF			
BAR	3	BEAT	2	+	7	VIOLA	A	8VE4	EIGHTH+	PP	ARCO	SULPONT
						BASSOON	C	8VE4	EIGHTH+	MP		SULTASTO
BAR	3	BEAT	3	+	3	VIOLA	REST		HALF			SULPONT
BAR	3	BEAT	3	+	5	VIOLIN	REST		HALF			FLUTTERIGE
BAR	3	BEAT	4	+	5	VIOLA	F	8VE4	HALF	PP	ARCO	MUTED
BAR	4	BEAT	1	+	1	VIOLA	D	8VE4	HALF	PP	ARCO	SULPONT
						BASSOON	A	8VE3	HALF			NORMALT
BAR	4	BEAT	1	+	3	VIOLIN	REST		EIGHTH	PP	SLUR	FLUTTERIGE
BAR	4	BEAT	1	+	5	BASSOON	REST		QUARTER	MP		GLISS
BAR	4	BEAT	1	+	7	BASSOON	B-	8VE4	HALF	PP	ARCO	SULPONT
BAR	4	BEAT	2	+	3	FLUTE	F+	8VE4	HALF	P		NORMALT
BAR	4	BEAT	2	+	5	VIOLIN	D+	8VE4	HALF	PP	ARCO	GLISS
						VIOLIN	D+	8VE4	HALF			SULTASTO
BAR	4	BEAT	3	+	1	VIOLA	G+	8VE3	32ND	PP		NORMALT
BAR	4	BEAT	3	+	2	VIOLA	G+	8VE3	32ND	PP		GLISS
BAR	4	BEAT	3	+	7	VIOLA	C	8VE4	WHOLE	MP	SFFZ	SULTASTO
						BASSOON	C	8VE4	WHOLE			SULTASTO

BAR	4	BEAT	4	+	3	FLUTE	F+	8VE4	WHOLE	PP	NORMAL	SULTASTO
BAR	4	BEAT	4	+	5	VIOLIN	D	8VE4	HALF		ARCO	SULPONT
BAR	5	BEAT	1	+	7	BASSOON	B	8VE4	HALF	MP	NORMAL	SULTASTO
BAR	5	BEAT	2	+	5	VIOLIN	G	8VE3	HALF	PP	ARCO	SULPONT
BAR	5	BEAT	3	+	2	VIOLIN	C+	8VE4	HALF	MP		GLISS
BAR	5	BEAT	3	+	5	VIOLA	C	8VE4	16TH+			SULTASTO
BAR	5	BEAT	3	+	5	VIOLA	G	8VE3	QUARTER			SULTASTO
BAR	5	BEAT	3	+	7	VIOLA	C+	8VE4	QUARTER			SULTASTO
BAR	5	BEAT	4	+	3	BASSOON	E	8VE3	HALF		NORMAL	FLUTTERIGE
BAR	5	BEAT	4	+	5	FLUTE	F+	8VE4	EIGHTH+	PP	ARCO	GLISS
BAR	5	BEAT	4	+	5	VIOLA	D+	8VE4	EIGHTH			SULPONT
BAR	5	BEAT	4	+	5	VIOLA	F+	8VE4	EIGHTH			
BAR	5	BEAT	4	+	5	VIOLIN	B	8VE4	EIGHTH			
BAR	5	BEAT	4	+	5	VIOLIN	E	8VE4	EIGHTH			
BAR	6	BEAT	1	+	1	FLUTE	D	8VE4	QUARTER	MP	NORMAL	SULTASTO
BAR	6	BEAT	2	+	1	FLUTE	D	8VE4	32ND		SLUR	
BAR	6	BEAT	1	+	1	VIOLA	REST	8VE4	32ND			
BAR	6	BEAT	1	+	2	VIOLIN	B-	8VE4	EIGHTH	PP	ARCO	SULPONT
BAR	6	BEAT	1	+	2	VIOLIN	D	8VE4	EIGHTH			GLISS
BAR	6	BEAT	1	+	5	VIOLA	A	8VE4	16TH+	MP		
BAR	6	BEAT	1	+	5	VIOLA	C+	8VE4	16TH+			GLISS
BAR	6	BEAT	2	+	1	VIOLA	C+	8VE4	EIGHTH			NORMAL T
BAR	6	BEAT	2	+	1	VIOLA	C+	8VE4	EIGHTH		SLUR	
BAR	6	BEAT	1	+	5	VIOLA	E	8VE3	32ND			
BAR	6	BEAT	1	+	5	VIOLIN	D	8VE4	16TH	PP	ARCO	SULPONT
BAR	6	BEAT	1	+	5	VIOLIN	B	8VE4	16TH			
BAR	6	BEAT	1	+	7	BASSOON	REST	8VE4	16TH+			
BAR	6	BEAT	1	+	7	VIOLIN	A	8VE4	16TH+			
BAR	6	BEAT	2	+	2	FLUTE	B-	8VE5	HALF	MP	NORMAL	FLUTTERIGE
BAR	6	BEAT	2	+	2	VIOLA	REST	8VE5	WHOLE			
BAR	6	BEAT	2	+	2	BASSOON	B	8VE3	EIGHTH			

00000133	00000134	00000135	00000136	0JJC0137	0JJC0140	00000141	00000000	00000000	00000000
00000000	0JJCC000	0J000000	00000000	0J000000	0J000000	00000000	00000000	00000000	00000000
00000000	TIMBRE ORDERS STRINGS								
00000151	0J000144	0J000145	00000214	00000147	0JJC0150	00000000	00000000	00000000	00000000
00000000	00000000	00000000	0J000000	00000000	0J000000	00000000	00000000	00000000	00000000

APPENDIX E

COMPASS PROGRAMS: DESCRIPTIONS, LISTINGS, AND FLOW CHARTS

1)	SHIFT.....	114
2)	ZIPF, IZIPF.....	116
3)	RFG.....	121
4)	IRIG.....	124
5)	RIG.....	126
6)	SHUFFLE.....	129

ACKNOWLEDGEMENTS

I wish to express my sincerest thanks to Lejaren Hiller for designing the following compositional routines, and to Raveesh Kumra for programming them into the COMPASS assembler language.

FUNCTION SHIFT

CALLING SEQUENCE:

I=LSHIFT(I,N)

FUNCTION:

A logical shift, LSHIFT shifts the contents of a word (I) right or left by the number of bits N. If N is positive, the shift is left. If N is negative, the shift is right. Vacated bits are zero-filled. An attempt to shift 60 places or more either to the left or to the right will give a zero result as expected.

PARAMETERS:

Two.

RETURN:

Normal.

INPUT:

I is the word.
N is the number of bits to be shifted.

OUTPUT:

The word I shifted by the number of bits N.

REGISTERS USED:

B0, B1, B2, B3, X1, X2, X6, X7.

EXAMPLE:

To shift the word I 12 bits to the left: I=LSHIFT(I,12), or to the right: I=LSHIFT(I,-12).

IDENT SHIFT
ENTRY LSHIFT

* LOGICAL SHIFT
* ENTRY AND EXIT PROCEDURES FOR CDC 6400 RUN COMPILER
* FUNCTION CALL CONVENTIONS.
* PARAMS 1ST. = OPERAND
* 2ND. - NO. OF SHIFTS,
* POSITIVE IS LEFT SHIFT
* NEGATIVE IS RIGHT SHIFT
* AN ATTEMPT TO SHIFT 60 PLACES OR MORE EITHER TO THE
* LEFT OR TO THE RIGHT WILL GIVE ZERO RESULT AS EXPECTED.

LSHIFT	BSS	1	
	SA1	B1	OPERAND
	SA2	B2	SHIFTS
	MX7	1	MASK
	BX6	X1	
	ZR	X2, LSHIFT	ZERO=NOP
	PL	X2, PL1	
	SB2	X2	RIGHT SHIFT COUNT
	LX2	B2, X1	RIGHT SHIFT
	SB2	B2+1	
	LX6	B2, X7	UPPER DELETION MASK
	BX6	-X6*X2	DELETE UPPER
	EQ	LSHIFT	RETURN
PL1	SB2	X2-1	
	SB3	59	
	SX6	B0	RETURN ZERO AS RESULT,
	GE	B2, B3, LSHIFT	IF SHIFT COUNT >=60
	AX6	B2, X7	DELETION MASK
	BX6	-X6*X1	DELETE (LOWER)
	SB2	B2+1	
	LX6	B2, X6	SHIFT
	EQ	LSHIFT	RETURN
	BND		

SUBROUTINE ZIPF (COMPASS)

CALLING SEQUENCE:

SX6 N (integer range)
RJ ZIPF

FUNCTION:

Chooses an integer out of the set (1, 2, 3, . . . , n) according to Zipf's law, which states that the probability of choosing the ith integer is $P1/i$ where $P1$ is the probability of choosing the first integer of the set.

PARAMETERS:

None.

INPUT:

Integer N should be in X6.

OUTPUT:

Resultant integer in the range 1 to n is in X6.

REGISTER USAGE:

X6, X7, and X0 (in RFG). All others are saved to restored.

RETURN:

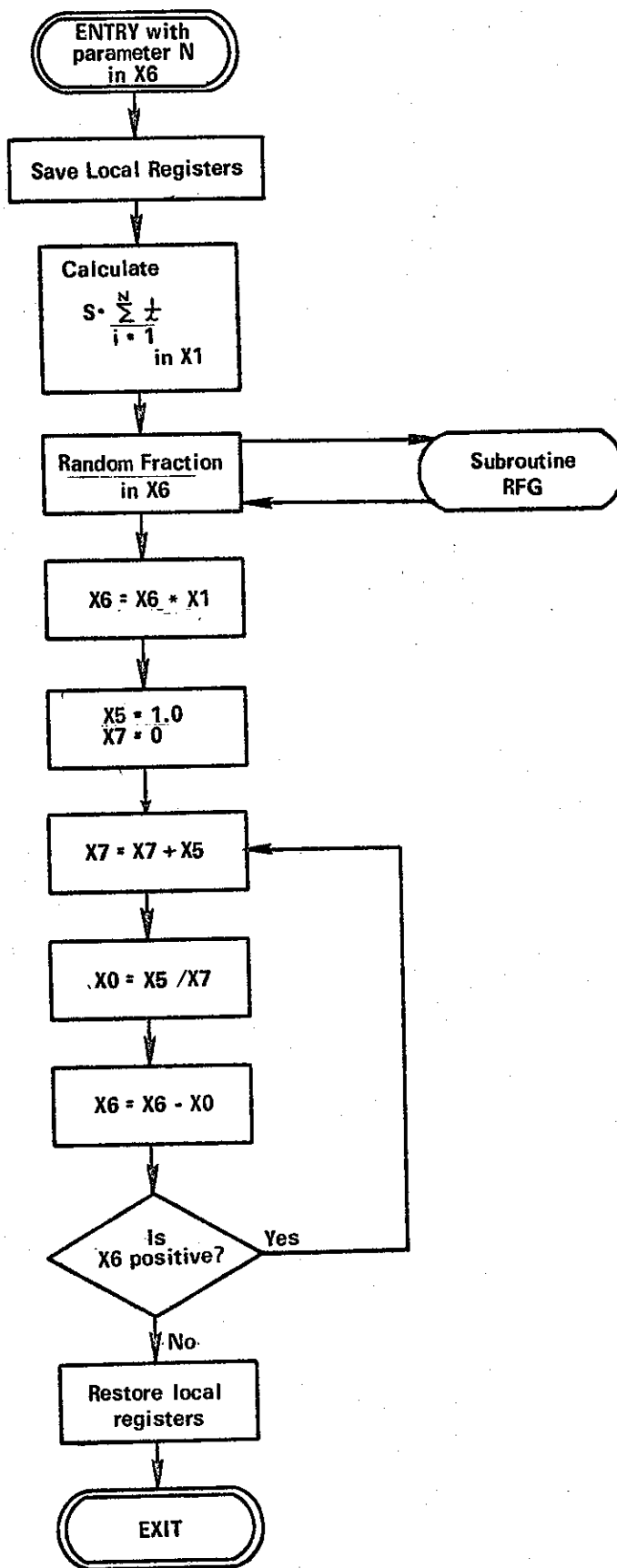
The instruction following RJ ZIPF.

EXAMPLE:

To choose an integer in the range 1 to 25 according to Zipf's law, we may write:

SX6 25
RJ ZIPF

SUBROUTINE ZIPF

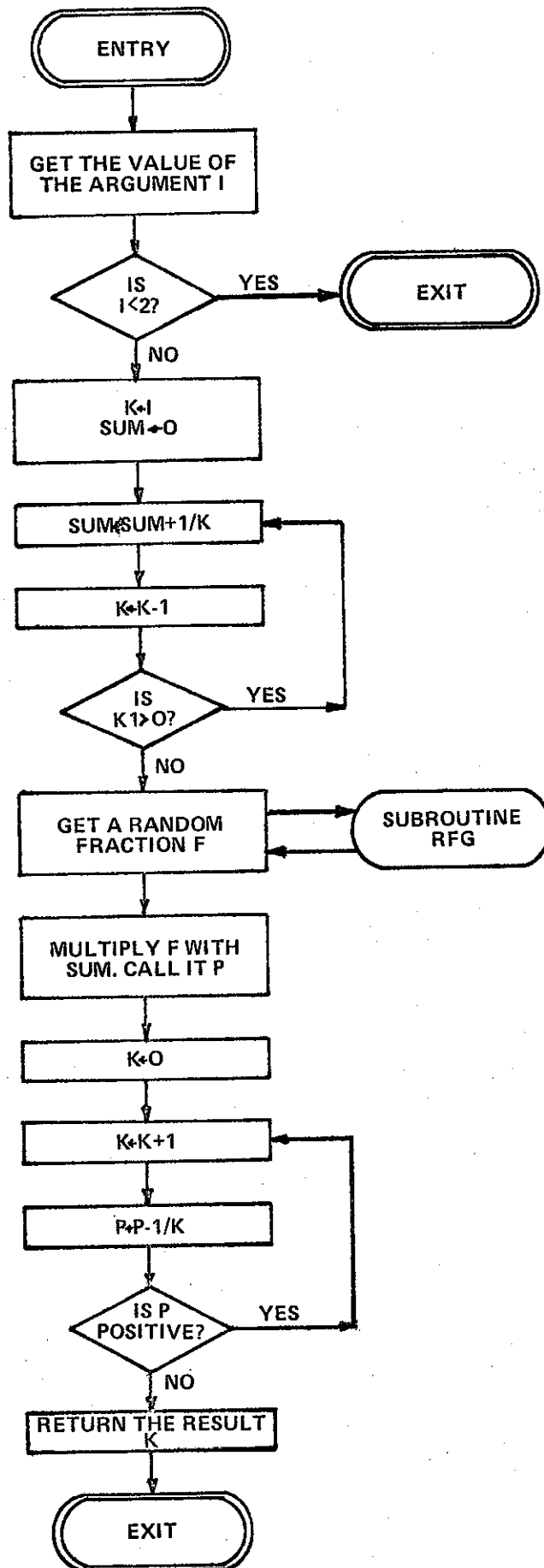


	IDENT	ZIPF	
	ENTRY	ZIPF	
	EXT	RFG	
ONE	DATA	1.0	
*	THIS FUNCTION RETURNS AN INTEGER VALUE IN THE SPECIFIED		
*	RANGE ACCORDING TO ZIPF'S LAW.		
ZIPF	BSS	1	
	SA1	B1	
	BX6	X1	
	SX7	X1-2	
	NG	X7, ZIPF	
	SA5	ONE	
	SB1	X6	
	SX6	B0	SUM OF 1/I
AGAIN	SX7	B1	
	PX7	B0, X7	CONVERT I TO
	NX7	X7	NORMALIZED FLOATING POINT
	FX7	X5/X7	DIVIDE 1 BY I
	FX6	X6+X7	ADD TO SUM
	NX6	X6	
	SB1	B1-1	
	GT	B1, AGAIN	CHECK FOR END
	BX1	X6	SAVE SUM IN X1
	RJ	RFG	GET A RANDOM FRACTION IN X6
	FX6	X1*X6	MTPLY RANDOM FRACTION BY SUM
	SX7	B0	
BACK	FX7	X7+X5	NUMBER I IN FLOATING POINT
	FX0	X5/X7	
	FX6	X6-X0	SUBTRACT 1/I FROM THE
	NX6	X6	PRODUCT
	PL	X6, BACK	IF POSITIVE, GO BACK.
	UX6	B1, X7	CONVERT I TO FIXED POINT
	LX6	B1, X6	RESULT IN X6
	EQ	ZIPF	RETURN
	END		

SUBROUTINE IZIPF

CALLING SEQUENCE:	J=IZIPF (I)
RETURN:	Normal.
FUNCTION:	Zeroth-order Zipf's law distribution.
PARAMETERS:	One.
INPUT:	I is the range parameter.
OUTPUT:	An integer in the range 1 to I according to Zipf's law as the function value (with 1 as the most probable value).
REGISTERS USED:	A1, B5, B1, X0, X1, X5, X7 and X6 (Result) Also A2, A6 and B5 (used in RFG)
COMMENT:	Uses subroutine RFG.
EXAMPLE:	To get an integer in the range 1 to 12 with zeroth-order Zipf's distribution we write the calling instruction, I=IZIPF(12)

-120-
SUBROUTINE "IZIPF"



SUBROUTINE RFG (COMPASS)

CALLING SEQUENCE:

RJ RFG (in COMPASS)
or RFG(N) (in FORTRAN, where N is
any number. The fraction then is
returned in RFG which is used as
a primary in an expression).

FUNCTION:

Generates and returns a random frac-
tion f between 0 and 1 (exclusive).

PARAMETERS:

None.

INPUT:

None.

OUTPUT:

Fraction f in Register X6.

REGISTER USAGE:

X0, X6, and X7. All others are saved
and restored

RETURN:

The instruction following RJ RFG.

EXAMPLE:

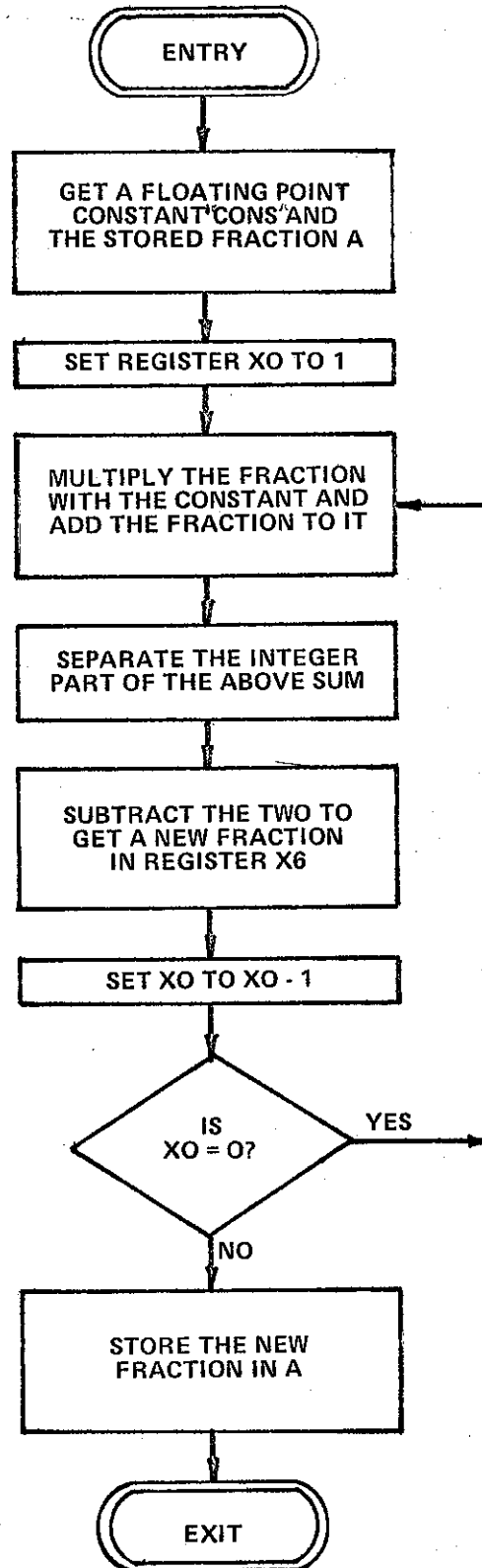
A section of a code making a random
binary choice between calling sub-
routine A or B is:

HALF	DATA	0.5
	SA1	HALF
	RJ	RFG
	FX1	X1-X6
	NG	X1,CALL.A
	RJ	B
	EQ	JOIN
CALL.A	RJ	A
JOIN	NO	

The same can be written in FORTRAN
as:

	IF (0.5-RFG(4)·LT·0·0)GO TO 5
	CALL B
	GO TO 6
5	CALL A
6	CONTINUE

SUBROUTINE "RFG"



	IDENT	RFG	
	ENTRY	RFG	
A	DATA	0.21500368942357854678532102	
CONS	DATA	55.73	
SAV	BSS	2	
RFG	BSS	1	
	SX7	B5	SAVE B5 REGISTER
	SA7	SAV	
	BX7	X5	SAVE X5 REGISTER
	SA7	SAV+1	ENTER RIG WITH A CONSTANT
	SA5	CONS	TO GET A RANDOM INTEGER
	BX6	X5	GET THE REAL NUMBER IN X5
RIG	SA5	A	MULTIPLY THE TWO NUMBERS
	FX6	X5*X6	WITH ONE ADDED TO THE SECOND
	FX5	X5+X6	CONVERT THE PRODUCT -INTEGER
	UX6	B5,X5	ADJ. VALUE TO CORRECT MAG.
	LX6	B5,X6	FLOAT THE RESULT FROM X6
	PX6	B0,X6	NORMALIZE IT
	NX6	X6	SUB. THE 2 NOS. TO GET NEW A
	FX7	X5-X6	
	NX5	X7	
	SX0	X0-1	CHECK FOR 1ST OR 2ND ENTRY
	ZR	X0,RIG	
	BX6	X5	STORE IT IN A
	SA6	A	RESTORE REGISTERS B5 & X5
	SA5	SAV	
	SB5	X5	
	SA5	SAV+1	
	EQ	RFG	
	END		

SUBROUTINE IRIG
(for FORTRAN programs only)

CALLING SEQUENCE:

IRIG (I)

FUNCTION:

Same as RIG except that it is designed for use in FORTRAN programs. It gives, with equiprobability, one of the set of random integers in the specified range of 1 to N.

PARAMETERS:

I is the range parameter. Used as a FORTRAN primary in a FORTRAN expression, it returns the random integer in the range 1 to I in IRIG (I).

EXAMPLE:

To generate random powers of 2 in the range 2^1 to 2^{32} , the following expression can be used.

IN = 2 ** IRIG (32)

COMMENT:

An entry SETIRIG(X) is provided in order to set the seed in IRIG. A call to SETIRIG will replace the current seed by X. X of course should be a fraction.

	IDENT	IRIG	
	ENTRY	IRIG,SETIRIG	
*	THIS FUNCTION SUBPROGRAM RETURNS A RANDOM INTEGER IN THE		
*	RANGE 1 TO N WHERE N IS AN INTEGER ARGUMENT IN THE		
*	FUNCTION CALL.		
A	DATA	0.6924036894235785467	
COMMA	DATA	17177777777777776453B	
SETIRIG	BSS	1	
SAL	SA1	B1	
	BX6	X1	
	SA6	A	
	EQ	SETIRIG	
IRIG	BSS	1	
	SA4	B1	
	BX6	X4	
	ZR	X4,IRIG	RETURN IF THE RANGE IS ZERO
	PX6	B0,X4	CONVERT THE RANGE TO FL. PT
	NX6	X6	NORMALIZE IT
	SA5	A	GET THE REAL NUMBER IN X5
	FX5	X5*X5	MULTIPLY THE TWO NUMBERS
	UX6	B5,X5	CONVERT PRODUCT TO INTEGER
	LX6	B5,X6	ADJ. VALUE TO CORRECT MAG.
	PX7	B0,X6	FLOAT THE RESULT FROM X6
	NX7	X7	NORMALIZE IT
	FX7	X5-X7	SUB. THE 2 NOS, GET NEW A
	NX7	X7	
	SA5	COMMA	MULTIPLY BY APPROX. 1 TO
	FX7	X5*X7	KEEP IRIG IN SHAPE
	SA7	A	STORE IT IN A
	SX7	1	
	IX6	X6+X7	
	EQ	IRIG	RETURN WITH RANDOM INTEGER
	END		IN X6

SUBROUTINE RIG
(for COMPASS programs only)

CALLING SEQUENCE: SX6 N
 RJ RIG

RETURN: The instruction following RJ RIG

FUNCTION: RIG generates and returns a random
 integer in the range 1 to N with
 all integers having equal proba-
 bilities of being chosen.

PARAMETERS: N

INPUT: The value of N should be in
 register X6.

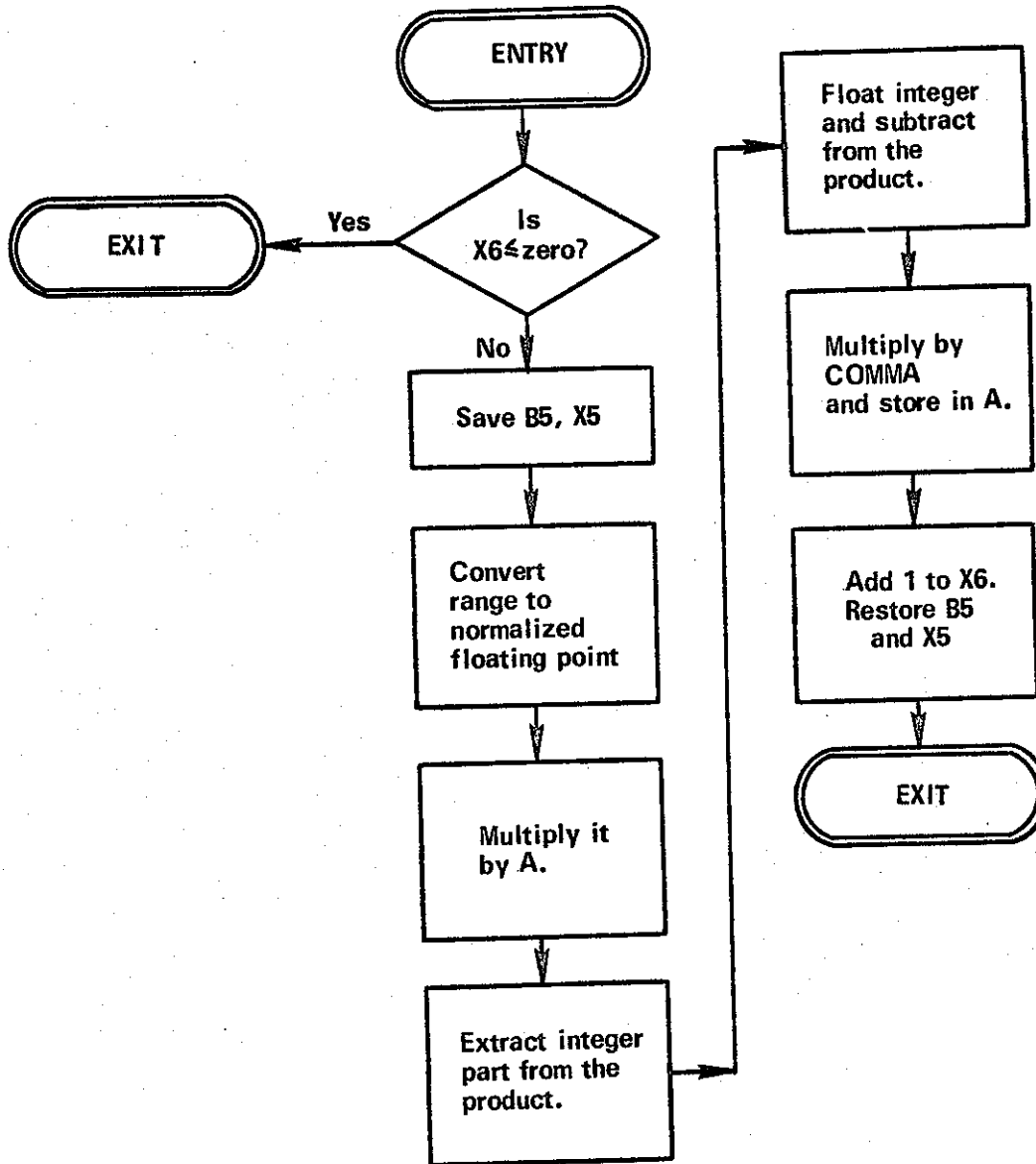
OUTPUT: The value of the random integer
 on return is in X6.

REGISTER USAGE: X6 and X7

COMMENT: RIG has to be declared EXTERNAL
 to the calling COMPASS program.

EXAMPLE: To choose a random integer in the
 range 1 to 32, the following
 instructions are used.
 SX6 32
 RJ RIG

SUBROUTINE "RIG"



Explanations:

1. Register X6 contains the fixed-point range on entry.
2. Register X6 contains the random integer on return.
3. Location A contains the floating-point pseudo-random number between 0 and 1.
4. COMMA is a number very close to 1 which is multiplied by A to prevent recurring digits in A.
5. Registers B5 and X5 are used for internal calculations.

	IDENT	RIG	
	ENTRY	RIG	
*	THIS IS A SUBROUTINE TO GENERATE A RANDOM INTEGER IN THE		
*	RANGE 1 TO N. THE VALUE OF N IS ENTERED IN REGISTER X6		
*	AND THE RESULTING RANDOM INTEGER IS ALSO RETURNED IN		
*	REGISTER X6.		
A	DATA	0.21500368942357854678532102	
COMMA	DATA	171777777777777657453B	
SAV	BSS	2	
RIG	BSS	1	
	PL	X6,*+1	IF NOT POSITIVE, RETURN
	EQ	RIG	
	SX7	B5	
	SA7	SAV	SAVE B5 REGISTER
	BX7	X5	
SA7	SA7	SAV+1	SAVE X5 REGISTER
	PX6	B0,X6	CONVERT THE RANGE TO FL. PT.
	NX6	X6	NORMALIZE IT
	SA5	A	GET THE REAL NUMBER IN X5
	FX5	X5*X6	MULTIPLY THE 2 NUMBERS
	UX6	B5,X5	CONV. PRODUCT TO INTEGER
	LX6	B5,X6	ADJ. VALUE TO CORRECT MAG.
	PX7	B0,X6	FLOAT THE RESULT FROM X6
	NX7	X7	NORMALIZE IT
	FX7	X5-X7	SUB. THE 2 NOS. TO GET NEW A
	SA5	COMMA	
	FX7	X5*X7	MULTIPLY BY APPROX. 1 TO
	NX7	X7	KEEP IRIG IN SHAPE
	SA7	A	STORE IT IN A
	SA5	SAV	RESTORE REGISTERS B5 & X5
	SB5	X5	
	SA5	SAV+1	
	SX7	1	
	IX6	X6+X7	
	EQ	RIG	RESTORE WITH RANDOM INTEGER
	END		IN X6

SUBROUTINE SHUFFLE

CALLING SEQUENCE:

(in COMPASS)

SB1 L
SB2 =N
RJ SHUFFLE or REIHE

(in FORTRAN)

CALL SHUFFLE (L,=N) or REIHE (L,=N)

RETURN:

The instruction following RJ SHUFFLE

FUNCTION:

Random shuffling of the elements of an array (Entry SHUFFLE) or the production of a set of unique numbers in a random array from 1 to N, where N is the length of the array (Entry REIHE).

INPUT PARAMETERS:

The address of the first element of the array should be in register B1 and the length of the array should be in register B2. (This is done automatically in FORTRAN as shown in the example below).

OUTPUT PARAMETERS:

B1 contains the address of the zeroth element of the array.

REGISTER USAGE:

All local registers except X6 are saved and restored.

COMMENT:

SHUFFLE has to be declared external to the calling COMPASS sub-program. It also uses RIG.

EXAMPLE:

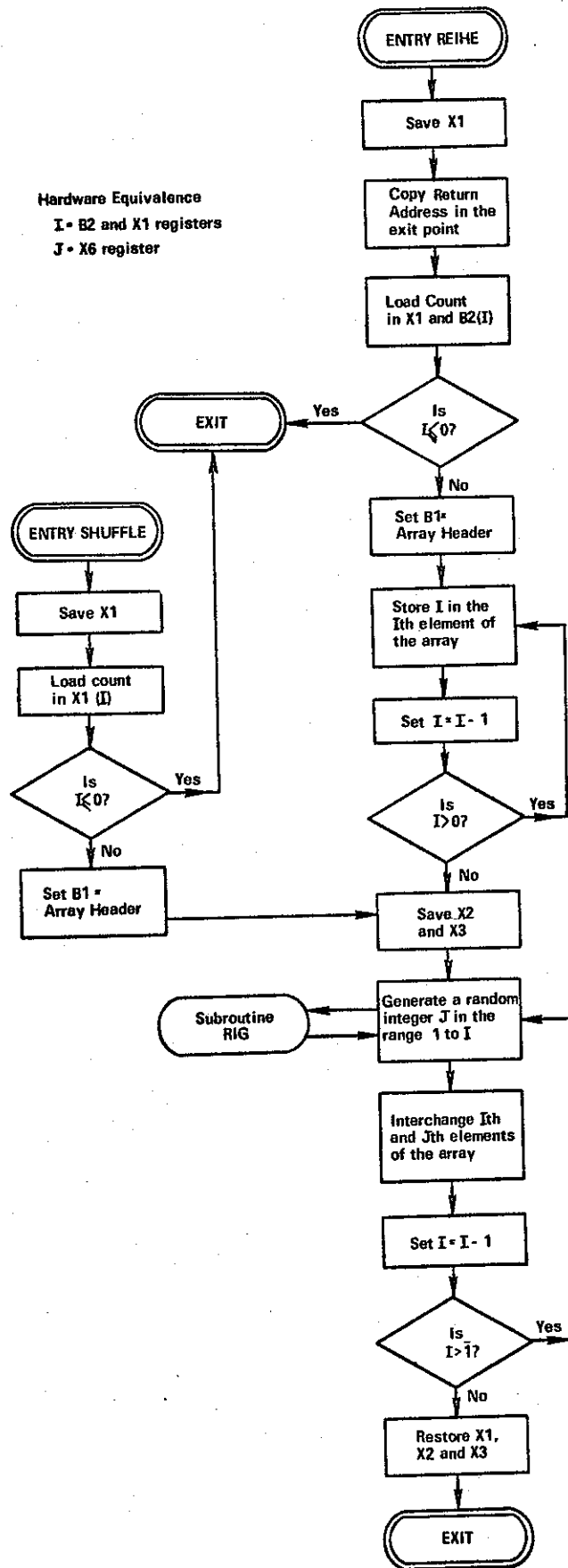
To generate a 12-tone row in an array L of size 12, where numbers 1 to 12 correspond to the 12 tones of the chromatic scale, we may use in FORTRAN:

CALL REIHE (1, 12)
or in COMPASS:

SB1 L
SB2 =12
RJ REIHE

SUBROUTINE "SHUFFLE"

Hardware Equivalence
 I = B2 and X1 registers
 J = X6 register



	IDENT	SHUFFLE	
	ENTRY	SHUFFLE,REIHE	
*	THIS ROUTINE SHUFFLES (ENTRY SHUFFLE) AN ARRAY OF		
*	SPECIFIED LENGTH OR RETURNS RANDOM INTEGERS IN THE		
*	RANGE 1 TO N IN THE ARRAY OF LENGTH N (ENTRY REIHE)		
	EXT	RIG	
SAV	BSS	3	
REIHE	BSS	1	
	BX6	X1	
	SA6	SAV	
	SA1	REIHE	COPY THE EXIT POINT TO
	BX6	X1	ENSURE CORRECT RETURN, THE
	SA6	SHUFFLE	NORMAL RETURN POINT SHUFFLE
	SA1	B2	GET THE LENGTH OF LIST IN X1
	SB2	X1	
	LT	B2,REIHE	RETURN IF THE LENGTH IS NEG.
	SB1	B1-1	
AGAIN	SX6	B2	CREATE A SEQUENCE OF NOS.
	SA6	B1+B2	AND STORE THEM IN THE ARRAY
	SB2	B2-1	
	GT	B2,AGAIN	AFTER FINISHING THIS TASK,
	EQ	SHUFFL	SHUFFLE THIS ARRAY
SHUFFLE	BSS	1	
	BX6	X1	SAVE REGISTERS OF LOCAL USE
	SA6	SAV	
	SA1	B2	GET THE LENGTH OF LIST IN X1
	NG	X1,SHUFFLE	RETURN IF LENGTH IS NEG.
	SB1	B1-1	
SHUFFL	BX6	X2	
	SA6	SAV+1	
	BX6	X3	
	SA6	SAV+2	
LOOP	BX6	X1	GENERATE A RANDOM INTEGER J
	RJ	RIG	IN THE RANGE 1 TO I
	SA2	X1+B1	
	SA3	B1+X6	
	BX6	X2	
	SA6	A3	INTERCHANGE THE I-TH AND THE
	BX6	X3	J-TH ELEMENTS IN THE LIST
	SA6	A2	
	SX1	X1-1	DECREASE I BY 1
	SX6	X1-2	
	PL	X6,LOOP	TEST IF I>1. IF YES GO TO
	SA1	SAV	LOOP RESTORE LOC. USED REGS.
	SA2	SAV+1	
	SA3	SAV+2	
	EQ	SHUFFLE	
	END		

BIBLIOGRAPHY

- Cherry, Colin. On Human Communication, A Review, A Survey, and A Criticism. New York: Science Editions, Inc., 1961. 333 pp.
- Gena, Peter. Homage to G.K. Zipf. Unpublished M.A. thesis. State University of New York at Buffalo, 1972. 24 numbered leaves.
- Hiller, Lejaren. "Information Theory and Musical Analysis," Technical Report No. 5. University of Illinois Experimental Music Studio, July, 1962. 40 pp.
- "Programming the I-Ching Oracle," Computer Studies in the Humanities and Verbal Behavior. Vol. III, No. 3, October, 1970. pp. 130 - 143.
- Hiller, Lejaren and Antonio Leal. "Revised MUSICOMP Manual," Technical Report No. 13. University of Illinois Experimental Music Studio, May, 1966. 88 pp.
- Moles, Abraham. Information Theory and Esthetic Perception. Translated by Joel E. Cohen. Urbana: University of Illinois Press, 1966. 217 pp.
- Xenakis, Iannis. Formalized Music, Thought and Mathematics in Composition. Translated by C. Butchers, G. W. Hopkins, and Mr. and Mrs. J. Callifour. Bloomington: Indiana University Press, 1971. 272 pp.
- Zipf, G. K. Human Behavior and the Principle of Least Effort. Cambridge, Mass.: Addison-Wesley Publishing Co., 1949.