

IN THE BEGINNING I
(ELECTRONIC)

DAVID ROSENBOOM

1978

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IN THE BEGINNING

(1978-1981)

DAVID ROSENBOOM

General Notes on the Series of Works

The macro-title, *In the Beginning*, refers to a series of works created from 1978 through 1981. These works were written for a variety of large and small instrumental ensembles, computer-aided electronic music instruments, film/video, and synthetic speech. The last of these is, in turn, also a series of pieces, titled, *Future Travel*, documented by an LP record (Street Records) and more recently a CD (New World Records) released under the same name. All of the works focus, among other things, on the development of a unique harmonic, rhythmic and melodic language. This language takes inspiration from research on a model of proportional structures in music and on an evolving, topologically modeled theory of musical "shape" perception. There is programmatic content in the works, which relates to human beings' propensity to attempt to double themselves in both religion and technology and which develops a scenario for the evolution of human consciousness toward the birth of a macroscopic Earth-organism to which all individual entities contribute.

The *In the Beginning* system of proportions emphasizes sets of irreducible ratios with inversive symmetry and exploits both harmonic (linear) and sub-harmonic (non-linear) relations. These are used to construct cycles of growth and decay, resulting from the natural reinforcement of proportions with each other, moving toward maximum resonance and away from it. Thus, a sense of natural phasing occurs, though all movement takes place through proportional modulation by quantum steps. Additionally, stochastic methods are used to implement smooth transitions from areas where the probability is high that one or more sets of proportions will be predominant in the musical material to areas where others take over.

Many of the horizontal (ex. melodic) forms result from the use of a limited set of prototype shapes or contours. These are applied to the other musical materials (ex. pitch, rhythm, timbre) currently predominant in the space of proportions. Each section of music has its own unique shape determinants and modulation schemes. The contours themselves resulted from physiological analyses of human expressive gestures carried out in preparation for the works.

The compositions mirror nature in the creation of singularities, particles, or differentiated units of perception. They do this by making use of the idea of resonance as a key to creation within an initially smooth medium, like undifferentiated space or the undisturbed surface of a calm lake. Resonance represents the force of drawing together in patterned relationships, which outline natural ontological evolution. The harmonic and rhythmic space is the medium; the composer and performers provide the initiating force; the system of proportions articulates growth when interactions produce reinforcement and decay when they produce collisions.

Recordings for the entire *In the Beginning* series are now documented on CDs (New World Records).

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IN THE BEGINNING I (ELECTRONIC)

DAVID ROSENBOOM

DEKALB/TORONTO 1978

The title, *In the Beginning*, refers to a rhythmic and harmonic construction for percussion, sustaining pitch, and melodic instruments. This construction is treated as a master structure from which numerous subset realizations can be created to serve the orchestrational demands of specific groups of performers.

The master structure is based on a system of proportions that emphasizes irreducible ratios (e.g. 2/11, 3/10, etc.). It exploits both harmonic and sub-harmonic relationships. The ratios are applied to all musical parameters toward which compositional attention is directed in a given realization. The relationships are used to construct cycles of growth and decay resulting from natural reinforcement of proportions moving toward maximum resonance and away from it. Thus, a sense of natural phasing occurs, though all movement takes place through proportional modulation by quantum steps. There are no strictly gradual or continuous processes, though movement from a rhythmic pattern of 11's to a pattern of 10's might give such an illusion.

Contained herein is a subset realization made for the 300 Series Electric Music Box, a computer assisted electronic music instrument developed at Buchla and Associates in Berkeley, California. At the heart of this system lies a computer language for composition and live performance, called PATCH-IV. In order to thoroughly understand and attempt to make a realization of this score one would naturally need to become familiar with its programming language. This can be accomplished by referring to the *User's Guide to PATCH-IV and the Series 300 Electric Music Box*. Nevertheless, it is hoped that sufficient information is presented here to enable one to gain a sense of the materials of the piece, especially in association with a hearing of it. A complete enough representation is presented for anyone who is familiar with PATCH-IV and has access to a 300 Series system to make a realization. Similar realizations may be developed for other systems and instrumental combinations.

A few definitions of symbols used in the score are provided here to assist those not familiar with PATCH-IV.

K__	a numbered key used as an abstract definition of an action stimulus. Keys may either be DEF (definition) keys or STM (stimulus) keys. DEF keys make STM keys available for action or change their meaning during the course of a program. STM keys are always associated with an action response, which takes place immediately upon the key being activated.
VFN	a computer controlled, time-variant, function designation always associated with a voltage output port number.
VLT	a computer controlled, voltage offset designation always associated with an output port number.
VSM	a computer controlled, voltage source and multiplier designation always associated with a voltage input and an output port number.

SOURCE a voltage source input available to computer controlled VSM designations with an input port number.

Each box in the following system configuration diagrams contains a list of all parameters that are controlled during a performance of the piece. Those not associated with a computer control function are manually tuned and/or varied during the performance for best sound.

The piece proceeds through seven sections plus a short introduction. The proportions of lengths of the sections are derived from the following set, (1/2, 1/3, 2/3). The character of each section is determined by the primary set of proportions emphasized within it. These proportions are applied in the realms of pitch, rhythms articulated by eleven "percussion" instruments, timbre and waveform modulation cycles, and note duration values for four sustained pitch voices. The proportions used in each section are detailed in a ratio usage table, which follows.

Following this are two tables, which show the initial diad sets of tones used to articulate the given proportions in the pitch domain. These initial sets plus the ratio usage table are used to derive the source sets of chords used for each section of the composition. These chords are listed subsequently. Finally, the initial rhythm set, the waveform and timbre control function set, and the note duration set are all used to articulate the same primary groups of proportions.

The percussion instruments, which articulate the rhythms, are derived from spectrally segmented and gated white noise. The instruments each have center frequency tendencies, which form three groups of constant "Bark" interval pitch centers. Control sequences, which cause given instruments to play given rhythms, make use of cycles that add the 11/13 proportion to the primary set of ratios.

Once the performer becomes very familiar with the character and operation of the program for the composition, he may wish to interact manually with the running program to subtly alter the distributions, particularly in Section 4. Additionally, he/she is free to perform simple melodic improvisations over various sections using the mode specified in its ascending and descending forms. The basic character and flow of the piece, together with the personalities of the sections, should always be maintained, however.

The system configuration diagrams are based on modules of the 300 Series system. All lines interconnecting boxes are patch connections that must be made by the performer.

Lastly, a PATCH-IV listing of the complete composition form description is provided, which may be used directly to realize the piece. The listing consists of three tables. The PATCH TABLE lists all stimulus-response definitions including performable keyboard actions. The FUNCTION TABLE lists all time-variant voltage function descriptions, which may be accessed at any of the voltage output ports according to definitions contained in the PATCH TABLE. The SEQUENCE TABLE contains a list of timed, sequential actions, which are cycled in various ways by a number of software sequencers and their associated counters. This table contains the master list of all sequential actions programmed for the composition.

After the equipment is set up and the program loaded into the computer, the waveform generators must be tuned. Activating K43 (key number 43) will define all pitch control keys. The system may then be tuned by using the keys listed in the initial diad set tables. To let the composition play in its automatic performance mode, activate K82 followed by K98. This will start the master control sequencer, which will in turn activate the processes required by each section. The computer clock must be adjusted for the indicated tempo. Further examination of the program listing will reveal the actions programmed for other keys, which may be activated during a performance in order to interact with the running program in real time.

RATIO USAGE TABLE

Section 1	7/6, 11/2, plus reciprocals and results of combinations and octave transpositions of individual voices
Section 2	8/5, 10/3, plus reciprocals and results of combinations and octave transpositions of individual voices
Section 3	7/6, 9/4, plus reciprocals and results of combinations and octave transpositions of individual voices
Section 4	1/12, 2/11, 3/10, 4/9, 5/8, 6/7, 1/2, 2/3, 3/4, 4/5, 5/6, 7/8, 8/9, 9/10, 10/11, 11/12, plus reciprocals
Section 5	all the ratios of Section 4 with greater emphasis given to the ratios of Section 3.
Section 6	all the ratios of Section 4 with greater emphasis given to the ratios of Section 2.
Section 7	all the ratios of Section 4 with greater emphasis given to the ratios of Section 1.
Note:	When referring to pitch, a ratio expresses a quantitative relationship among the frequencies of two tones (diad) and not to the tuning of a single note, as defined by H. Partch. Similarly, when referring to rhythmic patterns, durations, control functions, waveforms, and other things, a ratio also expresses a quantitative relationship between two items.

INITIAL DIAD SET 1:

VL T__	XX	94	92	88	84	80	76
harmonic numbers		12	11	10	9	8	7
		1	2	3	4	5	6

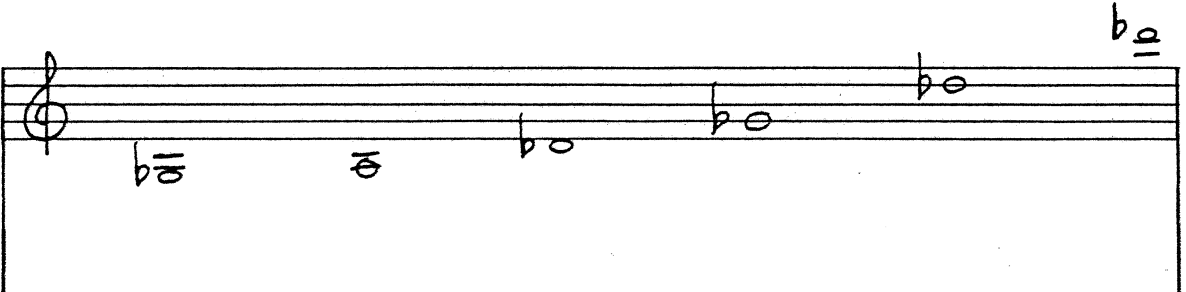
VL T__	XX	08	32	46	56	64	70
--------	----	----	----	----	----	----	----

STM (stimulus) key nos.

K12 K14 K15 K17 K19 K20

Note: A VL T__ XX step of one results in a pitch step of approximately one-fourth tone, (quarter step).

INITIAL DIAD SET 2:



VL T__ XX

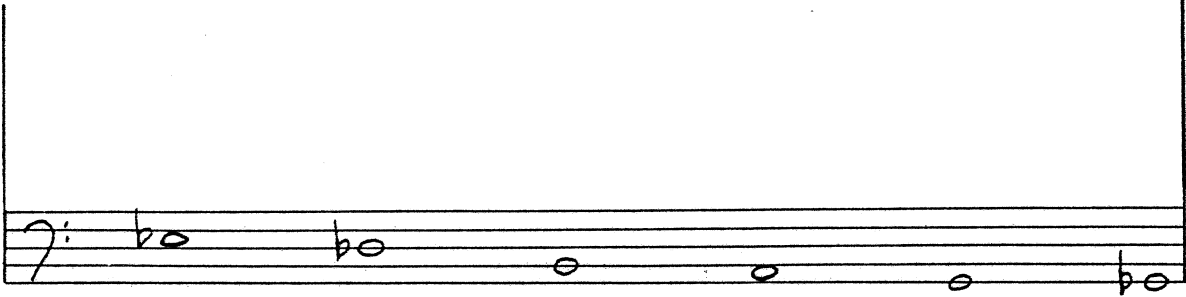
4248566680A4

sub-harmonic numbers

6	5	4	3	2	1
7	8	9	10	11	12

VL T__ XX

343228242018

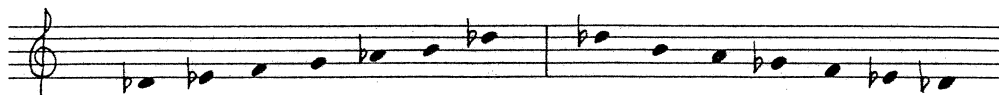


STM (stimulus) key nos.

K22K24K26K27K29K31

ASCENDING MODE

DESCENDING MODE

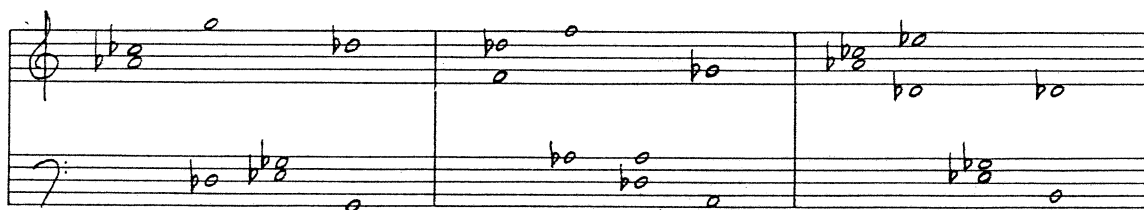


CHORDAL SOURCE SETS

SECTIONS 1 & 7:

SECTIONS 2 & 6:

SECTIONS 3 & 5:



SECTIONS 4, 5, 6 & 7:

The image displays four systems of handwritten musical notation, each consisting of a treble and bass staff. The notation includes various notes, rests, and accidentals (sharps, flats, and double flats).

- System 1:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 2:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 3:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 4:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 5:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 6:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).
- System 7:** Treble staff has notes with flats (Bb, Eb, Ab, Gb, Fb, Eb). Bass staff has notes with double flats (Bbb, Ebb, Abb, Gbb, Fbb, Ebb).

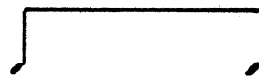
INITIAL RHYTHM SET, ♩ ≈ 65MM:

DEF (definition) key nos.:

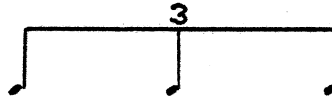
K32



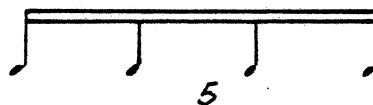
K33



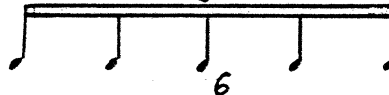
K34



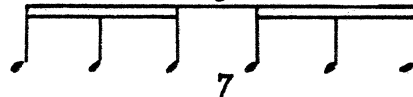
K35



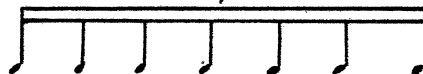
K36



K37



K38



K39



K40



K41



K42



K49



(rest)

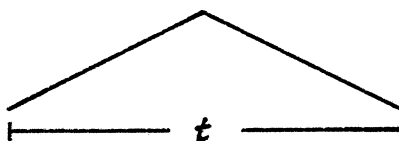
"PERCUSSION" INSTRUMENT SET:

STM (stimulus) key nos.:

K01	250 Hz	center frequency	
K02	350 Hz	"	"
K03	500 Hz	"	"
K04	630 Hz	"	"
K05	1.0 KHz	"	"
K06	1.3 KHz	"	"
K07	1.6 KHz	"	"
K08	2.6 KHz	"	"
K09	3.5 KHz	"	"
K10	5.0 KHz	"	"
K11	8.0 KHz	"	"

WAVEFORM AND TIMBRE CONTROL FUNCTION SET:

Prototype function:



STM (stimulus) key nos:

t ratios

t=

K59	<u>11</u>	10.12 secs.
K61	<u>10</u>	9.20 "
K63	<u>9</u>	8.28 "
K71	<u>8</u>	7.36 "
K73	<u>7</u>	6.44 "
K75	<u>6</u>	5.52 "

NOTE DURATION TABLE

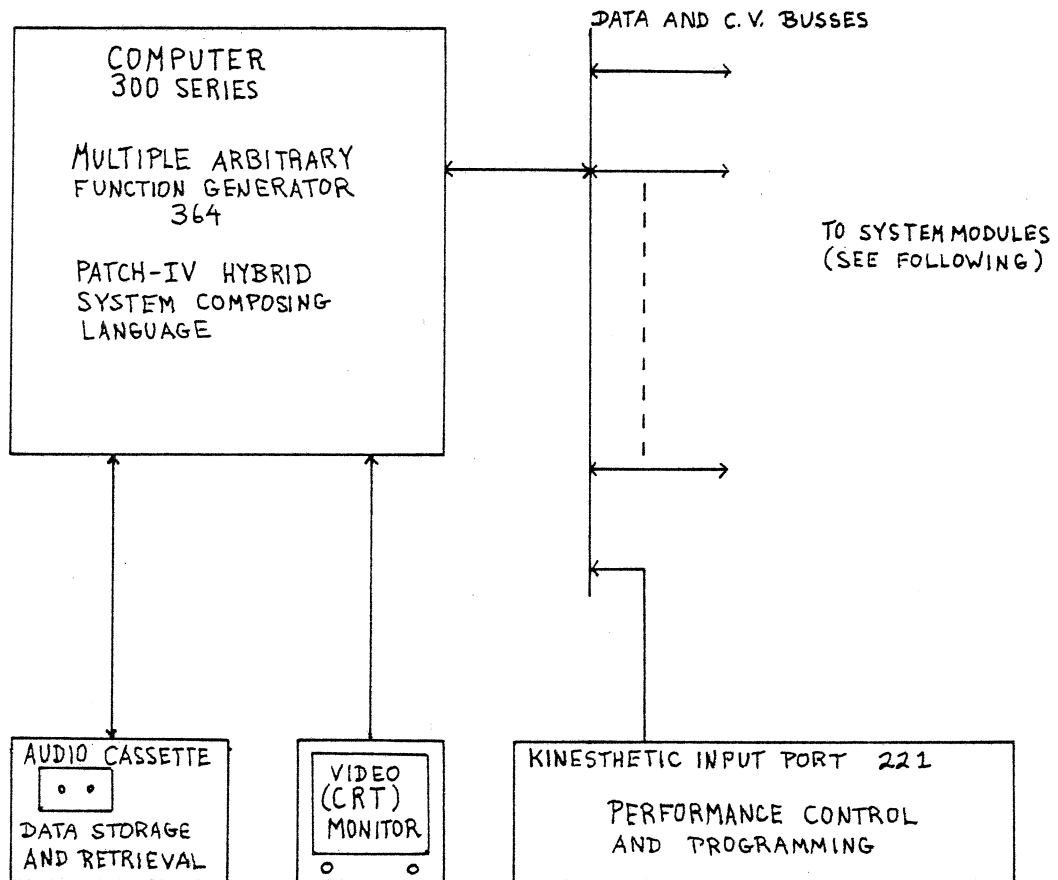
Duration values in seconds:

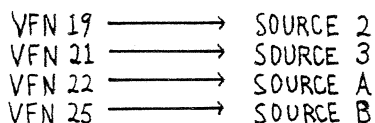
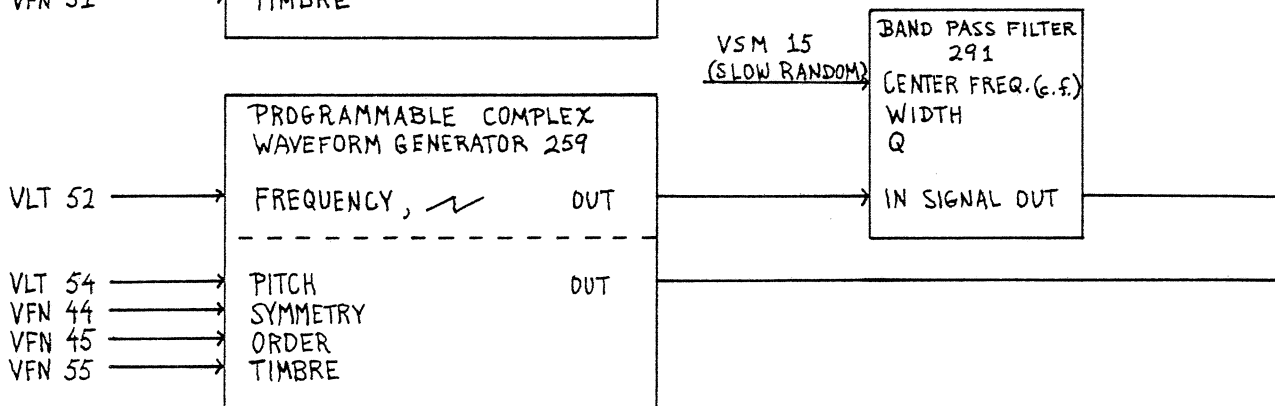
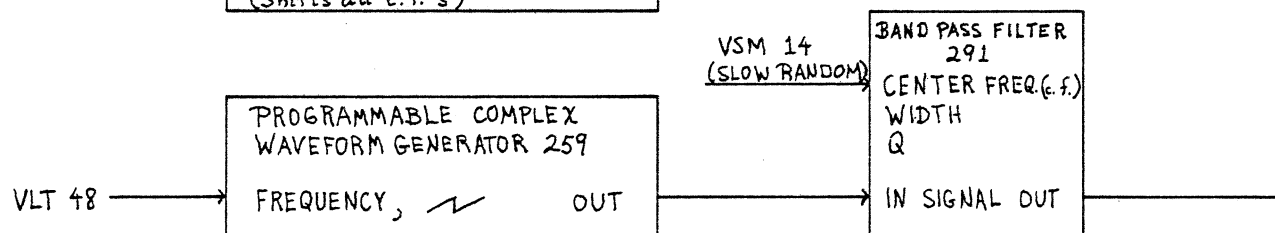
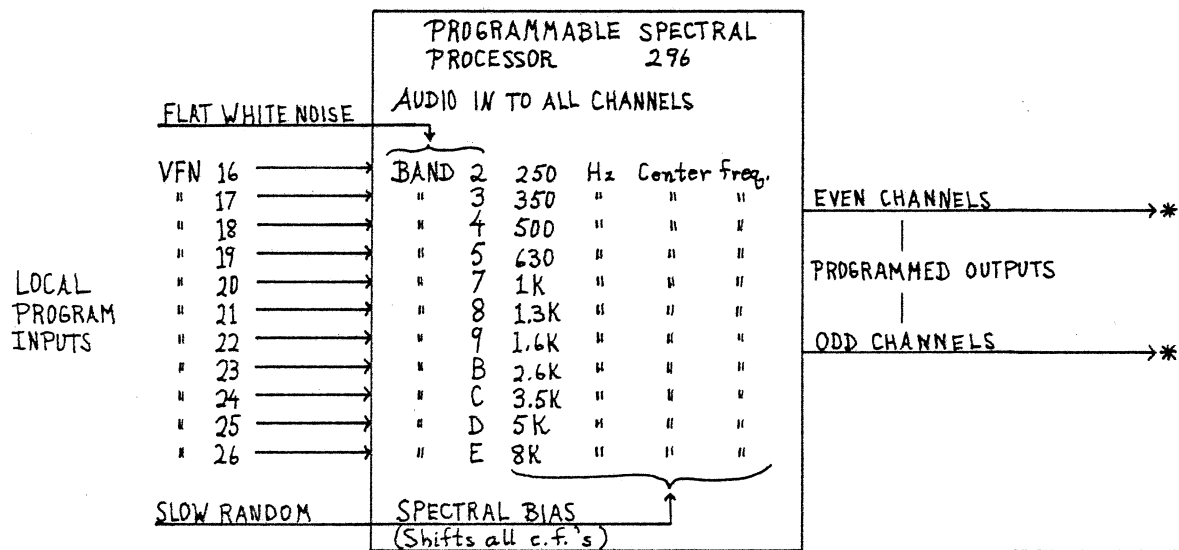
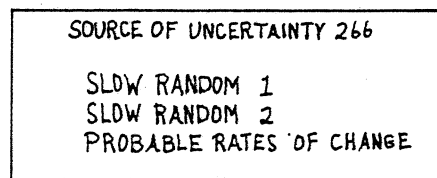
Approximate ratios:

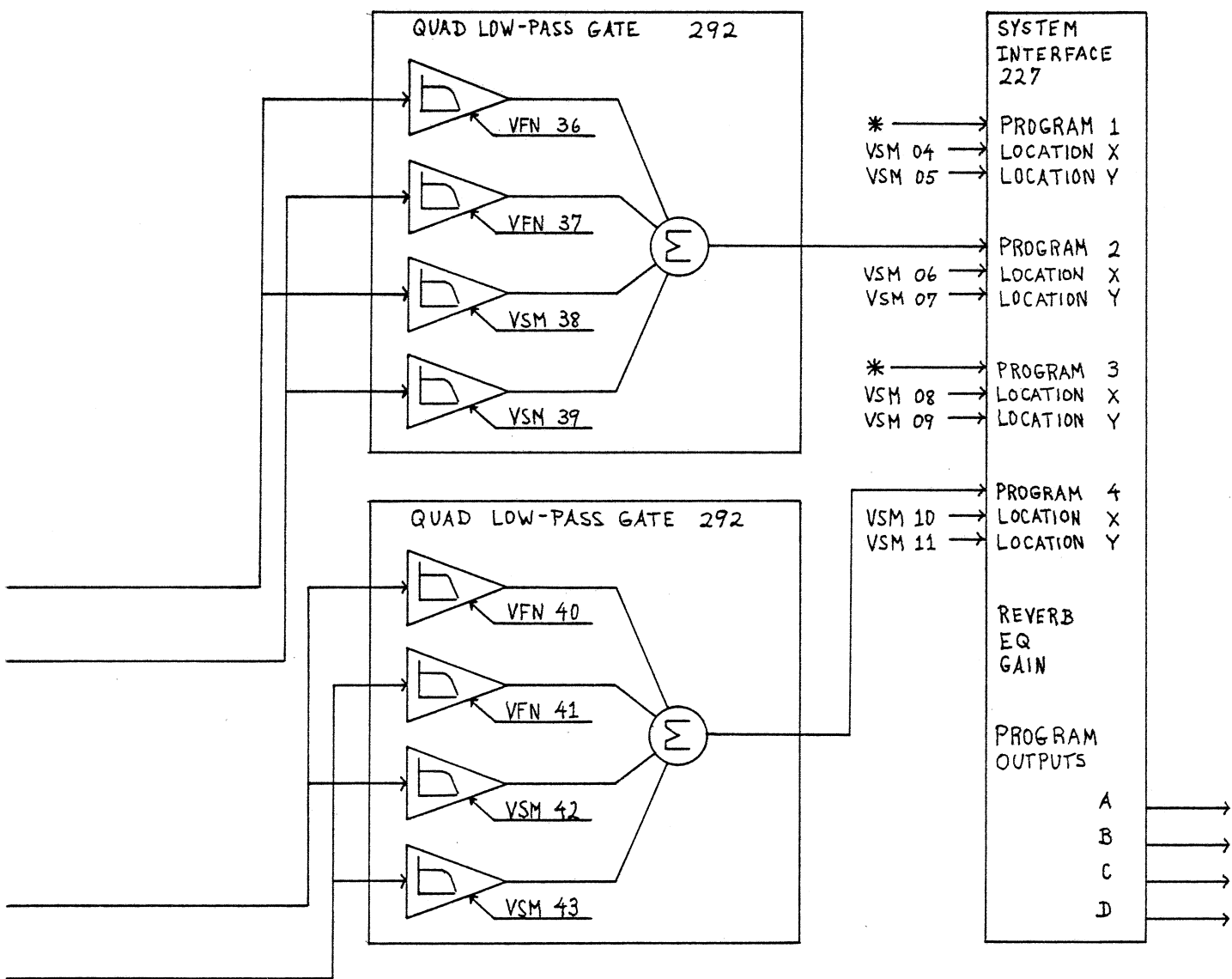
00.92	<u>1</u>
01.84	<u>2</u>
02.76	<u>3</u>
03.68	<u>4</u>
04.60	<u>5</u>
05.52	<u>6</u>
06.44	<u>7</u>
07.36	<u>8</u>
08.28	<u>9</u>
09.20	<u>10</u>
10.12	<u>11</u>

IN THE BEGINNING
(ELECTRONIC)

SYSTEM CONFIGURATION DIAGRAMS







PATCH TABLE

These blocks select rhythmic cycles from the set of thirteen function specifications defined for each of the eleven "percussion" instruments.

```

@@DEF STM ADDRS DA
K32 K01 VFN16 01
K32 K02 VFN17 01
K32 K03 VFN18 01
K32 K04 VFN19 01
K32 K05 VFN20 01      rhythm 1
K32 K06 VFN21 01
K32 K07 VFN22 01
K32 K08 VFN23 01
K32 K09 VFN24 01
K32 K10 VFN25 01
K32 K11 VFN26 01
K33 K01 VFN16 05
K33 K02 VFN17 05
K33 K03 VFN18 05
K33 K04 VFN19 05
K33 K05 VFN20 05      rhythm 2
K33 K06 VFN21 05
K33 K07 VFN22 05
K33 K08 VFN23 05
K33 K09 VFN24 05
K33 K10 VFN25 05
K33 K11 VFN26 05
K34 K01 VFN16 09
K34 K02 VFN17 09
K34 K03 VFN18 09
K34 K04 VFN19 09
K34 K05 VFN20 09      rhythm 3
K34 K06 VFN21 09
K34 K07 VFN22 09
K34 K08 VFN23 09
K34 K09 VFN24 09
K34 K10 VFN25 09
K34 K11 VFN26 09
K35 K01 VFN16 0D
K35 K02 VFN17 0D
K35 K03 VFN18 0D
K35 K04 VFN19 0D
K35 K05 VFN20 0D      rhythm 4
K35 K06 VFN21 0D
K35 K07 VFN22 0D
K35 K08 VFN23 0D
K35 K09 VFN24 0D
K35 K10 VFN25 0D
K35 K11 VFN26 0D
K36 K01 VFN16 11
K36 K02 VFN17 11
K36 K03 VFN18 11
K36 K04 VFN19 11
K36 K05 VFN20 11      rhythm 5
K36 K06 VFN21 11
K36 K07 VFN22 11
K36 K08 VFN23 11
K36 K09 VFN24 11

```

K36	K10	VFN25	11	
K36	K11	VFN26	11	
K37	K01	VFN16	15	_____
K37	K02	VFN17	15	
K37	K03	VFN18	15	
K37	K04	VFN19	15	
K37	K05	VFN20	15	
K37	K06	VFN21	15	rhythm 6
K37	K07	VFN22	15	
K37	K08	VFN23	15	
K37	K09	VFN24	15	
K37	K10	VFN25	15	
K37	K11	VFN26	15	_____
K38	K01	VFN16	19	
K38	K02	VFN17	19	
K38	K03	VFN18	19	
K38	K04	VFN19	19	
K38	K05	VFN20	19	
K38	K06	VFN21	19	rhythm 7
K38	K07	VFN22	19	
K38	K08	VFN23	19	
K38	K09	VFN24	19	
K38	K10	VFN25	19	
K38	K11	VFN26	19	_____
K39	K01	VFN16	23	
K39	K02	VFN17	23	
K39	K03	VFN18	23	
K39	K04	VFN19	23	
K39	K05	VFN20	23	
K39	K06	VFN21	23	rhythm 8
K39	K07	VFN22	23	
K39	K08	VFN23	23	
K39	K09	VFN24	23	
K39	K10	VFN25	23	
K39	K11	VFN26	23	_____
K40	K01	VFN16	27	
K40	K02	VFN17	27	
K40	K03	VFN18	27	
K40	K04	VFN19	27	
K40	K05	VFN20	27	
K40	K06	VFN21	27	rhythm 9
K40	K07	VFN22	27	
K40	K08	VFN23	27	
K40	K09	VFN24	27	
K40	K10	VFN25	27	
K40	K11	VFN26	27	_____
K41	K01	VFN16	31	
K41	K02	VFN17	31	
K41	K03	VFN18	31	
K41	K04	VFN19	31	
K41	K05	VFN20	31	
K41	K06	VFN21	31	rhythm 10
K41	K07	VFN22	31	
K41	K08	VFN23	31	
K41	K09	VFN24	31	
K41	K10	VFN25	31	
K41	K11	VFN26	31	_____
K42	K01	VFN16	35	
K42	K02	VFN17	35	
K42	K03	VFN18	35	
K42	K04	VFN19	35	
K42	K05	VFN20	35	
K42	K06	VFN21	35	rhythm 11
K42	K07	VFN22	35	
K42	K08	VFN23	35	
K42	K09	VFN24	35	

K42	K10	VFN25	35	
K42	K11	VFN26	35	
K43	K12	VLT48	08	diad 1
K43	K12	VLT50	94	
K43	K13	DTA00	20	octave shifts/waveform selection
K43	K13	DTA02	00	
K43	K14	VLT48	32	diad 2
K43	K14	VLT50	92	
K43	K15	VLT48	46	diad 3
K43	K15	VLT50	88	
K43	K16	DTA00	21	octave shifts/waveform selection
K43	K16	DTA02	01	
K43	K17	VLT48	56	diad 4
K43	K17	VLT50	84	
K43	K18	DTA00	22	octave shifts/waveform selection
K43	K18	DTA02	02	
K43	K19	VLT48	64	diad 5
K43	K19	VLT50	80	
K43	K20	VLT48	70	diad 6
K43	K20	VLT50	76	
K43	K21	DTA04	20	octave shifts/waveform selection
K43	K21	DTA06	00	
K43	K22	VLT52	36	diad 7
K43	K22	VLT54	42	
K43	K23	DTA04	21	octave shifts/waveform selection
K43	K23	DTA06	01	
K43	K24	VLT52	32	diad 8
K43	K24	VLT54	48	
K43	K25	DTA04	22	octave shifts/waveform selection
K43	K25	DTA06	02	
K43	K26	VLT52	28	diad 9
K43	K26	VLT54	56	
K43	K27	VLT52	24	diad 10
K43	K27	VLT54	66	
K43	K29	VLT52	20	diad 11
K43	K29	VLT54	80	
K43	K31	VLT52	18	diad 12
K43	K31	VLT54	A4	
K43	K43	VLT48	72	
K43	K43	VLT50	72	
K43	K43	VLT52	72	sets oscillators of "A" pitch for autotune function
K43	K43	VLT54	72	
K43	K53	VLT54	80	keyboard pitch definitions for live melodic performance
K43	K54	DTA06	00	
K43	K55	VLT54	84	
K43	K56	DTA06	01	
K43	K57	VLT54	88	octave shift of melody voice
K43	K58	VLT54	92	
K43	K60	VLT54	94	
K43	K62	VLT54	A0	
K43	K64	VLT54	A4	ascending mode key assignments
K43	K65	VLT54	80	
K43	K66	DTA06	02	
K43	K67	VLT54	84	
K43	K68	DTA06	03	octave shift of melody voice
K43	K69	VLT54	88	
K43	K70	VLT54	90	
K43	K72	VLT54	96	
K43	K74	VLT54	A0	descending mode
K43	K76	VLT54	A4	
K49	K01	VFN16	04	
K49	K02	VFN17	04	
K49	K03	VFN18	04	"rests" (stops) for "percussion" instruments
K49	K04	VFN19	04	
K49	K05	VFN20	04	
K49	K06	VFN21	04	

K49	K07	VFN22	04	
K49	K08	VFN23	04	
K49	K09	VFN24	04	
K49	K10	VFN25	04	
K49	K11	VFN26	04	
K51	K28	VFN36	50	
K51	K28	VFN37	50	
K51	K28	VFN40	50	activates fade up of sustained voices
K51	K28	VFN41	50	
K51	K30	VFN36	51	
K51	K30	VFN37	51	
K51	K30	VFN40	51	activates fade down of sustained voices
K51	K30	VFN41	51	
K51	K59	VFN51	40	
K51	K61	VFN34	44	
K51	K63	VFN35	48	
K51	K71	VFN55	42	activates waveform and timbre controlling functions
K51	K73	VFN44	46	
K51	K75	VFN45	4A	
K51	KA0	VSM36	2A	
K51	KA0	VSM37	AA	
K51	KA0	VSM40	3A	routes rhythm functions to pitched voices
K51	KA0	VSM41	BA	
K51	KA1	VSM36	FF	
K51	KA1	VSM37	FF	"disconnects" rhythm functions from pitched voices
K51	KA1	VSM40	FF	
K51	KA1	VSM41	FF	
K82	K83	VSM04	4A	
K82	K83	VSM05	CA	
K82	K83	VSM06	CA	
K82	K83	VSM07	4A	
K82	K83	VSM08	4A	activates sound location controls
K82	K83	VSM09	CA	
K82	K83	VSM10	CA	
K82	K83	VSM11	4A	
K82	K83	VSM14	4A	activates band-pass filter c.f. controls
K82	K83	VSM15	CA	
K82	K83	SEQ	1 01	this block defines controls for sequential programs listed in SEQUENCE TABLE below
K82	K84	SEQ	2 0E	
K82	K85	SEQ	3 37	
K82	K86	SEQ	4 59	
K82	K87	SEQ	4 63	
K82	K88	SEQ	4 6D	
K82	K89	SEQ	4 77	
K82	K90	SEQ	5 5E	triggers for starting sequencers at specified locations in SEQUENCE TABLE below
K82	K91	SEQ	5 68	
K82	K92	SEQ	5 72	
K82	K93	SEQ	5 82	
K82	K94	SEQ	6 77	
K82	K94	SEQ	7 82	
K82	K98	SEQ	A 8D	
K99	K83	SEQ	1 0D	
K99	K84	SEQ	2 0D	
K99	K85	SEQ	3 0D	
K99	K86	SEQ	4 0D	
K99	K90	SEQ	5 0D	triggers for stopping sequencers
K99	K94	SEQ	6 0D	
K99	K94	SEQ	7 0D	
K99	K98	SEQ	A 0D	

FUNCTION TABLE

LN-	TIME-	I	VL	CTRL
00	00.001		00	STOP
01	00.001		C7	
02	00.120	I	03	
03	00.800	I	00	J 01
04	00.001		00	STOP
05	00.001		C7	
06	00.080	I	03	
07	00.380	I	00	J 05
08	00.001		00	STOP
09	00.001		C7	
0A	00.080	I	03	
0B	00.227	I	00	J 09
0C	00.001		00	STOP
0D	00.001		C7	
0E	00.060	I	03	
0F	00.170	I	00	J 0D
10	00.001		00	STOP
11	00.001		C7	
12	00.050	I	03	
13	00.134	I	00	J 11
14	00.001		00	STOP
15	00.001		C7	
16	00.040	I	03	
17	00.113	I	00	J 15
18	00.001		00	STOP
19	00.001		C7	
1A	00.030	I	03	
1B	00.101	I	00	J 19
1C	00.001		00	STOP
1D	00.001		00	STOP
1E	00.001		00	STOP
1F	00.001		00	STOP
20	00.001		00	STOP
21	00.001		00	STOP
22	00.001		00	STOP
23	00.001		C7	
24	00.030	I	10	
25	00.085	I	00	J 23
26	00.001		00	STOP
27	00.001		C7	
28	00.025	I	10	
29	00.077	I	00	J 27
2A	00.001		00	STOP
2B	00.001		00	STOP
2C	00.001		00	STOP
2D	00.001		00	STOP
2E	00.001		00	STOP
2F	00.001		00	STOP
30	00.001		00	STOP
31	00.001		C7	

cyclical rhythm
functions

32 00.024 I 10
 33 00.068 I 00 J 31
 34 00.001 00 STOP
 35 00.001 C7
 36 00.020 I 10
 37 00.064 I 00 J 35
 38 00.001 00 STOP
 39 00.001 00 STOP
 3A 00.001 00 STOP
 3B 00.001 00 STOP
 3C 00.001 00 STOP
 3D 00.001 00 STOP
 3E 00.001 00 STOP
 3F 00.001 00 STOP
 40 05.059 I C7
 41 05.059 I 00 J 40
 42 04.595 I C7
 43 04.595 I 00 J 42
 44 04.131 I C7
 45 04.131 I 00 J 44
 46 03.682 I C7
 47 03.682 I 00 J 46
 48 03.218 I C7
 49 03.218 I 00 J 48
 4A 02.762 I C7
 4B 02.762 I 00 J 4A
 4C 00.001 00 STOP
 4D 00.001 00 STOP
 4E 00.001 00 STOP
 4F 00.001 00 STOP
 50 19.972 I C0 STOP
 51 19.972 I 00 STOP

cyclical timbre
 control functions

————— fade up
 ————— fade down

SEQUENCE TABLE

LN	TIME	ACT1	ACT2	ACT3	
00	00.00	STOP			—— rhythmic pattern sequencer 1
01	00.00	K 01			
02	00.92	K 02			sequentially starts or stops ("rests")
03	00.92	K 03			each "percussion" instrument with a
04	00.92	K 04			predefined rhythmic pattern
05	00.92	K 05			
06	00.92	K 06			
07	00.92	K 07			
08	00.92	K 08			
09	00.92	K 09			
0A	00.92	K 10			
0B	00.92	K 11			
0C	00.92	J 01			
0D	00.00	STOP			
0E	00.00	A=00	D=00	C=00	—— rhythmic pattern sequencer 2
0F	00.92	K 01	INRD	INRC	
10	00.00	SD11	J 0F		
11	00.00	D=00	INRA		
12	00.92	K 06	INRD	INRC	
13	00.00	SD11	J 12		
14	00.00	D=00	INRA		
15	00.92	K 11	INRD	INRC	
16	00.00	SD11	J 15		
17	00.00	D=00	INRA		
18	00.92	K 02	INRD	INRC	
19	00.00	SD11	J 18		
1A	00.00	D=00	INRA		
1B	00.92	K 07	INRD	INRC	
1C	00.00	SD11	J 1B		
1D	00.00	D=00	INRA		
1E	00.92	K 10	INRD	INRC	
1F	00.00	SD11	J 1E		
20	00.00	D=00	INRA		
21	00.92	K 03	INRD	INRC	
22	00.00	SD11	J 21		
23	00.00	D=00	INRA		
24	00.92	K 05	INRD	INRC	
25	00.00	SD11	J 24		
26	00.00	D=00	INRA		
27	00.92	K 09	INRD	INRC	
28	00.00	SD11	J 27		
29	00.00	D=00	INRA		
2A	00.92	K 04	INRD	INRC	
2B	00.00	SD11	J 2A		
2C	00.00	D=00	INRA		
2D	00.92	K 08	INRD	INRC	
2E	00.00	SD11	J 2D		
2F	00.00	D=00	INRA		
30	00.92	INRD	INRC		
31	00.00	SD11	J 30		
32	00.00	D=00	INRA		
33	00.92	INRD	INRC		

34	00.00	SD11	J 33	
35	00.00	INRA	STOP	
36	00.00	STOP		
37	00.00	E=00	D=00	C=00 ——— rhythmic pattern sequencer 3
38	00.92	K 08	INRD	INRC
39	00.00	SD13	J 38	
3A	00.00	D=00	INRE	
3B	00.92	K 04	INRD	INRC
3C	00.00	SD13	J 3E	
3D	00.00	D=00	INRE	
3E	00.92	K 09	INRD	INRC
3F	00.00	SD13	J 3E	
40	00.00	D=00	INRE	
41	00.92	K 05	INRD	INRC
42	00.00	SD13	J 41	
43	00.00	D=00	INRE	
44	00.92	K 03	INRD	INRC
45	00.00	SD13	J 44	
46	00.00	D=00	INRE	
47	00.92	K 10	INRD	INRC
48	00.00	SD13	J 47	
49	00.00	D=00	INRE	
4A	00.92	K 07	INRD	INRC
4B	00.00	SD13	J 4A	
4C	00.00	D=00	INRE	
4D	00.92	K 02	INRD	INRC
4E	00.00	SD13	J 4D	
4F	00.00	D=00	INRE	
50	00.92	K 11	INRD	INRC
51	00.00	SD13	J 50	
52	00.00	D=00	INRE	
53	00.92	K 06	INRD	INRC
54	00.00	SD13	J 53	
55	00.00	D=00	INRE	
56	00.92	K 01	INRD	INRC
57	00.00	SD13	J 56	
58	00.00	INRE	STOP	
59	00.00	K 13	K 14	————— pitch pattern source sets of diads
5A	06.44	K 16	K 20	
5B	05.52	K 13	K 20	
5C	10.12	K 18	K 14	
5D	01.84	J 59		
5E	00.00	K 21	K 22	
5F	05.52	K 23	K 29	
60	06.44	K 21	K 29	
61	01.84	K 25	K 22	
62	10.12	J 5E		
63	00.00	K 18	K 15	
64	07.36	K 16	K 19	
65	04.60	K 13	K 15	
66	09.20	K 18	K 19	
67	02.76	J 63		
68	00.00	K 25	K 27	
69	04.60	K 21	K 24	
6A	07.36	K 25	K 24	
6B	02.76	K 23	K 27	
6C	09.20	J 68		
6D	00.00	K 18	K 20	
6E	05.52	K 16	K 20	
6F	06.44	K 13	K 17	
70	08.28	K 16	K 17	
71	03.68	J 6D		
72	00.00	K 21	K 22	
73	06.44	K 22	K 26	
74	05.52	K 25	K 26	
75	03.68	K 23	K 22	

76 08.28 J 72
 77 00.00 K 13 K 12
 78 06.44 K 16 K 20
 79 05.52 K 18 K 14
 7A 07.36 K 16 K 19
 7B 04.60 K 13 K 15
 7C 08.28 K 18 K 17
 7D 03.68 K 13 K 17
 7E 09.20 K 16 K 15
 7F 02.76 K 18 K 19
 80 10.12 K 16 K 24
 81 01.84 J 77
 82 00.00 K 23 K 27
 83 05.52 K 25 K 26
 84 06.44 K 21 K 29
 85 04.60 K 23 K 24
 86 07.36 K 25 K 31
 87 03.68 K 23 K 22
 88 08.28 K 21 K 31
 89 02.76 K 25 K 24
 8A 09.20 K 23 K 29
 8B 01.84 K 21 K 26
 8C 10.12 J 82
 8D 00.00 K 43 K 82 K 83
 8E 00.00 D=00 F=00
 8F 00.92 K 37 INRD
 90 00.92 K 38 SD06 J 8F
 91 00.00 K 51 K 99
 92 00.00 K 83
 93 00.00 K 82 K 86 K 90
 94 00.00 INRF K 28 K 84
 95 00.00 SA13 J 96 J 9B
 96 00.00 SC13 J 95 K 33
 97 00.00 C=00
 98 00.00 SA13 J 99 J 9B
 99 00.00 SC13 J 98 K 42
 9A 00.00 C=00 J 95
 9B 00.00 SF12 J 9C J DE
 9C 00.00 K 85 K 87 K 91
 9D 00.00 INRF K 59 K 71
 9E 00.00 SE11 J 9F J A4
 9F 00.00 SC11 J 9E K 36
 A0 00.00 C=00
 A1 00.00 SE11 J A2 J A4
 A2 00.00 SC11 J A1 K 39
 A3 00.00 C=00 J 9E
 A4 00.00 SF11 J A5 J 93
 A5 00.00 INRF K 84
 A6 00.00 SA13 J A7 J AC
 A7 00.00 SC13 J A6 K 34
 A8 00.00 C=00
 A9 00.00 SA13 J AA J AC
 AA 00.00 SC13 J A9 K 41
 AB 00.00 C=00 J A6
 AC 00.00 SF10 J AD J 9C
 AD 00.00 K 85 K 88 K 92
 AE 00.00 INRF K 61 K 73
 AF 00.00 SE11 J B0 J BB
 B0 00.00 SC11 J AF K 37
 B1 00.00 C=00
 B2 00.00 SE11 J B3 J BB
 B3 00.00 SC11 J B2 K 38
 B4 00.00 C=00
 B5 00.00 SE11 J B6 J BB
 B6 00.00 SC11 J B5 K 35
 B7 00.00 C=00

— master control sequencer: this sequence
 contains the complete composition form
 description and controls the operation
 of all other sequencers

B8 00.00 SB11 J B9 J B8
 B9 00.00 SC11 J B8 K 40
 BA 00.00 C=00 J AF
 BB 00.00 SF09 J BC J A5
 BC 00.00 K 84 K 89 K 93
 BD 00.00 INRF K 63 K 75
 BE 00.00 SA13 J BF J C1
 BF 00.00 SC13 J BE K 32
 C0 00.00 C=00 J BE
 C1 00.00 SF08 J C2 J AD
 C2 00.00 INRF K 85 K 94
 C3 00.00 SC11 J C3 K 37
 C4 00.00 C=00 K 30 K A0
 C5 00.00 SC11 J C5 K 38
 C6 00.00 C=00
 C7 00.00 SC11 J C7 K 32
 C8 00.00 C=00
 C9 00.00 SC11 J C9 K 36
 CA 00.00 C=00
 CB 00.00 SC11 J CB K 39
 CC 00.00 C=00
 CD 00.00 SC11 J CD K 35
 CE 00.00 C=00
 CF 00.00 SC11 J CF K 32
 D0 00.00 C=00
 D1 00.00 SC11 J D1 K 40
 D2 00.00 C=00
 D3 00.00 SC11 J D3 K 34
 D4 00.00 C=00
 D5 00.00 SC11 J D5 K 41
 D6 00.00 C=00
 D7 00.00 SC11 J D7 K 32
 D8 00.00 C=00
 D9 00.00 SC11 J D9 K 33
 DA 00.00 C=00
 DB 00.00 SC11 J DB K 42
 DC 00.00 C=00 F=07
 DD 00.00 K 28 K A1 J BC
 DE 00.00 K 49 K 99
 DF 00.00 K 86 K 90 K 94
 E0 00.00 K 82 K 83
 E1 00.00 K 30 STOP

—— end of composition

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1978