

# Buy One for Spare Parts

Phil Burk, Larry Polansky, and Phil Stone

3 Amigas and HMSL

Prologue: mod.mania I, II, and III (Burk, Polansky)

Is It Borrowing or Stealing? (Stone)

Interlude: if man had three arms ... (Burk)

Drawing Unnecessary Conclusions (from "Distance Music")  
(Polansky, with Burk and Stone)

Interlude: say -x dada

I ain't got nobody ("gamma-long") (Burk)

Distance Music I (Polansky)

Epilogue: The World's Longest Melody (for David Feldman)  
(from *Distance Music*, Polansky)

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## About the concert

The three performers on this concert view this particular set of works as highly experimental, an attempt to explore some of the possibilities of a new machine, programming environment, and way of collaborating. To encourage ourselves in this regard, we have made several a priori choices in the selection of technical and musical material. The first is to use the "local sound" of the Amiga in all cases, avoiding MIDI devices, in the hope that this will enable us to make some advances, which we hope will be useful and educational for ourselves and others, in the use of this particular hardware. On a personal level, I have enjoyed this restriction, for it forces the composer, in some sense, to, in the words of one of our great composers, "stop listening to the sound and pay attention to the music...".

Although this decision sounds at first like an exclusionary one ("no DX-7's !!"), it has in fact turned out to be inclusionary. In the first place, none of us can afford anything much larger than a Casio, so we could not have used these devices anyway. And more importantly, we have tried to take advantage of the things that a more general environment offers over "off-the-shelf" hardware and software. In this concert, for example, the pieces use complex tuning systems, point-by-point waveshape editing, direct synthesis and sampling techniques, arbitrary envelope generation, and other software oriented ideas. MIDI is used in one instance, for communications in Phil Stone's piece.

The second decision was to try, as much as possible, to use only our own software. To this end, we have employed a language called HMSL, designed at the Center for Contemporary Music, and written and designed by Phil Burk, Larry Polansky, and David Rosenboom, as well as others at the CCM. HMSL is a music programming environment, written in an object-oriented environment

created by Phil Burk, which makes use of a very small FORTH kernel. It is very much a project development, and the music on this concert forced us to address certain important and interesting key issues in the design of the environment. With the exception of some use of C and parts of the Amiga operating system, all of the concert was created and run in HMSL. Musically, this has meant that we are not limited to the ideas of other programmers (only our own!).

We by no means feel that these types of compositional decisions are to be universally adopted. Certainly, for example, the ease of creating music and sound in MIDI environments is a tremendous advance for musicians. However, we wanted to take advantage of the special nature of this concert series to present highly experimental work. This machine is new, unexplored, and for me at least, a very recent, most often productive but occasionally recalcitrant musical companion. We have tried in this concert to at least begin an exploration of certain of the musical and performance possibilities of machines of its kind.

— Larry Polansky

### About the Pieces

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**mod.mania I, II, and III** (Polansky, Burk) is a simple, revealing process. Very long samples are specified in terms of areas of the machine's memory, and these are used as modulators (both frequency and amplitude) of simple waveforms. The "periods" of these modulating waveforms are quite long, and as such have structural manifestations at least equally as important as their timbral ones. In this prologue, each machine runs a slightly different version (in terms of memory length and period) of the same algorithm, which quite literally attacks the sound generation aspects of the Amiga at a rather primitive level. Since this program simply starts a modulation in the multi-processing sound generation hardware, the computer does not have to be running any software for the piece to continue, but it does have to be turned on. —LP

**Is it Borrowing or Stealing** (Stone) (1986) is a piece for three music-producing computers (and associated humans), connected in a network. Each sand-brain, directed by the whim of its meat-brain controller, can produce a repeating melody (so that up to six melodies may be heard at any given moment.) Each composer may create or alter this melody "on the fly" using HMSL (discussed elsewhere in the program.) As the melodies play, they are "broadcast" on the network, so that each composer has access to, and may use (or abuse), the material of the other two composers.

The title alludes to the conflict between private property and the free flow of information. This issue has come into sharp focus with the advent of easily propagated information; "copyright" is a besieged and difficult-to-protect concept. As a software author, I earn my living because of the notion of information as private property; still, I can't help but see this as counter-productive in the long run. This piece denies, at least on a small scale, the impulsive drive to "own".

"Is It Borrowing or Stealing" is dedicated to three virtuosi of computer music performance: John Bischoff, Jim Horton, and Tim Perkis.— Phil Stone

### **If Man Had Three Arms** (Burk)

If man had three arms, with five fingers per hand, we might have a tuning system with 15 notes per octave. Then again maybe not. The tuning system is the overtone series (15,16,17... 27,28,29,30)/15. Polyrythms of 3 against 5 are used to see if they have a synergistic effect with the tuning. The melody is generated by choosing a note a short distance from the previous one, that is also different from the last five notes.— Phil Burk

**Drawing Unnecessary Conclusions (from Distance Music)** (Polansky, with Burk and Stone) This piece is a kind of "manual" implementation of the algorithms used in other parts of the Distance Music studies, and was suggested by the graphic shape editor module of HMSL, which allows the user to draw in various dimensions of the shape data structure (the lowest hierarchical level of what we call "musical morphologies" in the language). As in most of the Distance Music studies, this piece involves the notion of source and target shapes, but instead of computing distances between successive shapes (as in Distance Music I, below), we graphically deform (on

the screen) our own shapes to more and more look like the shapes of one of the other performers (which we know beforehand). The timbres for this piece were implemented by Phil Burk, using an Amiga instrument editor which is specific to the Amiga version of HMSL. This editor allows the composer to specify quite a lot about the instrument (complex envelopes, waveforms, tuning tables, and various aspects of its behavior, like whether it goes out to MIDI or uses the local sound...). The tuning that we all use is the ratios derived from the 32nd-64th pitches of the harmonic series.— LP

**Interlude: say -x dada** This short piece is a literal transcription, taken from covertly placed highly sensitive recording equipment, of Ronald Reagan's private discourses on Daniel Ortega, Ernesto Cardenal, and the impact of the Nicaraguan revolution upon day - to - day life in the United States.

**I Ain't Got No Body** (Burk) This piece utilizes three Amigas in different roles. One Amiga is providing abstract sounds to punctuate the piece. The sound effects are generated using hardware amplitude and frequency modulation, and processed sound samples from HMSL. The second Amiga is providing lyrics using the voice synthesis system of the Amiga. The lyrics concern the problem of getting yourself reincarnated when there is no one left alive on Earth. You can select your own political/ecological disaster that could account for this situation.

The backbone of the piece is provided by a third Amiga. It is playing a structure that contains five collections. The order in which the collections are played is the "behavior" of the piece. The order is based on a sliding window that produces the following pattern:

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1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
  2 3 4 5
    3 4 5
      4 5
        5
```

The first collection contains a fixed melody played using a simple sawtooth wave. The second collection generates melodies from a table of interval ranges and their direction. As an example, if the previous note was a 10 and the interval range is a 5 with a direction of -1, then the next note will be either 10, 9, 8, 7, or 6. This produces a semi-random series of melodies that sound similar but are not identical. This collection is played with a gong sample. The third collection is a polyrhythm of 5 against 3 played using a drum and a clave sample. The fourth collection is melody that is being edited by the performer while it is being played. The fifth collection has four pitches whose rate of rise and fall is slowly changed. The pitches bounce off of a pitch floor and ceiling. The tuning for the first four collections is a slendro tuning:

1/1 -8/7 64/49 3/2 12/7 2/1.— PB

**Distance Music I** (Polansky) This is an experimental work (meaning it probably is not finished, but I'm not quite sure what final form it will take) drawn from Distance Musics, a set of pieces designed for any number of performer/programmers. In this piece, each performer controls the trajectories of two "destination" morphologies, which consist of durations, pitches, envelopes, and steady-state waveforms. The software (written as a kind of algorithmic overlay to HMSL, but using all of the HMSL tools) provides a graphic interface for the performers in which they may pick new morphologies by specifying the distance (or metric value) from a source shape. They can specify the precise distance that one morphology (which might be thought of as a generalized melody) will be from another, and hear that in real time. They can also specify along what dimension (duration or pitch) that metric might be taken, so that a wide variety of trajectories through a two dimensional morphological metric space can be described. In addition, they may combine the metrics along the pitch and durational axis (in what is called a "city-block" version of the original metric) to produce a distance measure that integrates the parameters. They can also specify in what ratio these parameters are weighted (perceptually) in the metric.

The timbres are derived simply from the morphologies -- both the envelope and the waveform are micro-images of the melodies themselves, and are transformed along with the melodies.

The tuning for the piece is a 24 note to the octave just scale, in which one set of 12 notes is used as a kind of target scale, and the second set of twelve pitches, placed between the first twelve, is used in the transformations. For the curious, the tuning is:

(first 12)

1/1 21/20 8/7 7/6 5/4 21/16 10/7 3/2 8/5 12/7 7/4 15/8 2/1

("interleaved pitches")

33/32 17/16 140/121 16/13 9/7 11/8 49/35 11/7 13/8 243/140 49/27 64/33

(note that degree n in the second set lies between degree n and n+1 in the first)

The metric used for the transformations is chosen from a library of such metrics, each of which has different perceptual properties. This one is called the Linear Direction Metric (ordered), and is perhaps the simplest in the library, being only sensitive to intervallic direction (in a given parameter) and to successive intervals (the Matrix Direction Metric (ordered), would, for example, use all combinations of intervals in a morphology for its calculation...). However, I was interested in starting with the simplest, most perceivable version of the piece, and that, to some extent, accounts for its rather raw sound and direct form.

In some ways, this work is one of the most satisfying I have done, for it accomplishes some theoretical advances that I have been trying to achieve for quite some time (in real-time), and it begins a new phase in my work which I have been eagerly awaiting. I expect to produce many more pieces along these lines, instrumental and electronic, using the software I have begun to develop here. In other ways, it is among the most frustrating, for as performers, we simply have no experience in "playing" these kinds of large level forms in the ways that we would smaller ones. The control screen for this piece has nothing that we would remotely recognize as a "musical" action on it -- only ways of specifying mathematically the nature of morphological transformation. As in many of my recent pieces, one of my design intents is to more or less exclude the possibility that the performer or composer will make "musical" decisions of the type that we are accustomed to making (this can never, of course, be totally excluded). So it is difficult to perform (and perhaps to listen to), because it rather intentionally avoids anything we might traditionally associate with notions of drama, entertainment, or even artistic form. Those things which it does are very important to me for my own evolution, though occasionally I don't understand the results of my own ideas.— LP

**The World's Longest Melody (for David Feldman)** (Polansky) is one of the pieces from my "Distance Music" (described above), inspired by the work of composer and mathematician David Feldman who I recently met at a visit to Wesleyan University in Connecticut. Feldman's work, like that of Charles Ames, Gottfrey Michael Koenig, and a few others, has an internal integrity which more or less excludes the possibility of extra-theoretic "artistic" decisions (this is of course a personal impression, not supported in any way by conversations with Feldman, for example). "The World's Longest Melody" is a simple (but friendly) algorithm — the direction of a given musical parameter (up or down) is determined by a probability that the next step will be in the same direction as the previous. In other words, if it gets slower, will it keep getting slower. This probability is very simply changed during the course of the piece (there are several versions, each describing a source, destination, and trajectory type for the probability). In the current version, it is applied to pitch, duration, and a simple measure of waveform "simplicity" (a "local" autocorrelation).

I have experimented with quite long listenings to this melody, which seems to me to be more or less impossible (and probably not desirable) to achieve in wetware, but am at present not prepared to describe its effect on my musical values. However, one of my collaborators on this concert (whom I won't specify, but his name is Phil ...) has suggested the word "longest" might easily be replaced by other, less neutral adjectives. — LP