Hybridism: a practice-led investigation

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For mum and dad

Abstract

Composition of musical hybrids involves the combination of distinct musical styles into a perceptual whole with a distinctly multiple identity. When composing hybrids, the composer may make a number of choices as to how these disparate sets of material sit together in a composition. One such method is to conceptualise genre not as identities sited in a vacuum but as poles of a continuum; the delineation of these poles can provide categories of materials and organisational principles that may be manipulated such that the work can inhabit different regions on this continuum, and thus genre can be manipulated morphologically and plastically. This investigation focuses on composition using the concept of the continuum. Delineation of a particular polar identity of both popular music and electroacoustic music facilitates a compositional methodology that allows investigation into the plasticity of aspects of sound and how this impacts upon genre and genre transition.

This begins with an examination of Burkholder's typologies of borrowing to delineate particular aspects of the uses of existing material to us in discussion of hybrid manifestation. Furthermore, examination of Losada's ideas concerning compositional modulation between quotation is adapted to be of use to genre modulation.

Using these ideas, three sets of musical material are produced. The first, an album entitled *From Time To Time*, investigates various different approaches to hybridism. The second investigates the continuum of genre and its traversal in a large scale work, embodied in the piece *Drop the Towel, Come to Poppa*. Finally, a set of pieces including a diorama-narrative triptych (*Ocean Triptych*) and a remix (*Rock Robot)*, examine the manifestation of ambiguity on the hybrid continuum in live performance. These were facilitated by the production of an original piece of software for the project, entitled *catLitter.*

Contents

Creative Portfolio Contents

Data DVD of fixed media works (including renditions of live works)

All works are presented as sets of soundfiles, one for each speaker of the surround configuration. These follow the general naming scheme: piece_channel.wav. For example, the left surround channel of *Take It All Away* is contained in the "Take It All Away" subfolder, within the "Time to Time" folder, and is entitled TakeItAllAway_LS.wav

For playback, the 5.0 setup is as standard, with a front centre channel. The 4.0 works are designed for a quadrophonic setup. For both setup types, all channels should be summed through a subwoofer if available.

***From Time to Time* Album (27:41)**

***Take It All Away* (8:20) - 5.0 Surround Sound**

***Happy Robot* (15:17) - 5.0 Surround Sound**

***Blackened Box* (4:04) - 5.0 Surround Sound**

***Drop the Towel, Come to Poppa* (21:07) - 5.0 Surround Sound**

***Ocean Triptych* (21:19)**

***Ocean Triptych* movement one: *White Horses* (6:54) - 4.0 Surround Sound**

***Ocean Triptych* movement two: *Boom-Ti* (8:56)- 4.0 Surround Sound**

***Ocean Triptych* movement three: *Sunrise Over the Water* (5:29)- 4.0 Surround Sound**

***Rock Robot* Remix (6:41) - 4.0 Surround Sound**

3 Audio CD's of stereo mixdowns:

CD 1: *Take It All Away EP.*

CD 2: *Drop the Towel, Come To Poppa.*

CD 3: *Ocean Triptych* and *Rock Robot.*

CD of software:

***CatLitter* software environment**

***White Horses* software**

***Boom-Ti* software**

***Sunrise over the Water* software**

***Rock Robot* software**

Accompanying examples CD

Tracklisting

1. *Sonidos Bailables* extract (Blackburn) 6:16 - 7:11
2. *Chambre D'Enfants* extract (Dhomont) 0:00 – 1:30
3. *Surfer Stem* extract (Weinel) 5:40 - 6:55
4. *Cajón!* extract (Blackburn) 0:45 – 2:00
5. *Temazcal* extract (Alvarez) 0:00 – 2:30
6. *The World We Know* extract (Viñao) 0:00 – 1:30
7. *Omaggio a Jerry Lee Lewis* extract (Trythall) 1:00 – 2:30
8. *Nightbreed* extract (Weinel) 0:00 – 2:00
9. *Omaggio a Jerry Lee Lewis* extract (Trythall) 2:15 - 4:25
10. *Dancescape* extract (Verandi) 2:00 – 4:40
11. *Surfer Stem* extract (Weinel) 5:40 – 6:55
12. *Entoptic Phenomena* extract (Weinel) 0:00 – 2:00
13. *Swamp Process* extract (Weinel) 5:20 – 6:00

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To Phyllis Shave and Mary Walker, for the wonderful memories.

Composer's Timeline

Age 6: Began learning piano.

Age 15: Started first band, with the dream of becoming a famous front man. Studied GCSE music.

Age 17: Studied A-Level music.

Age 18: Attended Staffordshire University, Studying Foundation Diploma in Art and Design.

Age 19-22: Attended the University of York, studying a BA in Music concentrating on contemporary instrumental composition.

Age 22-24: Started the electro-pop band *Cats In The Alley*, playing several hundred national gigs and releasing three EPs and one album. Acted as keyboard player, one of the song writers, producer and engineer.

Age 23: Commenced MRes in Music Technology, focusing on hybrid electroacousticmusic -popular musical composition.

Age 24: Publication of Communicative Contract Analysis (Shave, 2008:41-50) in *Organised Sound.*

Age 25: Commenced Phd in Music Technology, furthering this investigation into aspects of hybrid composition.

Hybrid Composition:

A Practice-led Investigation

Chapter 1 – Elucidation

1.1 Hybrid

The concept of the hybrid can be located in disparate cultural fields - scientific, technological, artistic. Hybrid vehicles, capable of using both combustion and cells as a power source, are becoming increasingly popular. The biological hybrid, that which we each are of our parents, is easily understandable. Words - television for example - are hybrid, owing themselves to combinatory Greek and Latin origins. Many mythological creatures are hybrids; the centaur, the basilisk, the chimera. Etymologically, the concept is biological, referring to the 'offspring of a tame sow and a wild boar.' (Etymonline, 2001-2012) Whilst this pervasive concept infiltrates numerous fields its principal property remains; the hybrid is a singular multiplicity. That which gives it definition as an individual is the fact that it is multiple, owing its nature to identifiably separate sources.

The concept of multifaceted unitary experience is common to all perception, including music. That which may be thought of as a single musical event (a violin melody, for example) consists of identities of pitch, rhythm, timbre, dynamics and articulation combined into a perceptual unity. Furthermore, socio-cultural identity (classical violin or fiddle for example) including personal identity (my grandfather used to play the violin) effect the perception of this "unitary" event; consequentially something considered singular may be charged with a collocation of

meanings. The hybrid is multiple in a different manner; its multiple nature is clear and the complexity of the hybrid lies in its inhabitation of a necessarily multiplistic position. It is at once both distinctly and indistinctly individual, a consequence of its nature as a collage of synchronised contiguities. Its multiplicity is attributable to its reference to independent meanings, its individuality to the unifying properties of the whole, and its identity to the interplay that is a consequence of incorporating multiplicities into a tangible whole.

Hybridism could be described as an example of musical appropriation or borrowing; as incorporation of material which may be considered external or other to something, placing the hybridism prevalent in this portfolio at the contemporary point of an established tradition. As Emmerson points out, 'appropriation is not a new phenomenon and is at the basis of most musical exchange;' (Emmerson, 2007: 1) to which Blackburn adds that ‘sourcing sound materials from distant and foreign locations[1] has become a relatively common and elementary practice for the electroacoustic music composer to engage with.’ (Blackburn, 2011: 1) Waters suggests that the early history of electroacoustic music was concerned principally with acousmatics, resulting in an 'obsessively self-referential music' (Waters, 2000: 56) comparable to late serialism, but observes a change from an 'acousmatic culture' to a 'sampling culture' with roots in technology. This, he says ‘[increases] the likelihood of musical forms which owe their existence to the collision of different musical worlds, different disciplines, different modes of thought and understanding.’(Waters, 2000: 56) Furthermore, Emmerson points out that ‘Many of today’s younger composers do not ‘play at a distance with’ the styles and musics they hear, it is their primary practice. The world has always been (for them) a mix of musics – if any practices are dominant this is transitory.'(Emmerson, 2007: 2)

[1] One could consider internal others, particularly those which may inhabit dichotomous poles (such as popular and electroacoustic music) as “distant and foreign locations” from one another.

At the heart of this thesis is the *between*-nature of the in-between; how does the identity of a hybrid work inhabit a multiplistic position? These questions are approached concerning both technical and conceptual issues. Using Burkholder's investigation of musical borrowing the particularities of different borrowing types are investigated in order to achieve their integration into the discussion of hybridism. Secondly, using Losada's work on modulation the investigation focuses on the technicalities of the composition itself; the way in which the composer forges a cohesive whole from multiple sonic referents. In particular, this investigates the concept of a continuum between musical poles and the way in which musical material and structure can operate to create a morphology between seemingly dichotomous material.

With regards to conceptualisation of the hybrid continuum, the chemical/compound/mixture distinction is useful. (Emmerson, 2010: pers. comm.) If the chemical is considered a 'pure genre', the idea of the hybrid may be comparable to the mixture (rather than the compound) wherein the final product is mixed together yet identifiably multiple. The hybrid continuum may be imagined by thinking of a mixture of rocks of two different colours and different sizes. On observing the mixture, one may see large rocks which do not seem to mix at all. There may be areas of smaller rocks intermingling but still identifiable by colour, and areas of sand mixed so finely that one has difficulty in picking up individual colours, or where colours may blend. Such is the hybrid continuum - the transition from rock to pebble to sand, both the process of mingling material to produce a more or less identifiably multiple whole, and the way in which materials interact to affect the globally perceived nature of the work at any particular point.

The discussion includes consideration of a tool for hybrid composition embodied in *CatLitter*, a modular software environment produced in MaxMSP for this project. *CatLitter* offers a tactile GUI which aids conceptualisation and traversal of the hybrid continuum using the polar implications of sliders and dials, allowing hands-on real-time control of continuum traversal

parameters. The amount this software is used in a particular work (unused, as a worksurface for the production of musical material, or as a performance environment) reveals interesting differences in the manifestation of the plasticity of the continuum, and has implications for structure and varieties of continuum traversal.[2]

1.2 Hybrid typology

The issue of popular/electroacoustic musical hybridism has produced three broad methodologies for creating hybrid works **(Shave, 2008: 12)** These are:

The Synchronous Hybrid: The superimposition of referential material over material representative of another genre; the two genres exist contemporaneously. The material may well be a diluted or a stripped back synecdoche as shorthand reference (such as the crude orientalist Indian insertions in Kula Shaker's *Govinda* (Kula Shaker (2009): K.))

The Contiguous Hybrid: An insertion of material from a particular genre into a work from another genre. Rather than existing contemporaneously in time, the two regions of material are chronologically distinct. Despite this, the resultant musical work sits in a modulated cultural space as a consequence of the unifying properties of the concept of the work.

The Cross-Processed Hybrid: Procedurally distinct from the other methodologies. Sonic material indicative of a particular genre is subject to the organisational and structural or procedural characteristics indicative of another. The sonic material chosen may still act synecdochally, potentially as a sonic souvenir (Blackburn, 2011: 1).

[2] Four pieces of software were created for the project, all built from sets of *catLitter* modules. Another piece used *catLitter* to build software on-the-fly to accomplish desired processes.

A fundamental concern at the outset of previous research was the attempt to create an ideal hybrid comprised of material from either genre equally, effectively attempting to avoid the Oedipus hybrid[3] and create works that did not owe a majority of their identity to one or other genre. Whilst the theoretical aim was to examine the ways in which cross-processed hybridism may lead a composer toward this ideal hybrid, in practice the compositional output involved varying uses of all three types of hybridism, often within the same piece. Beginning a discussion of hybridism with an investigation into borrowing is appropriate as it specifically interrogates musical forms that have a deliberately multiplistic foundation; terminology and concepts developed for the theory of borrowing can be appropriated to address specifics of hybrid practice.

1.3 From? To?

Musical borrowing considers a work to be borrowing something from somewhere, incorporated into something else. In order to apply a theory of borrowing to this project, the locus of borrowing should be defined; to facilitate this, the works here will be defined as electroacoustic pieces which borrow from the popular music idiom for the following reasons:

1. 'Communicative Contract Analysis'[4] (Shave, 2008: 41-50) suggests that when an agent engages in a communicative act (of which composition is one) there is an implicit audience shaping the communicative artefact; the music here was composed imagining its dissemination in electroacoustic concerts, added to by the technical specificities of

[3] [The Oedipus hybrid] is not one which simply combines two inputs in a genetic birth process but one which comes to, maybe, too close a relationship with one parent while violently rejecting (even denying and destroying) the other.' (Emmerson, 2007: 3)

[4] Communicative Contract Analysis is a popular music analysis method which examines parametric identity on the basis of a constructivist model of experience.

loudspeaker diffusion.

2. Two of the works contained in the folio use recognisable samples or quotation from existing works. In the majority of the other works popular music aspects have been pre-composed and subsequently used as source material from which to construct works; the creation of these works has been approached as electroacoustic composition inflected with derivations from pre-composed popular music material

1.4 Borrowing

Since the works here are multiplistic, they involve roots stemming from diverse genre locations. Furthermore, borrowing is a useful concept since it involves the creation of musical forms with multiplistic provenance. As outlined above, these works can be thought of as examples of borrowing owing to their compositional methodology, perhaps as examples of 'self-borrowing.' In this context, Burkholder's investigation of borrowing provides a useful theoretical basis which can be adapted in order to appropriate terminology to underpin this discussion.

Burkholder investigates the delineation of borrowing types stemming from his work on Charles Ives. He states that Ives' work comes from a long tradition of musical borrowing such that 'his approaches can be understood as continuing this tradition in an extraordinary and individual way, building on rich precedent, rather than breaking radically with the past.' (Burkholder, 1994: 858) Burkholder outlines a typology of musical borrowing as a response to a scholarship deficit that meant that 'all [Ives'] varied uses of existing music...were being treated as instances of a single large category called quotation...large categories like borrowing or quotation are not enough. There are many ways of using existing music, and it is necessary to

differentiate among them. Comparing Ives' practices to those of other composers and reading what scholars had to say about borrowing in other repertoires was enormously helpful in establishing the typology...' (Burkholder, 1994: 855)

As an alternative to 'borrowing', Burkholder prefers the term 'the uses of existing music' since it 'encompasses everything, from direct quotation to the use of an older work as a model without overt reference, and it makes clear that there are many different methods included.' (Burkholder, 1994: 861-2) He suggests that musical borrowing may be used synonymously since 'the uses of existing music' is an awkward phrase, though he finds issue with borrowing as a term - for example, consider a piece of music written to avoid echoing a previous work; this would hardly qualify under the rubric 'musical borrowing' but would qualify as a 'use of existing music'. Burkholder also rejects the use of the term intertextuality; on the one hand he links this to a problematic terminological broadness and furthermore he believes that questions of priority and derivation are evaded with its use:

> We may say that two works are related intertextually without deciding whether one was based on the other or both were based on a common source. (Burkholder, 1994: 862)

Some problems are encountered in relating Burkholder's work to this study. He suggests that borrowing must involve using material or structure from an existing piece and that '[the source material] must be sufficiently individual to be identifiable as coming from this particular work, rather than from a repertoire in general.' (Burkholder, 1994: 863) Relatedly, he problematises the concept of stylistic allusion as a category of musical borrowing:

> To delimit the history of musical borrowing from the history of compositional and improvisational practice as a whole, it is best to focus on borrowing from specific works

> and to consider allusion to general repertoires and archetypes or even to the styles of individual composers as a closely related but different phenomenon.' (Burkholder, 1994: 863)[5]

Finally, when Burkholder talks of borrowing in the work of Ives he is generally talking about melodic and/or harmonic material that has rhythm; in the musical borrowing that occurs in the hybridism of the disparate genres of popular and electroacoustic music many of the types of borrowing are unlikely to occur; some of the remaining types must be modified in order for them to be applicable, and further categories need to be added.

Despite these problems, Burkholder's typology is a complement to this study as a method for delineation of hybrid practice when presented with caveats. Table 1 recreates his initial typology of borrowing with some modification. The first part of the table lists seven types of borrowing as outlined by Burkholder that are used within the compositions in the folio, to which two further types are added and the remaining types from Burkholder's original table are outlined at the bottom of the table; these could be used as compositional informants or analytical categories but are not encountered within this project.

[5] These issues could create issue with certain generalised implications of popular music used in these works, such as stylistic allusion through structure or instrumentation.

Methods of the uses of existing music
(1) **Modeling** a work or section on an existing piece, assuming its structure, incorporating part of its melodic material, imitating its form or procedures, or using it as a model in some other way (2) **Setting** an existing tune with a new accompaniment (3) **Stylistic allusion**, alluding not to a specific work but to a general style or type of music (4) **Cumulative setting**, a complex form in which the theme, either a borrowed tune or a melody paraphrased from one or more existing tunes, is presented complete only near the end of a movement, preceded by development of motives from the theme, fragmentary or altered presentation of the theme, and exposition of important countermelodies. (5) **Programmatic quotation**, fulfilling an extramusical program or illustrating part of a text (6) **Collage**, in which a swirl of quoted and paraphrased tunes is added to a musical structure based on modeling, paraphrase, cumulative setting, or a narrative program (7) **Patchwork**, in which fragments of two or more tunes are stitched together, sometimes elided through paraphrase and sometimes linked by Ives's own interpolations.
Added to which are: (8) **Quotation** of a small excerpt of another work. (9) **Sampling** from another work. Sampling is distinct from quotation in that in sampling what is heard is a direct recording of the original work, whereas a quotation consists of the instructions to perform an existing work (e.g. contained in a score) .
Not encountered within this project: (x) **Extended paraphrase,** in which the melody for an entire work or section is paraphrased from

an existing tune

(x) **Variations** on a given tune.

(x) **Paraphrasing** an existing tune to form a new melody, theme, or motive.

(x) **Arranging** a work for a new medium.

(x) **Cantus firmus**, presenting a given tune in long notes against a more quickly moving texture

(x) **Medley**, stating two or more existing tunes, relatively complete, one after another in a single movement

(x) **Quodlibet**, combining two or more existing tunes or fragments of tunes in counterpoint or in quick succession, most often as a joke or technical tour de force

Fig 1: Borrowing typologies. (Adapted from Burkholder, 1994: 854)

1.5 Modulation

In a work that employs the conspicuous use of existing music there is an interplay between constituent components, between the *borrowed from* and the *borrowed into*: the concatenation of two (or more) genres in a work highlights the cultural space between them. A significant component of the hybrid work is the way in which this distance is interrogated by the manipulation of material. Furthermore, the material of disparate genres may not fuse into a cohesive singular work and the hybrid composer can make compositional choices to create continuity between genre-suggesting material by employing a process of modulation, related to Stockhausen's concept of intermodulation or sonic mutation:

> What I use is the mutation process of nature; that's what music is all about. It's an intermodulation so that one being can become another. I'm not interested in collage, I'm interested in revealing how, at a special moment, a human sound is that of a duck and a

> duck's sound is the silver sound of shaking metal fragments. All these sounds are interrelated very subtly just by the manner in which you listen to them and in the way that they're exposed in time and space; the basic material is all the same. Many of the fairy tales are about this: the straw that the miller's daughter has to weave into gold in Rumpelstiltskin, for example. This has been in my works from the beginning: transubstantiation. Like the mystical moments in religion when the water in transformed into wine. (Cott, 1973: 150).

A point of interest in this study is the process that allows the transition from gold to straw, or water to wine. This can happen in the morphological qualities of genre-representative sounds and sets of sounds, meaning that two genres need not be seen as distinct entities separated by a vacuum but as poles on a continuum; the composer has the opportunity to craft works which reconcile the contrasts inherent in the use of multiple referents and maintain a stylistic unity within the work through the traversal of this continuum.

> Unity in the form of the integral serialism of the late 1950s may no longer be a goal for most composers now at the turn of the century, but the ability to make connections between sounds and to transform one type of sound event into another is a central feature of many compositions. (Stockhausen from Clarke, M. (1998): 239)

Catherine Losada interrogates the concept of modulation in musical collage to fill a perceived analytical deficiency; she notes that the previous choice of tools for the analysis of work which involves diverse and numerous quotations was unclear. Furthermore, she had a number of concerns with how the analytical literature on collage tended to concentrate on juxtaposition and discontinuity, and how the discussion of the linkage of material with diverse sources focused on referential connotations. In order to talk about convergence and continuity (as

opposed to juxtaposition and discontinuity), and to talk musically rather than referentially, Losada constructs a language with which to discuss modulation in musical collage:

> I shall focus on the specific issue of how the transition between disparate elements – the process of modulation – is achieved in a musical collage. I use the term 'modulation' because in its diverse connotations it brings to mind elements which remain evocative in the collage repertoire. In particular, the shift between distinct harmonic domains, the recurrence of a main or dominant sound world, the concept's association with sharp contrasts and the efforts to reconcile these contrasts all resonate with earlier uses of the term. (Losada, 2008: 295)

Losada points out a number of methods that facilitate modulation in the context of overlapping collage material, specifically pointing out pitch convergence (a self-explanatory concept) and textural dispersal/emergence (whereby the emergence and dispersal of collage material is used to facilitate transition; a technique of overlap.) She also discusses rhythmic plasticity, the way in which rhythmic character may be manipulated to facilitate modulation, and chromatic insertion:

> Often occurring simultaneously with overlap techniques, chromatic insertion constitutes another important means by which the borders between disparate collage materials are blurred. By creating points of pivotal transition which similarly absorb the pitch language of the surrounding quotations, chromatic washes (areas characterised by the saturation of the texture with chromatic scales or figurations) also fulfil a modulatory function as they fill in the intervening tonal space. (Losada, 2008: 312)

Losada's work is not immediately compatible with this project. Firstly, it is written concerning

contemporary instrumental work for ensemble rather than electroacoustic music (she examines Berio's *Sinfonia*, Rochberg's *Music for the Magic Theater* and Zimmermann's *Musique pour les soupers du Roi Ubu*) and secondly, she is concerned with musical collage rather than hybridism. However, whilst her terminology and ideas require reconstruction in order to be of use, the concept of continuity in sonically unified yet multiplistic work is central to this project.

1.6 Popular? Electroacoustic?

This thesis requires elucidation as to the definition of popular and electroacoustic music; this is critical since the project is not only concerned with the intermingling of these forms but is predicated on the idea that they may be conceptualised as the poles of a continuum. Problematically, these particular genres are broad; they span a large number of styles, organisational structures and sound-sets across nearly a century of musical output and an enormous geographical and cybernetic space. To define each as a set of axioms would be unnecessarily complex. Instead, the poles of the continuum are defined reductively (and Western-centrically) as a set of parameters used for the evocation of genre; a methodological compositional choice informing the use of sound-sets and organisational predicates as indicative of genre to facilitate continuum traversal. A function of this reductivity is to reduce the set of parameters to a set that would be manageable within the scope of this research project, a set which could be expanded upon and explored further.

Popular music:

Diatonic harmony (and melody).

Regular rhythmic structures (4/4)

Instrumental sources that are recordings or imitations of real world instruments including both

the singing voice and synthesisers.

Sounds have a static position within the (stereo) image.

Electroacoustic music:

Non-predominance of functional harmonic or melodic content.

Aperiodicity.

Sources that may include recording of real-world sounds or the voice, or may be devoid of source suggestion, unconnected to instrumentation or sung vocals as generally encountered in popular music.

Sounds often have motion within the (stereo or surround) image.

This idea is not without precedent:

> Gone are the familiar articulations of instruments and vocal utterance; gone is the stability of note and interval; gone too is the reference of beat and metre. (Smalley, 1997:107)

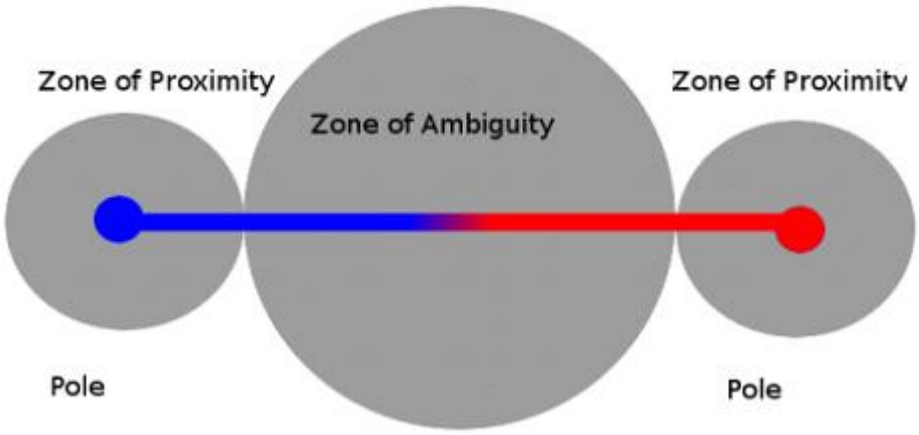


Fig 2: The hybrid continuum

Figure 2 represents this continuum. Continuum motion will not be treated as a measurable quantity but as a general process involving three important zones on the continuum. Several concepts are important here:

- ***Proximity to a particular pole*** means that at a particular point the overriding genre noticeably belongs more to one genre than the other.

- ***Traversal toward one pole from another*** reflects an overall shift along the continuum.

- ***An ambiguous position on the continuum*** means that an overall polar proximity is unclear.

- ***Some level of continuum ambiguity*** reflects reasons why material or genre is not as proximal to a pole as it could be.

1.7 Continuum traversal domains

The aim of continuum mobility is to create a perceptually conjunct musical work that operates in a modulatory way between multiple genres whilst avoiding discontinuity; this involves the delineation of the particularities and possibilities of continuum traversal utilising the properties of sound. For this purpose, the following section provides terminology for discussion of the manifestation and manipulation of the hybrid continuum within a distinct set of musical domains and using a distinct set of processes.

1.7.1 The distinctly temporal domain (DTD) and the indistinctly temporal domain (ITD)

This categorisation is taxonomically tricky. Simplistically, it refers to a distinction for the purposes of rooting continuum mobility in one or both of the domains of chronology (traditionally horizontal-time) or spectrum, typically vertical[6] information regarding sound quality that incorporates timbre and pitch. This is problematic since all sound necessarily occurs as a consequence of particularities of the continuum between periodicity and aperiodicity, a function of time (with time as an independent variable upon which periodicity is dependent). When this periodicity is immediately perceivable as collections of onsets and offsets of sounds the domain is the distinctly periodic, presenting the organization of distinct sounds in chronological space and concerned with the properties of order and disorder between periodicity and aperiodicity (wherein rhythmic and arhythmic are on a sub-continuum.) here this is referred to as the *distinctly temporal domain* (DTD), since the effect of its temporality is immediately recognisable as a function of time.

When periodicity increases to the point where the human ear becomes incapable of perceiving separable onsets and offsets of waveforms as independent events one enters the domain of the spectrum; pitch, timbre, sound quality. Western musical notation encounters difficulty here; though both the chronological-spectral and chronological-iterative properties of sound are functions of time, their representation within the same order is generally difficult and consequentially the visual representation of frequency is expanded vertically. The spectral-chronological domain is concerned with the order and disorder of sound along the noise-node-note axis, wherein timbre is a sub-category and pitch a sub-continuum. here this is called the *indistinctly temporal domain* (ITD), since the effect of its temporality is not immediately recognisable as a function of time.

[6] The vertical conceptualisation of sonic property organised in ascending order by frequency through periodicity.

1.7.2. The sonic domain and the meta-sonic domain

> ...a piece of music is not a closed, autonomous artefact: it does not refer only to itself but relies on relating to a range of experiences outside the context of the work. Music is a cultural construct, and an *extrinsic* foundation in culture is necessary so that the intrinsic can have meaning. The intrinsic and extrinsic are interactive. (Smalley, 1997: 110)

These two categories are principally delineated to allow conceptualisation of the latter. The sonic domain is the interrelationship of the work's internal sonic properties; the meta-sonic domain allows inferred properties from a context beyond the work to inform the perception of the continuum. For example, in the work *Blackened Box* the source material is chosen for use as synecdochic popular music style referent; some of these sounds are never used in an organisation akin to their popular musical function, but the sound itself implies this heritage and consequentially a degree of continuum ambiguity.

1.7.3. The morphological process and the convergent process

The morphological and convergent processes are terminology applying to continuum motion. The former is a gestalt process whereby a single sonic artefact or collection of related sonic artefacts is perceived to undergo some kind of procedure wherein continuum traversal is the consequence of the morphology of a single sound or sound-set. Within a convergent process two separate sonic artefacts (sound objects or streams) are brought to proximity on the continuum such that the disjunction or distance between the two is reduced and they can be heard as akin to one another. Consider the following example; a wideband granular cloud could become periodic before forming into delineated spectral streams to imply bass drum, snare and hi hat. This stream of sounds will be perceived to be of gestalt unity, but to have undergone a morphological process; a single sound stream has morphed into something else

and this sonic artefact has itself traversed the continuum - the straw has turned into gold in the perception of the receiver. On the other hand, if the stream had become more rhythmic and a drum-loop were introduced in synchronisation, then a convergent process within the DTD would have occurred. The two streams remain separable, but a relationship between them is inferred through particular characteristics; the gold has been drawn into wire and the perceiver may note that gold and straw could be considered akin to one another under certain circumstances. If both the stream and drum loop were passed through a similarly tuned comb filter then the convergent process would occur in terms of both sound organisation and timbre, and as a consequence the transition would be further smoothed. The more parameters that the sounds share or have imposed upon them, the more the process approaches the morphological.[7]

1.7.4. Conjunct traversal, disjunct traversal and implied traversal

To continue with the above example, if morphology or conjunction of the sounds happened contemporaneously (i.e. the traversal of the continua happened within a unitary sound or sound-set) then the traversal is conjunct. This may not be the case; for example, a stream could be recurrent within a work and make its traversal over several distinct iterations - in this case the traversal is disjunct. A degree of continuum ambiguity inherent in a sound that only occurs as a processed version (a granulated drum sample for example) is provided by implication due to the cultural connotations of the sound; this is an example of implied traversal.

1.7.5 Global continuum traversal

[7] There is potential for a continuum between morphological and convergent processes which is not investigated in this thesis.

The dominant genre at a particular moment within a work can be conceptualised as its proximity to a particular pole of the continuum, which can be described as the global continuum position of the work; this will necessarily be determined by the predominance of material from one genre. The global continuum may be traversed like any other; a large number of alterations to local continua can effect a change in the global - the majority of the works here affect global continuum traversal via single or multiple local continua traversals.

1.7.6 Transitional pivot

The transitional pivot is a modulatory concept occurring at a point where a work makes a global continuum traversal primarily attributable to one or more identifiable local continua traversals, a pivot akin to that of harmonic modulation. By way of an example consider an electroacoustic work predicated on a short sample of thunder accompanied by a mid-spectrum texture and high-frequency granular clouds. The iterations of the low frequency thunder sound may become more periodic, gradually taking on the figure of a four-to-the-floor bass-drum pattern around which other rhythmic percussive elements are introduced. In this case, it is this low frequency stream (undergoing a conjunct**,** morphological process) that operates as a transitional pivot about which the global continuum is traversed.

1.8 Continuum traversal techniques

The following section delineates a number of common continuum traversal techniques found in the portfolio, along with a number of examples on the accompanying CD drawn from contemporary electroacoustic works.

1.8.1 Pitch introduction

Pitch introduction may be convergent or morphological. In this technique, the transition between unpitched and pitched material (perhaps to facilitate the emergence of melody or harmony) is achieved by the introduction of pitched material or the imprinting of pitch onto material through processing (filtration or convolution, for example.) If a specific stream of sounds has pitch imprinted upon it, a morphological process is occurring, whereas if pitch is introduced to a stream to anticipate entry of pitched material it is convergent. It need not involve a shared tonality or pitch, being predicated on an amount of material that is somewhat pitched.

Track 1 of the CD is an extract from the third piece in Blackburn's *Sonidos Bailables* from 6:16 to 7:11 (Blackburn, 2006*.)* The gradual emergence of pitched texture suggesting provenance in a guitar sample builds in amplitude until it is somewhat dominant in the soundscape. Track 2 is the opening of Dhomont's *Chambre D'Enfants* (Dhomont, 1996) from 0:00 to 1:30, which demonstrates the gradual emergence of pitch from texture; the number of pitches grows until the soundscape is dominated by them. Track 3 is from Weinel's *Surfer Stem* (Weinel, 2007-10), from 5:40 to 6:55, involving a single pitch that grows in intensity and becomes dominant.

1.8.2 Timbre linking

Timbre linking is a technique that facilitates continuum traversal by timbral alteration of a sound or set of sounds. Linking can be morphological (such that a sound can morph into another as a single stream, as straw into gold) or convergent (a timbre made to imitate another, as straw resembling gold). By way of an example, consider noise undergoing filtration to imitate a snare drum; if this was then used as an electronic snare the process would be

morphological, if it prefigured the entry of a snare drum sample it would be convergent (which may occur with a complementary organisational morphology.)

Track 4, Blackburn's *Cajón!* (Blackburn, 2012) from 0:45 – 2:00, displays timbre linking between granulation and the sound of the cajón. The cajón, like the snare drum, has a somewhat granular texture and in this example the granulation and granular sounds of the cajón are perceptually related. Track 5 is Alvarez's *Temazcal* (Alvarez, 1992) from 0:00-2:30, which relates granular material in an electroacoustic section with the granular sound of the maracas.

1.8.3 Rhythmic plasticity

An operation using sound-set periodicity to traverse a continuum between aperiodicity and metric regularity; as an example, a granulated bass drum sample whose iterations become more periodic would be undergoing a process of rhythmic plasticity.

Track 6, the opening 1:30 of Viñao's *The World We Know (*Viñao, 2003) has a clear sense of the rhythmic plasticity wherein concrete sounds become more metrically organised until they are arranged into a consistent beat. Track 7, 1:00 to 2:30 of Trythall's *Omaggio a Jerry Lee Lewis* (Trythall, 1975) illustrates a rhythmic approach in the metric organisation of electroacoustic material. Track 8, the opening 2 minutes of Weinel's *Nightbreed* (Weinel, 2007-10), illustrates a rhythmic plasticity used as transitional pivot.

1.8.4 Textural emergence/dispersal.

Allied to Losada's concept of chromatic insertion this technique facilitates traversal with sets of sounds inserted or removed in order to weight the total amount of genre-indicating sonic artefacts, a process which may be thought of as roughly analogous to cross-fading.

Track 9 , Trythall's *Omaggio a Jerry Lee Lewis* (Trythall, 1975) illustrates textural dispersal of the recognisable elements of the original sample. Track 10, 2:00 – 4:40 of Verandi's *Dancescape* (Verandi, 1997) illustrates this with a crossfade between rhythmic material and electroacoustic soundscape. Track 11, 5:40 to 6:55 of Weinel's *Surfer Stem* (Weinel, 2007-10) illustrates a gradual textural dispersal of electroacoustic elements, leaving behind a set of pitched drones.

1.8.5 Narrative or Environmental emergence

A sound may traverse genre by means of either narrative progress or environmental emergence. Consider the following; an electroacoustic piece contains the evocation of a wind-up toy soldier drumming. As the toy begins to play, the beat could become regular and then be used as rhythmic backdrop for a popular music section; here a morphological, convergent process occurring as transitional pivot has been facilitated by a narrative. The second category occurs when an environment is presented, and emergent sounds from this environment facilitate genre crossover; the difference between these two types of emergence will be apparent in an individual work (differentiated by the presence or absence of an agent). To continue the above example, if the toy soldier was part of a diorama in which several sounds representative of background characters or features caused continuum traversal it would be a process of environmental emergence due to the lack of specific agent or agent-set principal to the narrative.

Tracks 12 and 13, from Weinel's *Swamp Process* (Weinel, 2007-10), 5:20 to 6:00*,* and from *Entoptic Phenomena* (Weinel, 2007-10), 0:00 to 2:00, illustrate these processes. In *Swamp Process*, Weinel constructs a diorama in which the rhythms are imagined as creatures. In *Entoptic Phenomena* the rhythmic patterns represent stages in a first-person narrative, the patterns acting as audio metaphor for hallucinatory experiences during altered states of consciousness. (Weinel, 2010.)

1.8.6 The spatial continuum

Within the popular music genre, spatialisation is usually organised statically (to mimic the static nature of instrumental source) and spread through the field (both to aid clear perception of different material, to enhance the audio field and potentially to give the impression of watching a live band.) In contrast to this, electroacoustic music often involves the exploration of space including changing points of emanation, and trajectories for sounds and streams of sounds. This is explored within the portfolio as a continuum. Within the popular music oriented sections, sounds are often static and organised according to a popular music sensibility whereas within the electroacoustic sections, or with "electroacoustic" material, spatial motion and organisation is explored more fully. As samples are mutated such that they traverse a continuum between their use as popular music material and electroacoustic material, so their spatial motion increases.

Chapter 2 - Popular and electroacoustic music relationships in contemporary work

In the existing repertoire there are a variety of linkages between aspects of electroacoustic and popular music techniques following a set of broad trends investigated here. There is an overlap in rhythmic approaches between music on the fringes of the popular, and approaches to rhythm in works in the electroacoustic repertoire which form a perceivable continuum. There are also numerous examples of electroacoustic works wherein popular music forms and references have been incorporated in specific regions of works, creating contiguous hybrids. The use of sampling is another example of a link between electroacoustic and popular music, with a number of composers using samples of popular music as composition material. Finally, Blackburn's cross-cultural hybridism is investigated for its use of sonic morphology to combine referential material with electroacoustic exploration.

2.1 The rhythmic continuum

Metric regularity[8], generally provided by "the beat" - percussive or electronic percussion instruments and instrumental referents (and additionally by rhythmic-harmonic instruments such as the rhythm guitar) - is a standard feature of much popular music. This steady articulation of pulse creates a metronomic presence that backdrops the work without becoming its focus, though at certain points the backdrop might grab the focus, such as with the drum fill or extended drum solo and when alterations of pattern are used to create or dissipate tension, such as the double time or half time drop. However, in general the beat is consistent and repetitive.

[8] *Metre* -the grouping of beats into patterns, marked by stronger and weaker beats. (Emmerson, 2008: 1)

Breakcore (a genre related to jungle and defined by its sampling of the ubiquitous *Amen Break* alongside other classic drum breaks from sampling culture) deals with irregularity in beat repetition. The tempo in breakcore is not regularly altered, but there is a great deal of change to the beat itself; the focus of breakcore music is often on the sampled beat itself, and ways which this sample may be manipulated, cut-up and rearranged without interrupting metric consistency, generally at a very fast tempo. Within the genre itself there are differing examples of rhythm track consistency and repetition. In Shitmat's *Amen Babylon* (Shitmat, 2004) the rhythm track alteration occurs in clearly perceivable units rather than as a constant evolution of the beat, giving some sense of structure. Both Aphex Twin's *vordhosbn* (Aphex Twin, 2001) and Kid 606's *Ecstasy Motherfucker* (Kid 606, 2003) have a consistently altering rhythm track forged into units by harmonic and melodic accompaniment whilst Venetian Snares' *Ultraviolent Junglist* (Venetian Snares, 2010) has no discernible sample-based or structural repetition; the rhythm track that is the focus of the work is in a state of constant and rapid flux. Kid 606's *Catstep-My Kitten-Catnap Vatst* (Kid 606, 2002) uses consistently changing rhythmic patterns, filtration techniques and tempo changes in a musical track that features all of the above: constantly changing rhythm in certain passages, repeated rhythmic units, and the structural unification of blocks of constantly changing rhythm through harmonic, melodic or sample-based accompaniment.

Artists such as Datach'i and Atomhead create rhythmic tracks that avoid standard percussion instrumentation or loop sampling, whilst employing a similar compositional approach to consistent rhythmic alteration. Datach'i's *Lillian* (Datach'i, 2006) and Autechre's *Parhelic Triangle* (Autechre, 2001) investigate a constantly changing glitch-based pulse; though the pulse is consistent, at times it tends toward non-pulse based groupings resembling granular clouds. Atomhead's *Combustion* (Atomhead, 2006) and *Robotomy* (Various Artists, 2008b)

have a consistently changing rhythm track that at times becomes non-pulse based, occasionally resembling granular clouds without discernible rhythm.

These approaches to rhythmic repetition represent a continuum whereby the breakcore artists begin to deviate from the mainstream by their use of non-repetitive rhythm tracks, whilst the glitchcore and speedcore artists produce work with a similar approach toward non-repetitive rhythm whilst avoiding conventional rhythmic indicators as beat material; it is at this point that distinctions begin to break down between the popular music provenance of these works and strongly rhythmic electroacoustic works such as Ricardo dal Farra's *Estudio sobre ritmo y espacio (*del Farra, 1982) and *Due Giorni Dopo (*del Farra, 1988), *Scherzo* from Dhomont's *Frankenstein Symphony (*Dhomont, 1997), Alvarez's *Temazcal (*Alvarez, 1992)*,* Jeff Morris' *StillMotion* (Morris, 2004)*,* Tenney's *Collage #One* (Tenney, 1961) or Trythall's *Omaggio a Jerry Lee Lewis* (Trythall, 1975).

It is important to note that this discussion is not attemping to categorise these works as hybrid in nature or approach; rather, it aims to direct attention to a true continuum that exists between the two genres of work. This resembles a language continuum; whilst the musical genres are distinct there are examples of instances whereby the approaches to the rhythmic facet of the work are so close as to no longer be distinct.

2.2 Popular music reference in electroacoustic music

A principal concern of Jon Weinel's work is the use of altered states of consciousness (ASC) as a compositional informant; within these works rhythm is often used as sonic metaphor for the visual patterns (know as entoptic phenomena) experienced by people under the effect of hallucinatory drugs or undergoing shamanic experiences. As both a breakcore and

electroacoustic composer, Weinel regularly uses the sonic palette and non-repetitive rhythms of jungle and breakcore as the basis for these patterns, producing musical works that are somewhat hybrid. The rhythmic sections in his work are generally strongly structurally demarcated as a consequence of their usage to describe specific phases in altered state of consciousness experiences.

Entoptic Phenomena (Weinel, 2007-10) imagines an hallucinatory experience; the work offers a surrealist soundscape to the listener, a soundscape bookended by rhythmic sections creating a contiguous hybrid wherein two distinct sections occupy a place on the hybrid continuum toward the popular music pole; *Night Breed* (Weinel, 2007-10) and *Surfer Stem* (Weinel, 2007-10) use these rhythms and sound sets in a similar fashion.

> I have previously discussed the concept of sonic atoms; rapid streams of rhythmic and micro-rhythmic sound as used in the flashcore music of La Peste. I identified this compositional approach as a means by which to mimetically reflect the form constants of entoptic phenomena. Rhythmic and micro-rhythmic sounds are used to analogously reflect the pin-point dots of light perceived during entoptic visions. (Weinel, 2010: 47)

Another piece wherein Weinel uses rhythmic patterns is *Swamp Process* (Weinel, 2007-10).

> ...the rhythmic sounds usually form clusters that move around within the spatial field as clouds, rather than engulfing it completely. I shall refer to these clouds as ‘entoptic creatures’. These ‘entoptic creatures’ correspond with interpretative visual patterns of hallucination, where the form constants coalesce into collective entities. (Weinel, 2010: 59)

.

The rhythmic qualities of this work are emergent and ambiguous - they do not necessarily refer to popular music as the rhythmic elements of *Entoptic Phenomena* could be taken to, but rather appear and disappear organically; they are embedded in a diorama and do not clearly demarcate large scale structural change.

The rhythmic elements in Weinel's work sometimes serve to create hybridism (such as in *Night Breed, Surfer Stem, Tiny Jungle* and *Entoptic Phenomena.*) The allocation of the hybrid material into specific sections creates contiguous hybrids; it is the combination of breakcore sections and electroacoustic soundscapes within a single work which define the hybrid. As the works are modeled on descriptions of psychedelic experiences and the rhythmic elements are taken as reference to particular pattern-based entoptic phenomena the rhythmic emergences are predicated on first-person narrative. The process of movement between the breakcore sections and the electroacoustic soundscapes is often sudden in the case of rhythmic entry, and usually gradual in the case of moving from breakcore sections toward electroacoustic sections (often achieved through a fading out or dispersal of rhythm to quieter elements of the track.)

Mario Verandi's *Dancescape* (Verandi, 1997) investigates rhythm within an acousmatic work:

> The aim was to create a dance/ambient piece using quasi-regular or periodic rhythmic elements structured within an acousmatic context. The original material comes from a recorded improvisation performed by myself on bongos. This material was later processed on the computer to give it a more electronic 'touch'.
>
> The piece is divided into two sections; the first section was constructed with a quasi-regular percussive rhythmic sequence. On top of this sequence unfolds an abstract soundscape composed of different timbres and gestures. The second section is mainly

> composed of processed vocal sounds and has a more gentle or 'ambient' characteristic. (Verandi, 1997)

The piece is strongly rhythmic, yet its incorporation of various textures maintains an electroacoustic feel to the work, as does their quasi-rhythmic nature (rather than totally rhythmic.) The morphology between the rhythmic and non-rhythmic is achieved by a fading out of the rhythm, and by convergent streams, with rhythm being transmitted from the bongo samples into the arrangement of mutated vocal samples through which Verandi gradually transitions between the rhythmic section and the electroacoustic soundscape. Toward the end of the work the rhythms reappear in an enmeshing of the rhythmic aspects and the soundscape.

In *The World We Know* (Viñao, 2003), Alejandro Viñao uses rhythm as explicit popular music reference:

> Today, the most ubiquitous of musical clichés are perhaps the rhythms of rap and hip-hop that we hear everywhere, coming from television sets, cars, supermarkets, arcades, shops in general and of course clubs and private homes. For this reason I took as the central cliché of my piece a generic hip-hop rhythm track created by a drum kit and a bass. This basic rhythm becomes the centre of gravity, the point of reference from and through which ‘the world ’ is perceived, including other past and present music clichés. In the beginning of the piece the common ‘concrete’ sounds of the world organise themselves into a hip-hop rhythm. Eventually, the hip-hop rhythm is itself modified by the sounds coming from the concrete sound world. (Viñao, 2003)

Viñao constructs rhythms from concrete sounds, and consequently this work forms a cross

processed hybrid. As the piece begins, the rhythmic organisation of the different elements becomes more distinctly periodic as the sonic investigation of real-world sounds takes on a rhythmic character; a clear motion along the continuum takes place via the works' rhythmic plasticity. The development of this hip-hop referential section is unlike hip-hop in that the rhythm track, in its rhythm and sample placement, is in a constant state of flux not unlike breakcore (though at a considerably lower tempo). At 4:41 the piece gradually loses rhythmic consistency; rhythmic plasticity is used to segue into an electroacoustically explored sound world. Interestingly, the latter makes frequent use of increasing/decreasing iteration resembling bouncing - a non-pulse based rhythmic grouping. The increasing pulse-based regularity of the drum entry at 6:30 uses rhythmic plasticity as a transitional pivot around which to move from the less metric electroacoustic sound world to a contrasting section dominated by metric regularity with the addition of a bass line, further adding to a sense of popular music provenance. The latter half sees considerable rhythmic flux within the work, producing a section that has an ambiguous metre and therefore a degree of ambiguity. This is another example of cross-processed hybridism; subjecting the hip-hop samples to the rhythmic organisation procedures inspired by contemporary classical music.

A related approach is found in Jeff Morris' *StillMotion* (Morris, 2004). Here the composer uses sonically identifiable everyday sounds unrelated to imitation of percussive instruments which take on beat patterns in subtle ways, producing a work that is very much in the domain of the electroacoustic with a strong pulse-based nature. As Morris states:

> All source sounds have been recorded during an average day in the lives of different people. In performance, the sound clips are fractured, so that the treble, middle, and bass frequencies of the sound act as three facets of a flexible beat pattern that articulates time. (Morris, 2004)

This clearly elucidates a morphology whereby sonic samples indicative of electroacoustic music are subject to the rhythmic organisational procedures which could be indicative of popular music.

Viñao's *Hendrix Haze* is a set of variations on Jimi Hendrix's *Purple Haze* (Viñao, 1983):

> *I structured Hendrix Haze in a very classical European fashion: a set of variations on the opening guitar riff of Purple Haze by Jimi Hendrix. The overall form of the piece is close to a traditional suite consisting of eight different sections played uninterruptedly.* (Viñao, 1983)

Hendrix Haze is a definite form of borrowing, a set of variations on an existing work heavily drawing from a previous popular musical work in order to create a new piece.

2.3 Sampling and popular-electroacoustic interaction

The advent of sampling proved a critical moment in both electroacoustic and popular music as it facilitated the capturing, organisation and manipulation of an enormous range of sounds; it also allowed the use of previous records as material for new work, leading to a large amount of creative output and not a small amount of legislative difficulties. A history or typology of sampling is not within the scope of this thesis, but the use of existing popular musical work as material for electroacoustic exploration is an interesting avenue for investigation which, by treating popular music source material as sonic objects for manipulation, can form cross-processed hybrids.

Oswald's plunderphonics (Oswald, 1989) had precursors in both James Tenney's *Collage #One* (Tenney, 1961)and Richard Trythall's *Omaggio a Jerry Lee Lewis*[9] (Trythall, 1975). *Collage #One* takes source material from Elvis Presley's *Blue Suede Shoes* (Presley, 1956) to create an electroacoustic work that is more concerned with the utilisation of a sonic souvenir of an internal other, an "indigenous element" (Polansky, 1992: 2), than creating a hybrid musical work. However, some elements are of note; there is a clear rhythmic impetus to the work and, as Polansky notes, the sonic transformations never undermine the sense of groove: at the point that the recognisable Elvis samples emerge in the second half of the work they do so with a consistent pulse. Another notable facet of this piece is the manifestation of the recognisable samples of Elvis' work:

> ...like much of Ives's music (as in the "Emerson" movement of the Concord Sonata, which Tenney is famous for playing), the development scheme is "backwards." The source material is not heard until the third section, unrecognizable and highly transmogrified material presented first. (Polansky, 1992: 3)

This gradual unfolding of material with recognisable popular music pedigree is a common feature of works within this folio. This material emergence occurs in a different direction in Trythall's *Omaggio a Jerry Lee Lewis.* Similarly to *Collage #One*, Trythall rarely sacrifices the beat in the work. Furthermore, the emergences of distinct sections of material taken from the original work are restricted to distinct sections. There would be potential here for the work to sound like a radio being tuned in and out; this is avoided by the consistency of the works' pulse. This pulse is provided by samples from the original recordings which are sometimes completely abstracted due to pitch alteration and sample size, giving certain sections of the work a glitch-like feel. The transition between the sections of glitch-type material and of the

distinct Jerry Lee Lewis material are achieved morphologically by various devices.

> It was created solely through tape manipulations applied to a pre-recorded work, "Whole Lotta' Shakin' Goin' On", as sung and played by Rock 'n' Roll great, Jerry Lee Lewis. This central source material was first cut into thematic and motivic units of various types and sizes - words, phrases, notes, chords, musical fragments, etc. These were then subjected to a wide variety of "musique concrète" procedures (speed change, filtering, head echo, reverberation, looping, signal interruption through erasure and excerpt loops, compression, expansion, phasing, panning, multiple readings, tape passes, editing, remixing, etc.). These results were then reassembled, mixed and re-mixed, until a new composition emerged.
>
> The abstract idea was that, like the table or newspaper in a cubistic painting, the familiar musical object - here the Jerry Lee Lewis performance - served the listener as an orientation point within a maze of new material. The concrete result, so to speak, was that the studio manipulations amplified the source material, carried it into new, unexpected areas while maintaining its past associations. As in a dream, the material could present itself intact, then dissolve and reassemble in new, vaguely familiar shapes. Moving back and forth along this line, controlling this movement, was what fascinated me. (Trythall, 2002)

Trythall's description of the production of the work resembles plunderphonics whilst clearly stating a process akin to cross-processed hybridism. Whilst the samples of the original could be described as sonic souvenirs of an indigenous other, their incorporation into an overall rhythmic consistency serve as a method of boundary blurring between the treated material and the material heard somewhat unprocessed. Interestingly, he discusses musical motion on

a line between the intact material, "new and vaguely familiar shapes" and dissolved forms, a statement which has connotations with the idea of a continuum between poles wherein material may be intact at one pole, and dissolved at the other.

These two works plunder pre-existing popular music for content; their treatment of the source material is from afar; Oswald's approach goes further in its use of the recognisable existing material within the work. An example *par excellence* is *Pretender* (Oswald, 1989), a treatment of Dolly Parton's version of *The Great Pretender* (Parton, 1984) which takes the original recording and effectively plays it through with decelerating speed (accomplished using a variety of technologies) creating 'a powerful, aesthetic, polysemic but highly focused and enjoyable sound artefact.' (Cutler, 2000: 88) Another classic example is *Dab* (Oswald, 1993) which takes as its source Michael Jackson's *Bad* (Oswald, 1989), regularly noted due to the litigation problems it incurred:

> After sliding into recognition this Michael Jackson cut follows the format of a video game - as it progresses the levels of complexity and abstraction increase. (Oswald, 1989)

Several sections of the work, which at times resembles a skipping CD, are recognisably related to the original and recall the treatment of classic breaks by breakcore artists; subjecting samples to pulse based non-repetitive iterations. At other times, the work has an electroacoustic quality, exploring textures and gestures as opposed to re-presentation of sounds which maintain a clear and direct link to the original. Structurally, this operates similarly to Viñao's *The World We Know,* using gradation to move between distinct regions which owe more or less of their identity to either popular music or electroacoustic music; the close of the work from 3:15 demonstrates a gradual but complete move from music with popular music

precedent into electroacoustic soundscape, achieved by increased processing of musical material and the removal of distinct pulse. Oswald made a number of works based on popular musical material (as well as classical music source material) by artists such as Metallica, the Beatles, Bing Crosby and Elvis Presley. There are a number of approaches Oswald uses to treat the material, from the complex re-imagining of Michael Jackson in *Dab,* the consistent deceleration of Dolly Parton in *Pretender* or the gradual overlaying of material in *Don't* (Oswald, 1989). At times, particularly in *Dab* for example, he approaches the compositional prerogative of Trythall and Tenney by using a popular music sample as sonic object creating a walk along a continuum between re-imagining existing popular music and electroacoustic composition.

Oswald is by no means the only plunderphonic artist working in this way; *Negativland* (Negativland, 1991) used samples and paraphrases of U2's *Still Haven't Found What I'm Looking for* (U2, 1987) and Kid 606's album *The Action Packed Mentallist Bring You The Fucking Jams* (Kid 606, 2002) uses wholesale sampling of existing records with the songs on this album sited in a position between the conventional re-mix and the plunderphonics of Oswald, Trythall and Tenney. Otondo's *Zapping Zappa* (Otondo, 2004) extends a plunderphonic approach. By not only sampling musical records, but also conversations recorded with Frank Zappa, the source material for this collage is not only popular music material but popular music paratext. Of particular interest is a central section which creates contiguity in a collage of quotation and electroacoustic material through the use of continuous pulse as linking factor.

2.4 Cross cultural hybrid modulation

Manuella Blackburn's *Cajón!* (Blackburn, 2012) takes its name from a percussion instrument from which much of its source material is derived:

> The piece Cajón! as the title suggests, makes use of sound recordings of the Peruvian percussion instrument of the same title. Due to an unfixed panel on its box-like shape, the cajón exhibits a surprisingly rich variety of sounds, one of which is likened to the snare drum rattle. This piece is structured in three sections exploring rhythmic material and the timbre of the cajón. A clapping technique known as 'palmas' in flamenco music is used alongside the cajón sound material to set up contrasting rhythmic patterns. In addition to these sounds, glitch and noise-like materials provide a backdrop to the activity of the gestural events. (Blackburn, 2008)

The work makes use of cultural sound objects within an electroacoustic composition; the morphology of the sounds give them mobility on a continuum between the electroacoustic and the concrete, between the intact material, ‘new and vaguely familiar shapes’, and ‘dissolved forms’ (Trythall, 2002). Due to the nature of the sonic souvenirs, this serves to create a continuum between two distinct (sound)worlds: acousmatic music and Latin American percussion repertoire.

The work has a strongly rhythmic quality; both poles of the continuum are complicit in espousing rhythmic characteristics. The cajón and the palmas technique iterate rhythmic material numerous times throughout the work. Granular textures without real world signification (such as the stream from 00:46 - 1:24) are at times arranged rhythmically, giving them the glitch like quality that Blackburn mentions. The opening statement from 0:00 - 1:24 is an exploration of morphological qualities of the work's multiplistic soundworld; a musical statement wherein the poles of the continuum are intermingled. The snare-like quality of the cajón relates it timbrally to the granular textures (an example of synchronous timbral convergence) and rhythmic plasticity is involved in creating convergent rhythmic morphology

between two distinctly separate streams; that of the cajón and of the grains. The work itself evokes not only two distinct soundworlds, but involves an intermediary layer which mediates between the two to create a conjunct work through timbral and rhythmic relationships.

Blackburn's *Sonidos Bailables* (Blackburn, 2006), also approaches the intertwined concepts of sonic souvenir and rhythmic pattern in electroacoustic music:

> This group of four acousmatic miniatures was conceived from the research ...concerning the incorporation of Latin American influences in electroacoustic music. Remaining with me from this study was the idea of the 'cultural sound object.' These miniatures use typical 'cultural sound objects' associated with the music from South America, exploring their potential in the medium of acousmatic music. (Blackburn, 2006)

The first movement of the suite uses samples from various Latin American percussion instruments and excerpts of music. These are spliced together to create alternative gestures which feel like an otherwordly interpretation of Latin American music, with the instrumental gestures having a quality not unlike the opening vocal sound in Wishart's *Tongues of Fire* (Wishart, 1994); mutation of something recognisable - wholly derivative, wholly new. The second miniature is a soundscape proximal to the electroacoustic pole throughout, relying on drones and granular textures without source bonding (though presumably their source is similar to that of the previous movement). The third work operates similarly to the first, constructing a modulatory soundworld with both electroacoustic characteristics and distinctly recognisable features of Latin American music which moves closer to the Latin American pole of the continuum than the first using tonality, as well as consistent rhythm. The grains used here are related to the percussive sounds, and the percussive nature of the strummed guitar. Much of the electroacoustic soundworld may be heard as synchronous overlay to the

consistent rhythmic-harmonic elements of the track. The final movement of the work takes a step back toward the electroacoustic pole of the continuum, making use of non-pulse based grouping and sounds with limited source reference. Of particular note here is Blackburn’s use of tonality, the piece closing with an undulating harmonic backdrop that recalls Eno's *Ascent, A Landing* (Eno, 1983).

Chapter 3 – *From Time to Time* Album

This chapter examines a set of three works composed as an album entitled *From Time to Time*. These examine different aspects of continuum traversal as manifest in compositional approaches predicated on structure, source material, rhythmic organisation and approaches to the use of vocals.

A note on analyses

The analyses segment the works in a number of ways by breaking down each work into overarching sections, broken into segments, further broken down into statements. The naming of each section follows the convention <section>..<statement>. For example, the third statement of the second segment of the fourth section would be written 4.2.3. Some pieces have whole sections consisting of one segment consisting of one statement. In this case, the section will simply be called something akin to 2.1.1 (for section 2 without further division).

A note on scores

The listeners scores included with each piece are to be used in tandem with the descriptive analysis as a guide to aid the listener around the critical aspects of hybrid elaboration in these works.

3.1 Take It All Away

Structural hybridism predicated on popular song structure

Format: 5.0

Length: 8:20

Vocalist: Tom Shave

--

If I'm to blame, take it all away,

If not the same, take it all away,

I can't step up upon this,

Oh, sure I can.

--

So fly, truly I

--

3.1.1 Overview

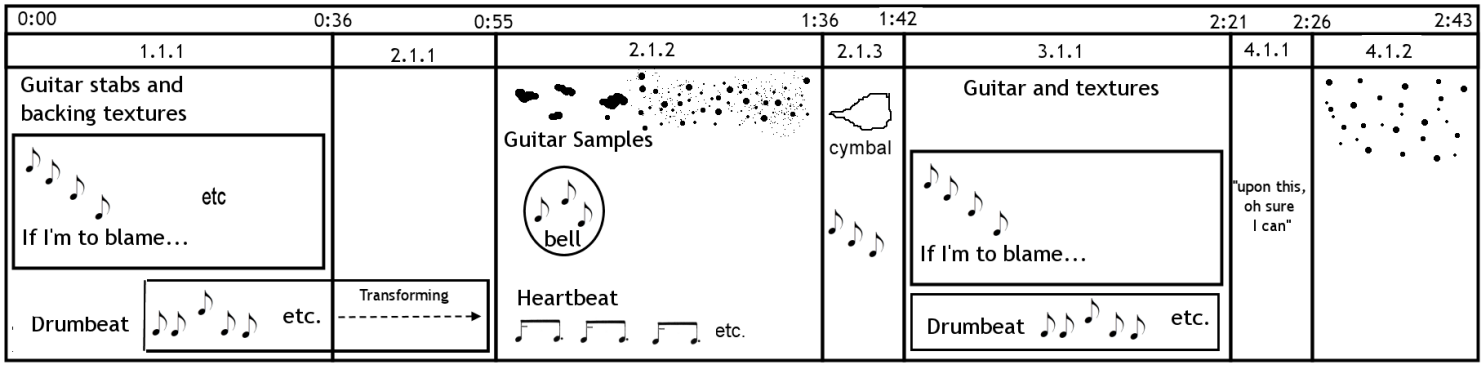
Take It All Away uses hybridism informed by structure; specific areas of the piece are demarcated for predominance of material from a particular genre and there is a rationale for

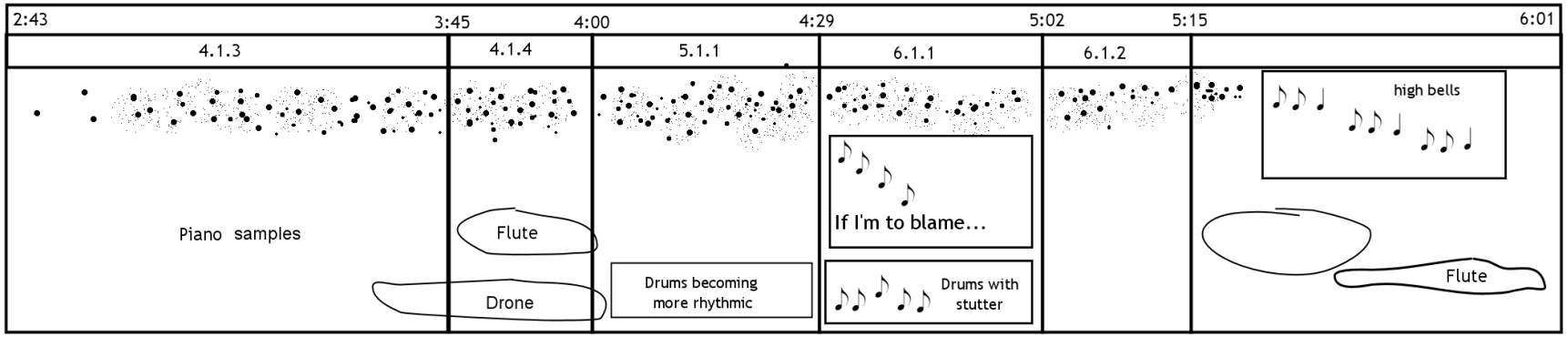
the choice of these areas. This work investigates sectional continuum ambiguity and ways that continuum traversal is manifest within segue passages; furthermore, the mobility of the global continuum is investigated as a consistently occurring motion throughout the work.

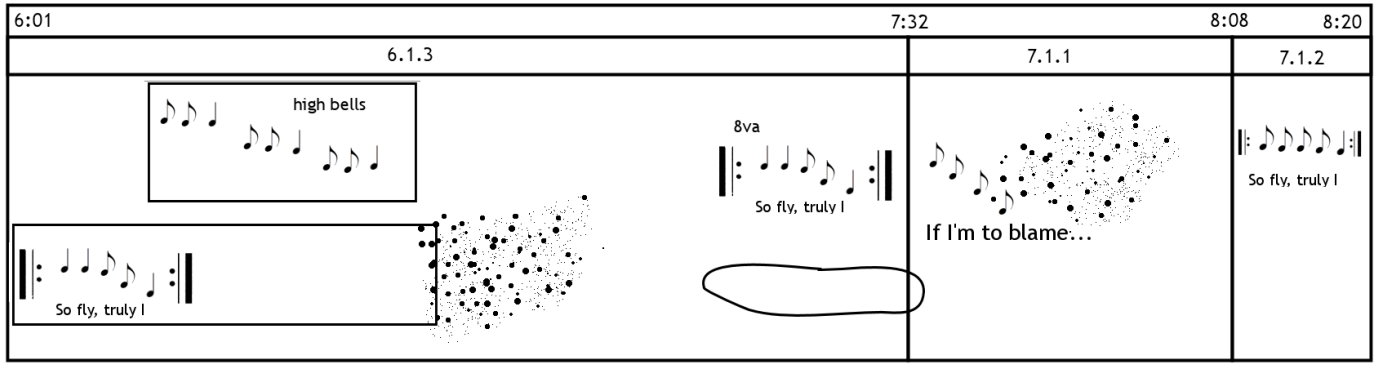
The structure imitates that of popular song, defined here as chorus - verse - chorus - verse - bridge - chorus. As a consequence there is a structural link to popular music. The chorus is considered as having proximity to the popular music pole of the continuum, whereas the verse is considered primarily electroacoustic; the conceptualisation of the chorus as 'home' and the verse as 'away' allows a sense of journey away from the chorus and back to it again .

The composition of the chorus sections was approached using a rhythmic and harmonic backing track over which various melodies were experimented with until the one chosen was arrived at. The work was inspired by *Dime Piece ft. Dwele*, by J Dilla (Dilla, 2006); *Take It All Away* contains a direct quotation (rather than sample) from this work during the bridge section.

3.1.2 Schematic Score (overleaf)


0:00
0:36
0:55
1:36
1:42
2:21
2:26
2:43
1.1.1
2.1.1
2.1.2
2.1.3
3.1.1
4.1.1
4.1.2
Guitar stabs and backing textures
etc
If I'm to blame...
Drumbeat
etc.
Transforming
Guitar Samples
bell
Heartbeat
etc.
cymbal
Guitar and textures
If I'm to blame...
Drumbeat
etc.
"upon this, oh sure I can"


2:43
3:45
4:00
4:29
5:02
5:15
6:01
4.1.3
4.1.4
5.1.1
6.1.1
6.1.2
Piano samples
Flute
Drone
Drums becoming more rhythmic
If I'm to blame...
Drums with stutter
high bells
Flute


6:01
7:32
8:08
8:20
6.1.3
7.1.1
7.1.2
high bells
So fly, truly I
8va
So fly, truly I
If I'm to blame...
So fly, truly I

3.1.3 Borrowing

Since the structure of this piece is modelled on that of popular song, a general musical structure rather than a specific piece *per se,* this could be considered stylistic allusion. The piece also has quotation within the bridge section. Furthermore, *Take It All Away* could potentially be described as a cumulative setting in reverse with the progress of the piece moving each popular music dominated section further away from that pole. The linking together of the quotation 'So fly, truly I' with the lyrical material of the chorus is an example of medley in the Burkholderian sense.

3.1.4 Analysis

Section	Timing	Analysis
Section 1 - Chorus 1 1.1.1	*0:00-0:36*	The first iteration of the chorus is heard without drum beat, added in the second. In addition to the instrumental presences more closely allied to the popular music pole of the continuum this section contains non-instrumental textural elements, inspired by the textural nature of J. Dilla's work. Stuttering in the drum track, in addition to the unusual 5/4 time signature, establishes rhythmic ambiguity. The chorus maintains a global continuum location toward the popular music pole (with metric regularity, tonality, sung vocal line, real-world pitched instruments and percussion samples.)
Section 2 - Verse 2 2.1.1	*0:36 - 0:55*	The transition phase at the close of the first chorus leads into the first verse using the morphology of the guitar sample and percussion. The bass drum (the transitional pivot here) is transformed into a heart beat, by low-pass filtration and rhythmic

		alteration. This section also uses textural dispersal as the popular music components dissipate revealing the electroacoustic soundscape.
2.1.2	*0:55-1:36*	Reverberated textures and high frequency granular clouds punctuated by sonic recurrences from the chorus, primarily the mutated guitar sample the treatment of which has moved it away from the popular music pole of the continuum.
2.1.3	*1:36-1:42*	The transition from the electroacoustic verse to the popular chorus utilises a descending pitch motif to reintroduce tonality via pitch emergence. This is followed by a reversed cymbal; the high frequency nature of this sound relates it to the granular clouds that dominate the latter half of the verse section.
Section 3 - Chorus 2 **3.1.1**	*1:42-2:21*	The dominant nature of the popular music material in the second chorus has reduced with the increased pervasiveness of the electroacoustic material; the presence of the textural components and mutated guitar has increased and the drum loop presence has decreased, consequentially shifting this chorus along the continuum away from the popular music pole.
Section 4 - verse 2 **4.1.1**	*2:21-2:26*	The closing sample of the voice singing 'upon this, oh sure I can' is low-pass filtered and cut-up, and is thus imbued with continuum mobility operating in tandem with an abrupt textural dispersal as segue.
4.1.2	*2:26-2:43*	This section is punctuated with mutated piano samples, altered in relation to an implied continuum since they are never heard without mutation. The sound of the heavily reverberated flicking book is a

		restatement of material occurring in the previous verse, a spectrum spanning device creating a gestural link between low and high frequency sounds.
4.1.3	*2:43-3:45*	An energetic soundscape of guitar granulation representing a development of the previous electroacoustic verse.
4.1.4 .	*3:45-4:00*	A low pitched drone enters
4.1.5	*4:00-4:29*	The sound of the drums re-enter for the segue into the third chorus. The drums are rhythmically plastic; the gradual increase of regularity in their metre is a morphological process. Additionally, before the start of the third chorus, two gestures imply pitch resolution to the chorus.
Section 5 - chorus 3 **5.1.1.**	*4:29-5:02*	This chorus is shorter than the previous due to omission of the latter part of the second iteration, it continues to use similar processes as found in the previous chorus to establish ambiguity. These factors exert a pull on the continuum position of this chorus toward the electroacoustic pole.
Section 6 - bridge **6.1.1**	*5:02 - 5:15*	The segue to the bridge retains important sonic elements presenting disjunct threads within the work; specifically, the mutated guitar sample and the drums (backgrounded with low-pass filtration.)
6.1.2	*5:15 – 6:01.*	This section is dominated by extended drones (which maintain an element of pitch) and incorporates bell sounds, a feature common to the works in the portfolio and used for their continuum ambiguity:

		bell sounds are not uncommon features of either genre (Garro calls them a cliché of the acousmatic genre (Garro, 2011)) The granulated guitar maintains its presence as a disjunct but consistent thread. Toward the end of this statement the low-pass filtered drums re-enter as segue into the next statement.
6.1.3	*6:01 - 7:32.*	A combination of the drone sounds, the granular guitar, mutated piano and bells create a quasi-harmonic backdrop to the repeated melodic vocal line 'so fly, truly I', a quotation from *Dime Piece*.
Section 7 - chorus **7.1.1**	*7:32-8:08*	The final chorus begins with heavily processed vocals, distorted by downsampling and barely audible over pitched drones.
7.1.2	*8:08-8:20*	The closing statement of the piece transforms the melodic-lyrical statement 'so fly, truly I', convolving it with bells.

3.1.4 Conclusion

Take It All Away takes a morphological journey wherein the polarity of the global continuum is oscillatory with diminishing returns; the piece is hinged upon the allocation of polar identity to areas within traditional popular song structure but its progress is defined by the motion of these sections away from their respective poles toward ambiguity. A number of musical elements are critical to this, in particular the drum loop and guitar sample have a morphology that is consistently continuum-mobile.

The continuum mobility of the drum loop predicated on the way the samples move in and out of metric regularity resembles the rhythmic plasticity found in Viñao's *The World We Know*,

which uses the plasticity of a rhythm track to segue between electroacoustic and popular oriented sections. The structuring predicated around rhythmic referential sections and semi-rhythmic or arhythmic soundscapes recall similar processes in Weinel's work though within *Take It All Away* there is a greater sense of permeability between the sections.

3.2 Happy Robot

Structural hybridism predicated on narrative.

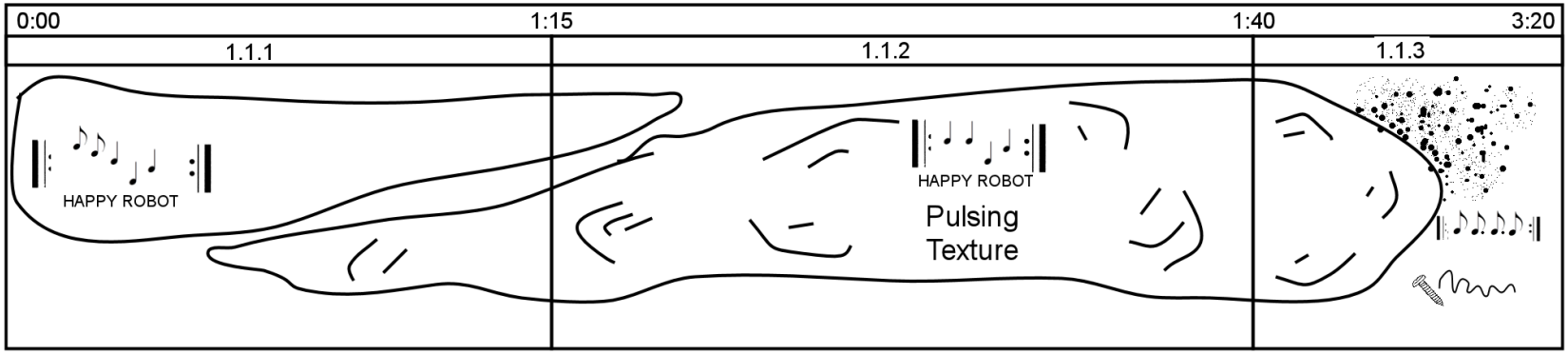
Format: 5.0

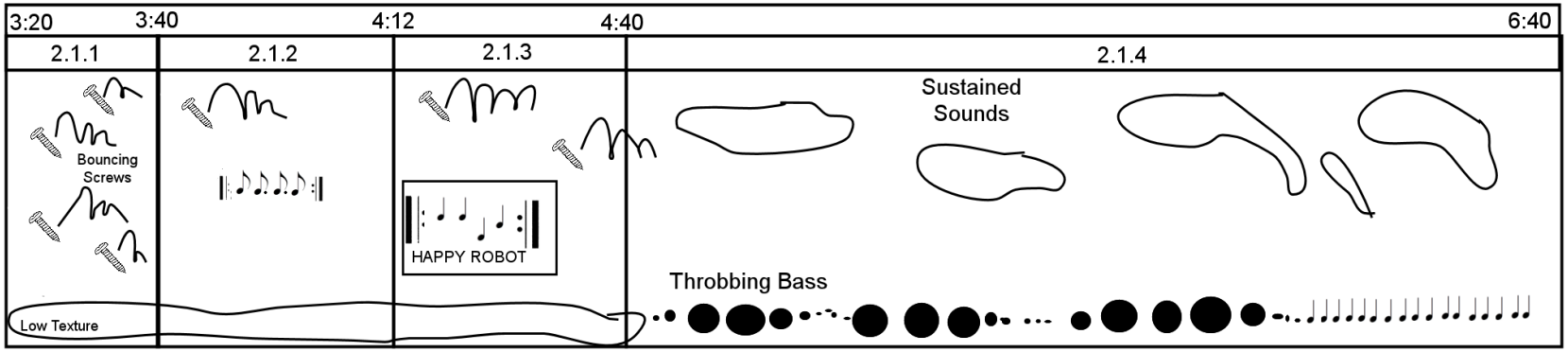
Length: 15:17

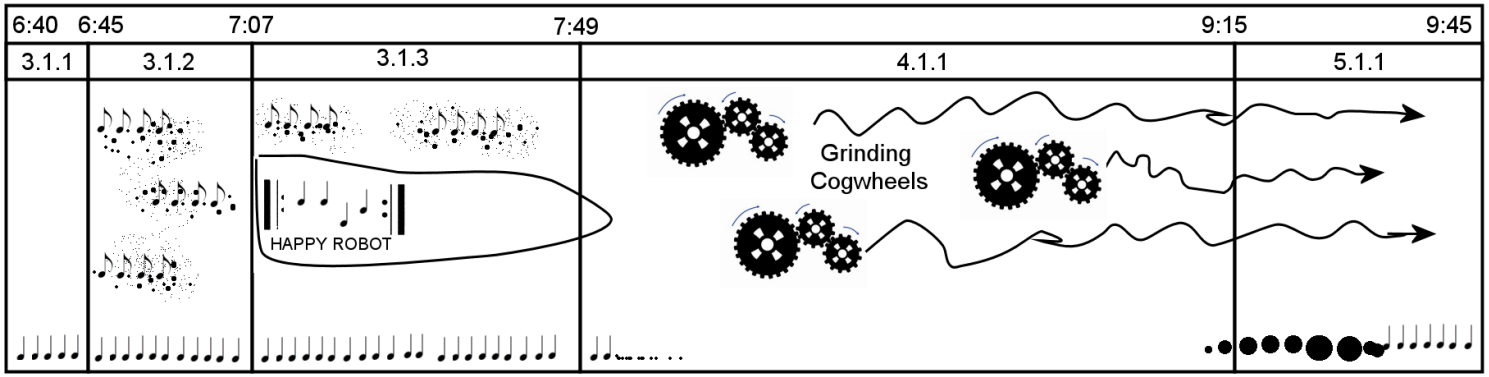
3.2.1 Overview

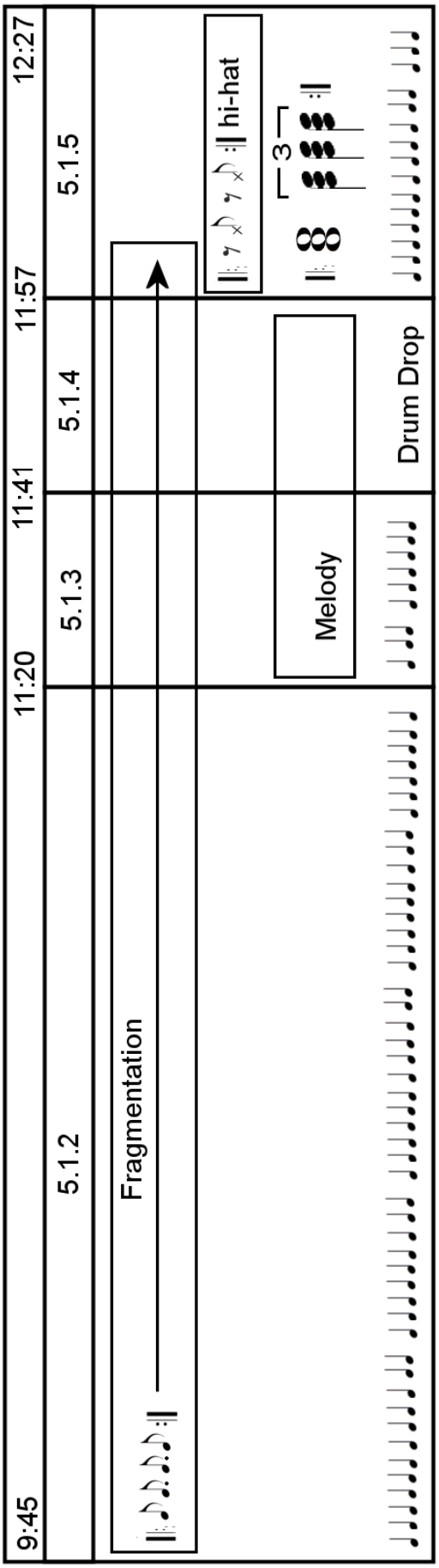
The hybridism in *Happy Robot* uses mappings as compositional informant predicated on narrative. This narrative is set in a dystopic future where humanity is extinct and the planet is inhabited exclusively by robots produced to perform service functions; in this case, the eponymous *Happy Robot* produces techno music. The work was influenced by Truax's *A Shaman Ascending* (Truax, 2007), particularly its use of a four-to-the-floor drum-like low frequency motif, and self-convolving techniques.

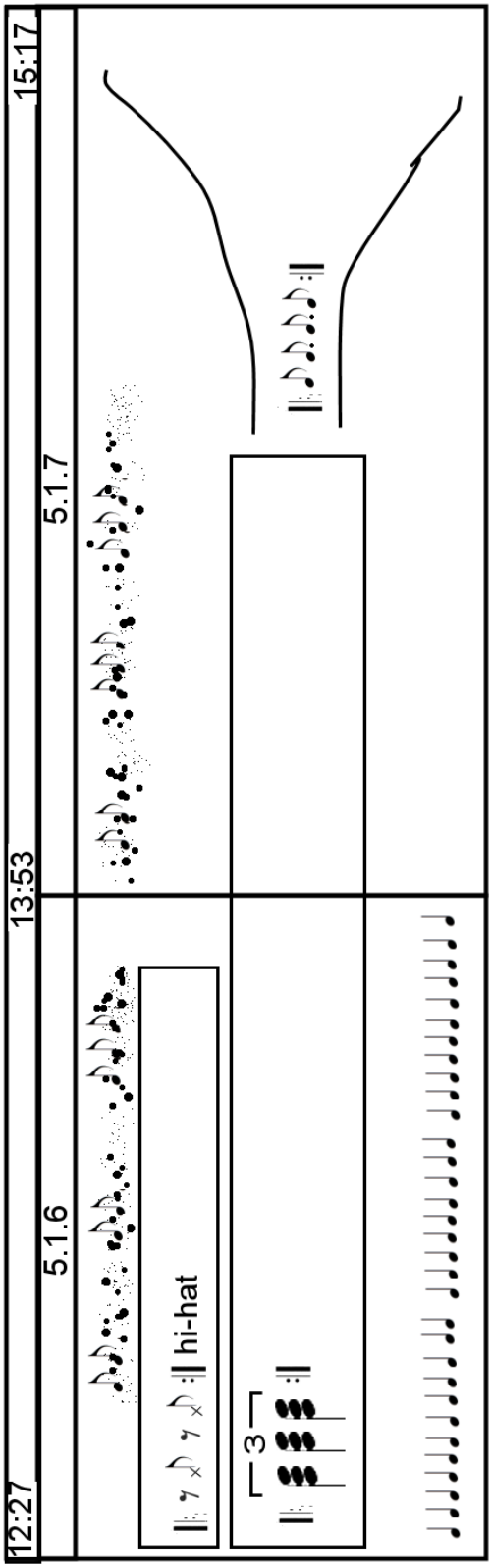
3.2.2 Schematic Score (overleaf)


0:00
1:15
1:40
3:20
1.1.1
1.1.2
1.1.3
HAPPY ROBOT
HAPPY ROBOT
Pulsing
Texture


3:20
3:40
4:12
4:40
6:40
2.1.1
2.1.2
2.1.3
2.1.4
Bouncing
Screws
HAPPY ROBOT
Sustained
Sounds
Throbbing Bass
Low Texture


6:40
6:45
7:07
7:49
9:15
9:45
3.1.1
3.1.2
3.1.3
4.1.1
5.1.1
HAPPY ROBOT
Grinding
Cogwheels


9:45
11:20
11:41
11:57
12:27
5.1.2
5.1.3
5.1.4
5.1.5
Fragmentation
hi-hat
Melody
Drum Drop


12:27
13:53
15:17
5.1.6
5.1.7
hi-hat

3.2.3 Borrowing

This piece employs both programmatic quotation and cumulative setting facilitated by narrative. The techno music fulfills a programmatic function within the narrative; the idea of the robot's function (and functionality). The nature of the narrative - the robot awakening then malfunctioning, repairing itself and playing music, malfunctioning again and finally repairing itself and playing more music - means that the narrative builds toward the final section of popular music reference as a cumulative setting. The idea of a narrative or diorama built around rhythm as indicator of an agent recalls the use of rhythmic entoptic creatures in Weinel's *Swamp Process* (Weinel, 2007-10.)

3.2.4 Analysis

Section	Timings	Analysis
Section 1 **1.1.1**	*0:00-1:15*	The repetition of the happy robot theme (played on a Yamaha DX-21 through a Rocktron *Banshee* Talkbox) recalls the work of *Daft Punk* (particularly *Robot Rock* (Daft Punk, 2005)), has both tonal and rhythmic qualities that it introduces to the work, and acts as both prologue to the work and an introduction to the protagonist.
1.1.2	*1:15-2:40*	This section is a pastorale, a depiction of the sun slowly rising over the scene and the eponymous happy robot. The textures are derived by auto-convolving the opening vocal line, recalling that found within *A Shaman Ascending* (Truax, 2007.)
1.1.3	*2:40-3:20*	The pastorale develops with the addition of a variety of sounds

		filling out the spectrum; the metallic sound that forms the basis of the following section emerges through a fade-in at 3:04.
Section 2 **2.1.1**	*3:20-3:40*	In narrative terms, the robot has begun to start-up as the sun rises over the scene; this is interrupted when a screw falls out of the robot and bounces away. This bouncing pattern is a recurrent motif in much electroacoustic music (see for example, Wishart's *Tongues of Fire* (Wishart, 1994), Biston's *Muance* (Biston, 2008) and Daoust's *Mi Bemol* (Daoust, 1998)) and serves as synecdoche.
2.1.2	*3:40-4:12*	The entrance of a syncopated rhythmic figure implies that the robot has regained some functionality.
2.1.3	*4:12-4:40*	The re-emergence of the happy robot motif serves both a narrative purpose, a suggestion that the robot is attempting to repair itself, along with a musical purpose, recalling the textures of the pastorale.
2.1.4	*4:40-6:40*	The gradual introduction of regular rhythm to a non-rhythmic bass texture marks this section, firstly through a throbbing pattern morphing into a four-to-the-floor bass drum figure.
Section 3 **3.1.1**	*6:40-6:45*	With the emergence of the electronic bass drum sample, the work has made a significant continuum traversal toward the popular music pole.
3.1.2	*6:45-7:07*	A high pitched rhythm joins, emerging gradually from a cloud of samples; it doesn't quite attain rhythmic or pitch consistency, but rather exists as a cluster of grains in approximate rhythm.
3.1.3	*7:07-7:49*	The happy robot statement returns, providing both musical

		linkage between sections as well as narrative suggestion of a return to function.
Section 4 **4.1.1**	*7:49-9:15*	This section constructs grinding sonic cogs and wheels as the robot breaks down again. This is accompanied by various sounds including auto-convolved samples of the happy robot motif and various hints of rhythm.
Section 5 **5.1.1**	*9:15 - 9:45*	As the grinding sounds subside the work shifts back toward the popular music pole, again using the bass drum as transitional pivot.
5.1.2	*9:45 - 11:20*	This popular music oriented section builds by gradually adding more rhythmic sounds, predominately percussive.
5.1.3	*11:20 - 11:41*	A new rhythmic motif enters, which has a degree of melodic implication.
5.1.4	*11:41 - 11:57*	With the removal of the bass drum, this statement loses a strong basis for popular music polar identity; some rhythmic integrity remains with the use of the melodic motif from section 5.1.3 whilst the claves lose some of their rhythmic consistency.
5.1.5	*11:57 - 12:27*	The bass drum is reintroduced along with a new rhythmic figure and off-beat hi-hats; the rhythms are synchronised and consequentially this presents the closest proximity to the popular music pole within *Happy Robot*.
5.1.6	*12:27- 13:53*	A sense of continuum mobility is introduced in the claves,created using a MaxMSP patch that randomised timing and pitch changes of the claves, effectively realising the Happy Robot.
5.1.7	*13:53 - 15:17*	The stopping of the bass drum facilitates a rapid traversal of the

		continuum from the popular pole to the electroacoustic pole acting as recapitulation. Narratively, as the sun sets, the piece returns to the auto-convolved pastorale textures.

3.2.5 Conclusion

The continuum mobility of this work is predicated on the narrative it describes; since techno music is the motif of the protagonist, rhythm is a critical transitional force here. Sectional identity is strongly linked with rhythmic content, with transition often reliant on the appearance, disappearance, or morphology of rhythm. The popular music section is not only built on rhythmic consistency, but on the use of an extremely straight meter and pattern (predicated narratively.) This is a contrast with the varieties of rhythm found elsewhere in the work, rhythms that maintain an electroacoustic position on the continuum through their contrast to the strictness of the techno meter: the pulsing textures of the pastorale, the bouncing motif of section two and the accelerating rhythms of section four, stand in sharp relief to the strict meter of sections three and five. Global rhythmic plasticity is a consistent, unifying thread within the work and is a regular transitional pivot.

3.3 Blackened Box

Hybridism using instruments as style referents

Format: 5.0

Length: 4:04

Vocalist: Tom Shave

Critical find, hope forms a new inside,

A blackened box, a hoop and gathered time,

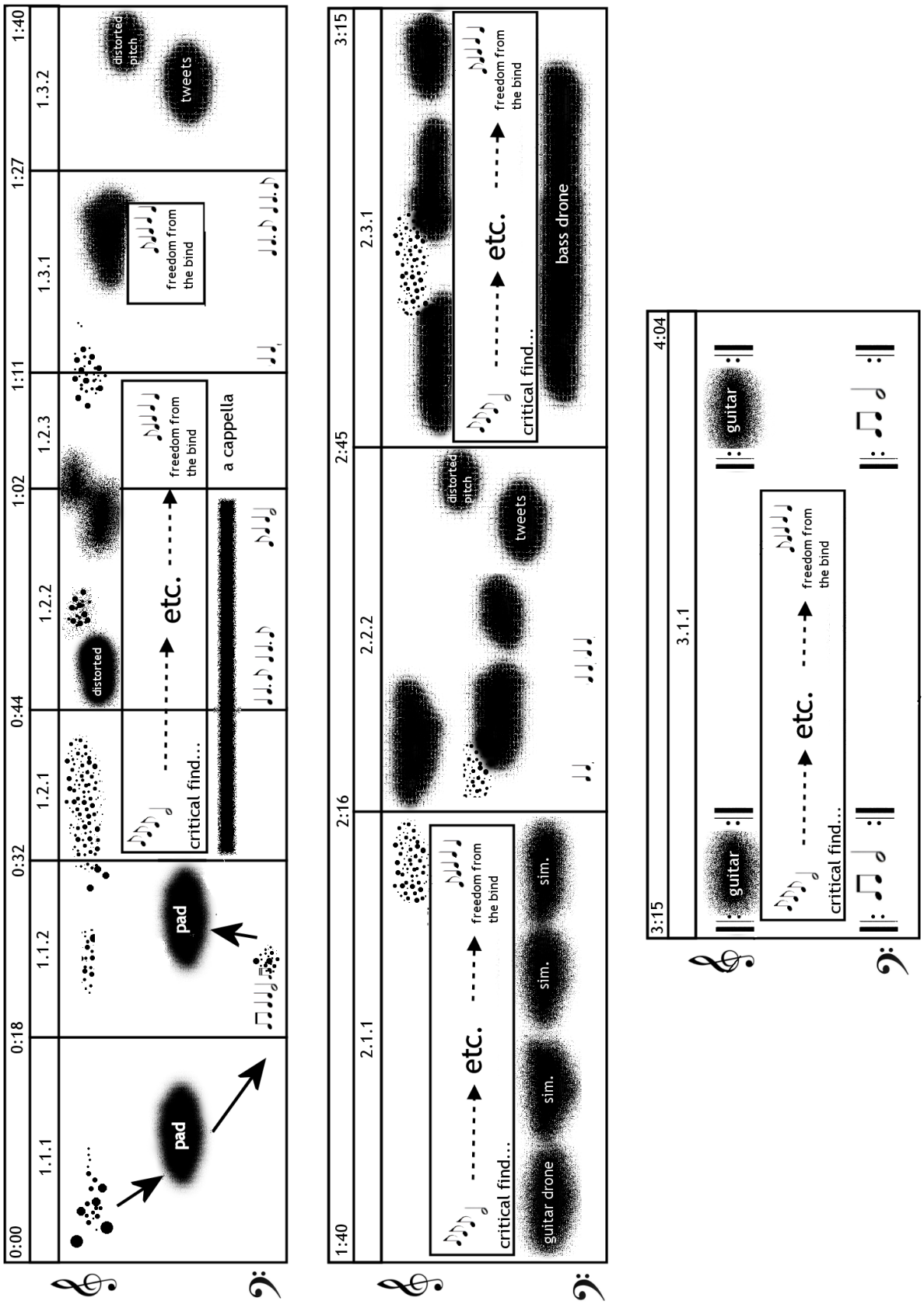
A vat of juice, a stolen jar of blood,

From time to time, freedom from the bind.

3.3.1 Overview

Blackened Box is the final work on the album; structurally, it meditates on different methods of combining popular and electroacoustic referential materials into sections and statements with differing locations on the global continuum. Its composition was undertook similarly to *Take It All Away* with the creation of the popular music statement facilitated by a drum and guitar track over which various melodic lines were improvised. Subsequently, one of these improvisations was chosen and treated as the existing music from which the electroacoustic sections of the work were derived.

3.3.2 Schematic Score (overleaf)


0:00
0:18
0:32
0:44
1:02
1:11
1:27
1:40
1.1.1
1.1.2
1.2.1
1.2.2
1.2.3
1.3.1
1.3.2
pad
pad
distorted
distorted pitch
tweets
critical find...
etc.
freedom from the bind
a cappella
1:40
2:16
2:45
3:15
2.1.1
2.2.2
2.3.1
guitar drone
sim.
sim.
sim.
bass drone
3:15
4:04
3.1.1
guitar
guitar

3.3.3 Borrowing

The final section of the piece is a full statement of the popular music material from which the rest of the piece is derived. The preceding sections provide a gradual build toward it, constituting an example of cumulative setting. The piece is structured in ternary form AAB, where the B section is the emergence of the popular music statement. The A sections inhabit ambiguous points on the continuum and are themselves in ternary form. Parts of the A sections could be described as examples of setting in the Burkholderian sense, since the vocal line is set to a new electroacoustic accompaniment.

3.3.4 Analysis

Section	Timing	Analysis
Section 1	**N/A**	The purpose of the first section is to introduce the musical landscape of the work.; it has an ABA structure predicated around the use of vocal material within the B section.
1.1.1 **1.1.2**	*0:00 - 0:18* *0:21 - 0:32*	This segment consists of two related gestures. The first consists of high pitched bell sounds (for a discussion of the significance of bell sounds in these works refer to the analysis of *Take It All Away*) followed by a pitched pad-like sound. The second gesture consists of an interpretation or mutation of an electronic bass drum sample, again followed by the pitched pad, giving the segment a descending then ascending frequency trajectory.
1.2.1	*0:32-0:44*	The entry of the vocals marks the beginning of this statement; the

		use of reverberation and low amplitude situates the voice within an electroacoustic soundscape rather than as a dominant foregrounded presence such as would be found in popular music.
1.2.2	*0:44-1:02*	The vocals are accompanied (and occasionally masked) by a number of electroacoustic gestures. They are followed by a reiteration of the bass drum motif found in the opening segment.
1.2.3	*1:02-1:11*	As a traversal toward the popular music pole of the continuum, the closing vocals of this segment appear *a cappella*.
1.3.1	*1:11-1:27*	This is an elaboration of part of the opening statement, consisting of a high to medium frequency gesture accompanied by the electronic claves and two strikes of the bass drum. It concludes with a developed electronic drum gesture providing a downward frequency trajectory that is responded to in 1.3.2
1.3.2	*1:27-1:40*	A gong announces a new motif with a rising frequency trajectory that ascends through distorted sounds including tweeting birds and a distorted pitched sound: this segment closes the opening section with a recollection of the frequency trajectory of the opening segment (high-medium-low-medium.)
Section 2	**N/A**	Section 2 is again in ternary form ABA; the content of the sections is inverted so that the vocal material falls into the A segments.
2.1.1	*1:40 - 2:16*	The segment has a significant relationship to the cumulative setting of the work, and exists in proximity to the popular music pole of the continuum. Pitched guitar gestures, heavily distorted but still recognisable, provide backing for the vocals, which are somewhat

		masked and mixed with low gain.
2.2.1 .	*2:16-2:45*	A development of previously heard material which develops the oscillatory frequency motif found in 1.1.1 and 1.1.2 through various samples culminating in a recurrence of the motif that begins with the gong (previously stated in 1.3.2.)
2.3.1	*2:45-3:14*	This statement consists of a vocal line buried under semi-pitched distorted drones.
Section 3 3.1.1	*3:14-4:04*	The climax of the cumulative setting involves a complete statement of the popular music melodic-lyrical line and the instrumental accompaniment from which much of the piece is derived, involving a droning tonal backdrop created by heavily distorted guitar together with backgrounded and masked vocals, and a bass drum pattern.

3.3.4 Conclusion

Instrumentation as sonic referents is used here in two distinct ways. Firstly, the use of popular music style markers embodied in the percussion and guitar samples treated electroacoustically is an example of cross-processed hybridism, using an implication of the hybrid.. Secondly, the use of the vocals is as synchronous hybrid, with the vocal line operating as synecdoche overlaid onto the electroacoustic material.

Similarly to *Cajón!* this work makes use of instruments as synecdochal evocation, or perhaps sonic souvenir. Furthermore, there is not a lot of material of the instruments taking on their "usual" role. This work is distinct from much of the contemporary repertoire in its use of the voice, generally unprocessed and unambiguous, a device which creates a synchronous hybrid. As in Weinel's work, there are distinct sections of material giving predominance to either genre but in contrast this material is pervasive outside its boundaries; the guitar sound belongs to a sub-set of distorted sounds, the vocal line appears outside these sections to produce synchronous hybrids, and the bass drum heard at the close is often used as a sonic souvenir (the bass drum within the work is predominately a concrete sample rather than a rhythmic device or synecdochal evoker).

Chapter 4: catLitter

A modular software environment for tactile, real-time continuum exploration

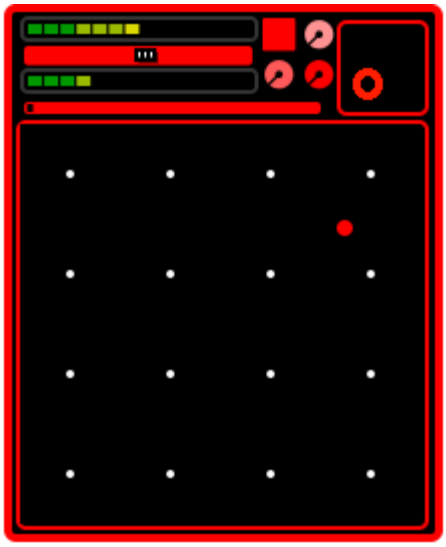
The remaining works in the portfolio make use of the catLitter modular environment; it is therefore apropriate to introduce it at this point, both as a tool for live performance and/or for use as a sonic laboratory. CatLitter is a modular suite created for this project using the MaxMSP programming environment, to be used for the real-time manipulation of sound in order to facilitate continuum traversal. Essentially, it consists of a set of MaxMSP patches contained within bpatchers which can then be connected into larger scale patches. The modules in CatLitter can be assembled into a live performance environment (as used in *Ocean Triptych* and *Rock Robot*) or as a palette of tools with which to create patches for the generation and exploration of material (generally an on-the-fly process; this method was used to create much of the material in *Drop The Towel, Come to Poppa*). Some of the modules require no explanation (such as reverberation, input gain, etc.); here, an introduction will be given to some of the more novel patches featured within CatLitter, with particular respect to the possibilities of continuum traversal inherent in them. A full description of each module is provided in the appendix.

4.1 scrawlCat

The scrawlCat[10] engine is a granulator (based on Nobuyasu Sakonda's *Granular 2.5*) with a set of real-time controllable parameters (density, grain size, transposition, randomisation of playback location, etc.). While these are standard granulation tools, scrawlCAT is unique due to the gestural/graphical nature of the sonic manipulation. By drawing into a 200 x 200 square (or by using some form of input tool such as a wiiMote, graphics tablet or touchscreen tablet personal computer) the user may generate sound directly related to gestures giving the user a sense of sonic plasticity. Additionally, catLitter records these gestures so that they can be replayed at different speeds, scrolled through and/or looped. It features a random path drawer (using Bezier curves) with definable region, speed, walk-range and drunkenness.

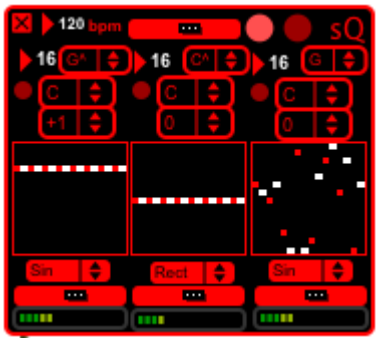
[10] The scrawlCat interface was originally built as a standalone patch; it was from this that the idea for catLitter as modular environment began.

4.2 catFX



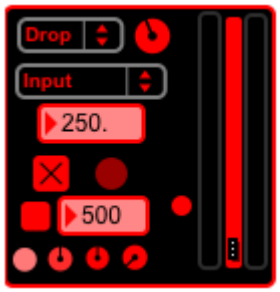
catFX uses a similar gestural principle to scrawlCat in order to apply effects to sounds. The centre of the 200 x 200 panel represents no effects added, and the 12 outer white dots represent different types of effects. Proximity to these dots represents the amount of effect added to the sound. The module can be automated using a similar mechanism to that found in scrawlCat.

4.3 seqCAT



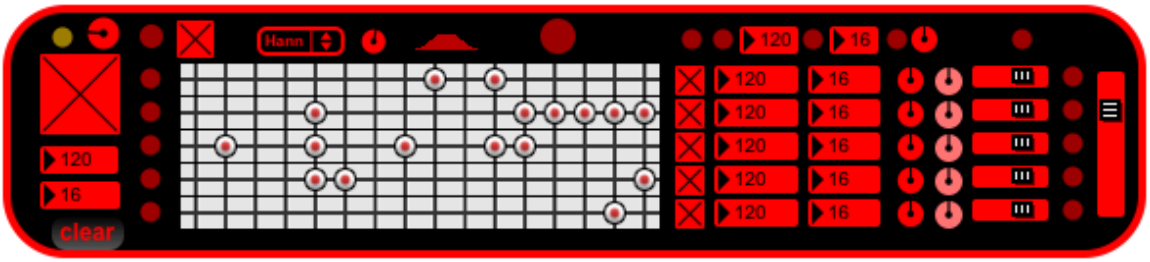
seqCAT is a sequencer which creates sine, rectangular and/or saw wave loops. The key, loop point and transposition can all be defined, as can chords or major key tonal sequences. The chords and sequence can also be randomised. This module is used in *White Horses* and *Sunrise over the Water* (movements within the *Ocean Triptych*), as well as for producing material found in *Drop The Towel, Come to Poppa.*

4.4 catNip



catNip is built upon the decreasing or increasing delay time suggestive of bouncing and controlled by physical modeling of a bouncing particle, a sound organisation often occurring in electroacoustic music (see for example, Wishart's *Tongues of Fire* (Wishart, 1994), Biston's *Muance* (Biston, 2008) and Daoust's *Mi Bemol* (Daoust, 1998)). This can "bounce" a captured sample from input (with controllable window size and shape,) or iterate a loaded sample with a "bouncing" pattern. Gravity, the coefficient of restitution and dropped height of the particle can be input and modified. Rather than following a bouncing pattern whereby the particle eventually comes to rest, after the delay time reaches a threshold the process reverses and the particle bounces back to its original height, creating a bouncing loop.

4.5 drumCat



drumCat is effectively a rhythmic granulator; it records a sample from input, assigning a sample to each of five rows on a grid which can be assigned to trigger in a typical 16X5 drum-machine method. The window size and shape are controllable as are the loop point tempo and pitch of each row: this allows for great control over rhythmic plasticity. Rather than only sampling as a one-shot process, drumCAT can also sample continuously and act as a live granulator with a strong rhythmic impetus and/or rhythmic plasticity.

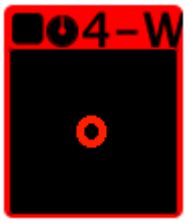
4.6 fileCat

fileCat is a file player; speed, pitch and regions can be selected for playback and looping. Playback may also be shuffled such that playback jumps around random segments of the sound file.

4.7 catSpace

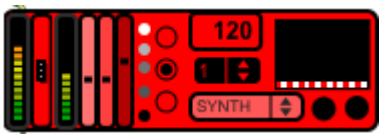
catSpace is at the heart of catLitter; a simple four-channel spatialisation device with both path automation and built-in reverb (single channel pre-spatialisation via timeverb.vst.) As it is simple it is not hungry, and is used regularly as a result.

4.8 4wayMix



This is a mixer between 4 separate inputs defined as the vertices of the square. It has a speed-definable automation function.

4.9 resCat



This module takes an input signal (or signals) and applies narrow band filtration to impose harmonic shape via a filter bank. The Q and gain are specifiable as are various filter shapes; several of which have a strongly discernible pitched character. resCat can be sequenced, or played monophonically or polyphonically with a MIDI controller.

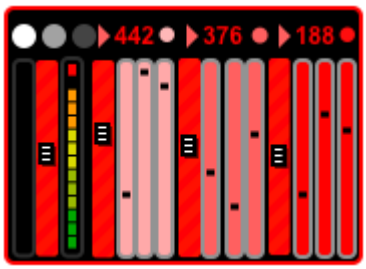
4.10 cloudCAT

cloudCAT is designed for the random spatialisation of multiple grains (particularly designed for the eight-grain output of resCat, scrawlCat and liveCat.) The user can define the spatialisation as static, on a random path, or as circular rotation. It also has a built in reverb, with definable mix-level, room size and decay (reverb is single-channel pre-spatialisation via timeverb.vst.)

4.11 liveCAT

liveCat granulates a live input signal; envelope size and shape can be specified as can the standard granulation parameters. It outputs both a single mono-stream or eight grain streams individually for further treatment, or for passing on to spatialisation modules such as cloudCat.

4.12 catDeeley



This module takes an input signal and applies three delay lines; each line has specifiable delay time (in milliseconds) as well as specifiable feedback level, delayed-sound pitch and feedback cumulative pitch which may be used to generate rising or falling pitch in the delay patterns.

Chapter 5 : Single Movement Large-Scale Compositional Investigation

As a complement to the set of pieces in *From Time to Time*, an investigation into the manifestation of particularities of continuum traversal within a single movement large scale work is here investigated. Furthermore, the majority of this works' material was created within the catLitter software environment and as such serves as an investigation into the effects of *CatLitter's* use as a work surface for material generation before organisation in a Digital Audio Workstation.

5.1 Drop The Towel, Come To Poppa

Manifestations of continua traversal in a single movement, large scale work.

Format: 5.0

Length: 21:07

Vocalist: Dan Tierney

--

As sweet rain from high tide,

Unreal thoughts and visions.

To where we're bringing shuffling feet,

King and God we won the seasons.

Yes I'm on my way,

A thousand years of blue,

To where we're singing a shuffling beat,

Been and gone we lost the meaning.

--

Don't be shy,

Meet my eye,

Drop the towel,

Come to poppa.

--

5.1.1 Overview

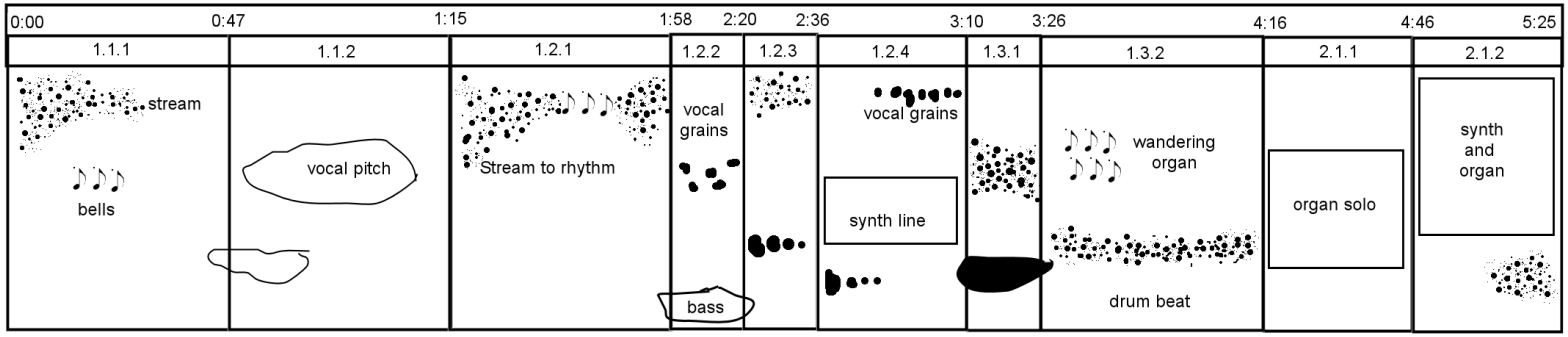
Two sections of this work are definitively proximal to the popular music pole of the continua. One of these is a melodic/harmonic slowly paced section[11], the other the upbeat, funky section that closes the work.[12] I met the vocalist in a music studio to create the vocals for these sections. We developed the lyrics together (using an online random lyric generator for the phrase beginning 'as sweet rain.') The vocalist was presented with a backing track comprised of a rhythm and tonal progression over which he improvised several melodies: through a back and forth process, the vocal content was generated, consisting of main melodic line and harmonies, along with various vocal samples used to produce other material for the work.

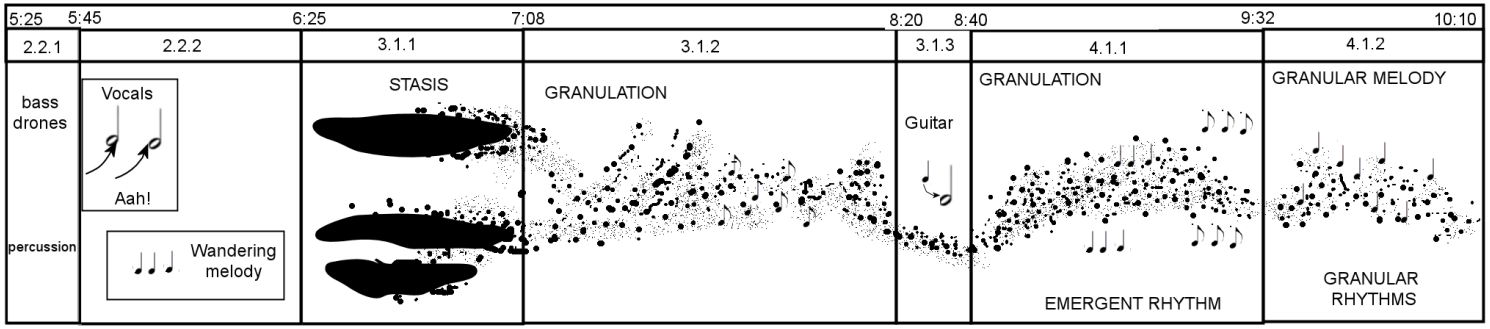
[11] Hereafter referred to as PMSA (Popular Music Statement A)
[12] Hereafter referred to as PMSB (Popular Music Statement B)

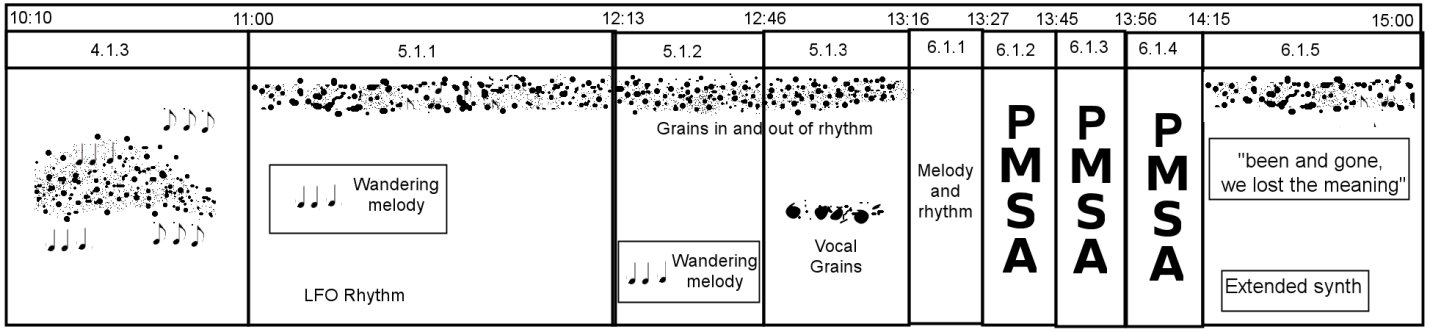
5.1.2 Borrowing

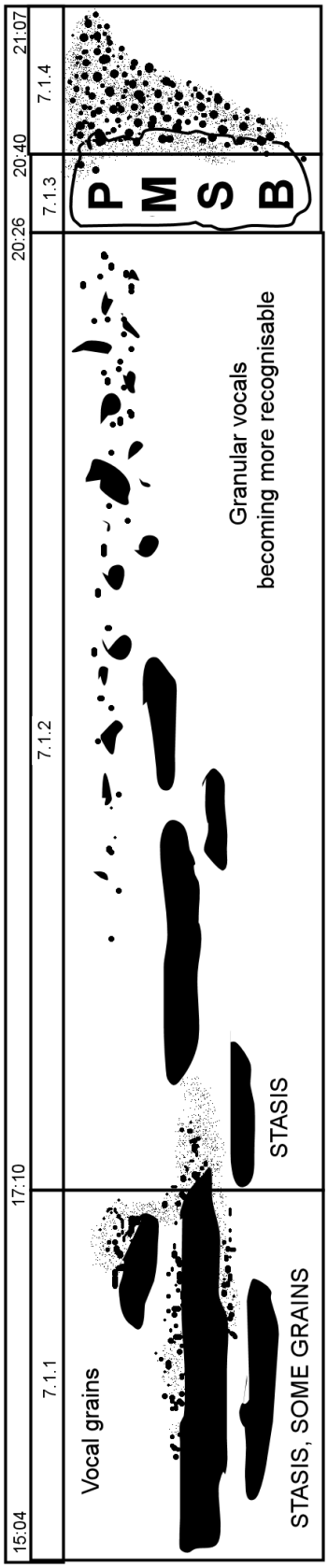
This piece contains two nested cumulative settings; PMSA (beginning 'As sweet rain') culminates at 13:24-14:24. The material for PMSB (20:27-20:39) enters earlier in the work, despite its full statement not appearing until the close of the piece. Their appearance as separate statements are interwoven, so in a sense the piece operates as a cumulative setting of two works emergent from a shared thread (or perhaps as two popular music possibilities inherent in the morphology of this thread.)

5.1.3 Schematic Score (overleaf)


0:00
0:47
1:15
1:58
2:20
2:36
3:10
3:26
4:16
4:46
5:25
1.1.1
1.1.2
1.2.1
1.2.2
1.2.3
1.2.4
1.3.1
1.3.2
2.1.1
2.1.2
stream
bells
vocal pitch
Stream to rhythm
vocal grains
bass
vocal grains
synth line
wandering organ
drum beat
organ solo
synth and organ


5:25
5:45
6:25
7:08
8:20
8:40
9:32
10:10
2.2.1
2.2.2
3.1.1
3.1.2
3.1.3
4.1.1
4.1.2
bass drones
percussion
Vocals
Aah!
Wandering melody
STASIS
GRANULATION
Guitar
GRANULATION
EMERGENT RHYTHM
GRANULAR MELODY
GRANULAR RHYTHMS


10:10
11:00
12:13
12:46
13:16
13:27
13:45
13:56
14:15
15:00
4.1.3
5.1.1
5.1.2
5.1.3
6.1.1
6.1.2
6.1.3
6.1.4
6.1.5
Wandering melody
LFO Rhythm
Grains in and out of rhythm
Wandering melody
Vocal Grains
Melody and rhythm
PMSA
PMSA
PMSA
"been and gone, we lost the meaning"
Extended synth


15:04
17:10
20:26
20:40
21:07
7.1.1
7.1.2
7.1.3
7.1.4
Vocal grains
STASIS, SOME GRAINS
STASIS
Granular vocals
becoming more recognisable
P
M
S
B

5.1.4 Analysis

Section	Timings	Analysis
Section 1 **1.1.1**	*0:00-0:47*	The piece opens with a water-like granular stream that becomes foregrounded and then rhythmic. This stream is accompanied by bell samples, used due to their continuum ambiguity (see the discussion of *Take It All Away*.)
1.1.2	*0:47-1:15*	The emergence of pad-like sounds introduces pitch, prefiguring a gradual introduction of pitched vocal sound.
Segment 2	**N/A**	The continuum traversal in this segment is more pronounced than that found in the previous one, closing with a synthesiser line accompanied by granulated voices.
1.2.1	*1:15-1:58*	This is a restatement of the gesture from 1.1.1 with the granular stream acquiring a rhythmic pattern.
1.2.2	*1:58-2:20*	As occurs in segment 1, the figure of the granular stream becoming rhythmic is followed by a pitched pad sound followed by vocals. As contrast to segment 1 the voice is distinctly granulated rather than sustained.
1.2.3	*2:20-2:36*	The rhythm of the grains is transmitted to lower pitched sounds. Rhythmic content occurs in multiple parts of the spectrum though it is not aligned synchronously.
1.2.4	*2:37-3:10*	The synthesiser line that occurs as the harmonic backdrop to the climax of PMSA completes an iteration, backgrounded by reverb.

1.3.1	*3:10 - 3:25*	This short section sees the introduction of a new granular texture, coarser than the opening granular stream and without comb filtering.
1.3.2	*3:27-4:16*	A wandering organ melody is introduced in the background as the granular stream moves between rhythmic and arhythmic configurations.
Section 1 summary	**N/A**	Each segment within the opening section utilises a different method for exploring continuum mobility. Despite this mobility, the section maintains an overall position toward the electroacoustic pole of the continuum.
Section 2	**N/A**	Section 2 is in binary form, and facilitates continuum traversal using tonal statements, granular rhythms and vocal sounds similarly to the preceding section.
2.1.1	*4:16-4:46*	The organ solo has a degree of continuum ambiguity conferred upon it by granulation but this is principally a very strong tonal instrumental statement and presents a major continuum shift. Th
2.1.2	*4:46-5:25*	The organ solo is joined by a somewhat granular, coarse sounding rhythm, processed vocal sounds and a full iteration of the synthesiser statement central to the cumulative formation of PMSA.
2.2.1	*5:25-5.45*	The percussion becomes more aggressive as polyrhythms are introduced: this statement is dominated by rhythmic content and accompanied by low frequency pitched sounds.

2.2.2	*5:45-6:25*	The continuum is traversed back away from the popular pole with the removal of the drums and low frequency pitched material, but there are still tonal elements in the wandering sine-wave melody, recalling the organ from 1.3.2. A crucial emergence is that of the unprocessed vocals heard as corporeal rather than manipulated, presenting an emergence of the idea of a lead singer.
Section 3	**N/A**	The previous sections have a strong directional impetus to their continuum traversal but section 3 interrupts that process. After a period of stasis the potentialities of pitch emergence from the granular streams are examined as an alternative to the rhythmic continuum traversal examined thus far.
3.1.1	*6:25 - 7:08.*	With a slight overlap of some of the sounds from 2.2.2 (a textural emergence/dispersal) this statement is a period of stasis produced by sustained comb-filtered sounds.
3.2.2	*7:08 - 8:20*	Streams forming rising and falling pitch motifs are introduced. The material is granular and therefore linked to a restatement of the granular gesture from the opening of the work.
3.2.3	*8:20-8:40*	A distorted pitched figure closes the statement; a strong closing motif that is recognisable as bearing relation to an electric guitar.
Section 4 **4.1.1**	*8.32-9.32*	This section predominantly involves rhythmic emergence, with some tonal and melodic emergence; although distinctly rhythmic, this rhythm is not a configuration directly involved in the emergence either PMSA or PMSB.
4.1.2	*9.32-10:10*	The synthesiser line re-enters with increased amplitude, foregrounding melodic development without complementary

		rhythmic development.
4.1.3	*10:10-11:00*	This segment presents a further shift along the global continuum with the introduction of pitched and rhythmic elements appearing together. Towards the end of this section humming is introduced, somewhat processed but clearly recognisable as vocal.
Section 5 **5.1.1**	*11:00-12:13*	This consists of a brief recapitulation of earlier material, with a restatement of the wandering organ motif from 1.3.2 and the re-introduction of the opening statement of the granular stream becoming rhythmic.
5.1.2	*12:13-12:46*	The gradual re-introduction of the grains maintains continuum ambiguity by stating the granular forms alongside the consistent melodic content of the organ.
5.1.3	*12:46-13:16*	This section involves a large scale continuum traversal as a segue into the cumulative formation of PMSA via a collection of streams.
Section 6 **6.1.1**	*13:16-13:27*	The synthesiser and rhythm synchronize, announcing the cumulative formation of PMSA, and the global continuum is largely traversed toward the popular music pole. The presence of multiple non-embodied treated vocals establishes a vocal presence alongside these elements, but maintains a level of ambiguity, facilitating conjunct transition.
6.1.2	*13:27-13:45*	The following three statements present the full culmination of PMSA.
6.1.3	*13:45-13:56*	This is a repeat of the previous statement with a more fully

		realised popular section incorporating greater percussion presence and bass line, consequentially located closer to the popular music pole.
6.1.4	*13:56-14:15*	This section consists of a final iteration of PMSA meandering along the hybrid continuum and comprised of sets of material that at different times use the synthesiser, the percussion, the bass line and the granular stream as vocal backdrop.
6.1.6	*14:15-15:04*	The close of the cumulative formation of PMSA is facilitated by a slowing statement of the synthesiser gradually backgrounded by the treatment of its amplitude and reverberation.
Section 7	**N/A**	Section 7 is a shorter scale cumulative setting of PMSB. Though it is in a different style to PSMA, it shares both tonality and, critically, the same vocalist (making it comparable to two songs by the same band, for example). Furthermore, it uses material introduced in earlier sections (principally the organ solo from section 2.1.1.)
7.1.1	*15:04-17:10*	Section 7 begins with a lengthy period of stasis offering calm after the culmination of PMSA. There is a consistent presence of mutated vocal samples; in a sense the vocals are not lost between cumulative settings but exist as a disjunct, morphological stream with a mobile continuum presence afforded by processing technique and genre suggesting significance.
7.1.2	*17.10-20:26*	The emergence of the vocals happens gradually through granular clouds wherein the grains are gradually iterated more regularly and with greater length.

7.1.3	*20:26-20:40*	A full realisation of the cumulative formation of PMSB presenting a close relationship to the popular music pole of the global continuum.
7.1.4	*20:40-21:07*	The piece makes a rapid continuum traversal back to the electroacoustic pole using the opening water-like granular stream which emerges and disappears through amplitude reduction and increased reverberation.

5.1.4 Conclusion

Drop the Towel, Come to Poppa is a cumulative setting work occurring over a large expanse of time allowing a gradual full continuum traversal via an intermediary statement (PMSA). This form of gradual traversal is facilitated by the extended nature of the piece. Furthermore, the use of the *CatLitter* software environment as a tool for creating material for this piece has had a significant effect on this malleability since it allows for the tactile, real-time imagination of, and experimentation with, morphological sonic qualities that can then be used to facilitate continuum traversal. Furthermore, the use of similarly-tuned comb-filters, and the same granulation and rhythmic tools applied to varied materials imprints a similarity that serves to create a sonic unity within the work.

The treatment of the rhythmic content in the work occupies a middle ground between Viñao's *The World We Knew* in addition to much of Weinel's work. In common with Weinel and Viñao, distinct sections (in particular the sections with vocal content or instrumental melodic content) are given to emergence of percussive metric rhythms. As with Viñao, these rhythms are generally plastically emergent, though in the case of PMSB they enter as a sudden drop more in common with the treatment Weinel often employs. Similarly to Blackburn, rhythm is often

perceived to come in the form of alternative figurations of a granular stream which also appears as a non-periodic grouping of grains, an arhythmic granular cloud. In contrast to the work of both Weinel and Viñao, the percussive elements of the track are not the only popular music characteristics used for traversal but rather serve as a vehicle around which to organise several musical parameters indicative of the popular music pole of the continuum.

Chapter 6: Live hybrid continuum exploration

The hybrid-composition strategies and techniques developed in the fixed media work, particularly those related to the hybrid continuum, are applied to live performance manifested as a suite of original compositions and a remix of an existing work. This application is facilitated by the *catLitter* environment, used to produce a number of modular patches for live exploration of hybrid composition and continuum traversal.

The liveness of *Ocean Triptych* and *Rock Robot* is defined as follows. They are all produced using MaxMSP patches, and the musical content of the works is controlled in real-time. Sample players are occasionally used, but these do not provide continuous backing material as a "backing track" but are always shorter samples that are modified by the performer. The recordings contained within the portfolio are studio realisations of the works; *Rock Robot* and each part of the triptych are single takes of real-time controlled version of the pieces. The pieces are intended for performance in concert using a laptop, rather than dissemination as fixed media recordings.

6.1 Ocean Triptych: White Horses, Boom-Ti, Sunrise on the Water

Length: 21:19

Format: 4.0

Vocalist: Tom Shave

This suite is a set of three pieces that are loosely inspired by *The Owl and the Pussycat* by

Edward Lear (Lear, 1871), principally in relation to the central section entitled *Boom-Ti*. In Arabic, boom-ti means 'my owl'; the quality of the words themselves (as sounding similar to a bass drum followed by a hi-hat) acted as inspiration.

The triptych is an art form I have been surrounded by for a number of years through the paintings of my father. In his work the outer panels are smaller and tend to investigate detail, pattern or surface. The central panels are often employed to investigate a narrative and form the main "body" of the painting. *Ocean Triptych* operates similarly, investigating details and patterns of a diorama in the outer "panels" whilst creating a sense of narrative in the central "panel."

> I work using triptychs, a traditional formal presentation of three juxtaposed images. This format, which I have used for over twenty years, allows for obvious thematic linkings as well as referencing historical sources and biblical choice. It also suggests visual narratives, continuing my interest in the relationship of film to the static image. (Shave, 2005)

Beach from Place Series, Terry Shave (2009)

The first and last pieces, entitled *White Horses* and *Sunrise on the Water*, are complements to *Boom-Ti* and act as the outer panels in the triptych; the piece may be imagined as a viewer looking over a triptych from one side to the next. Briefly, the narrative describes an opening scene of water with some breeze and choppiness (the left-most panel of the triptych); the owl and cat drift past in a boat and there is a storm (the central panel). They and the storm depart the scene, the right-most panel focusing on still, shimmering water over which the sun rises. Through this narrative, different aspects of continuum traversal and ambiguity are investigated. The pieces can be performed separately, but together they form a diorama as a programmatic ternary form.

6.2 Borrowing

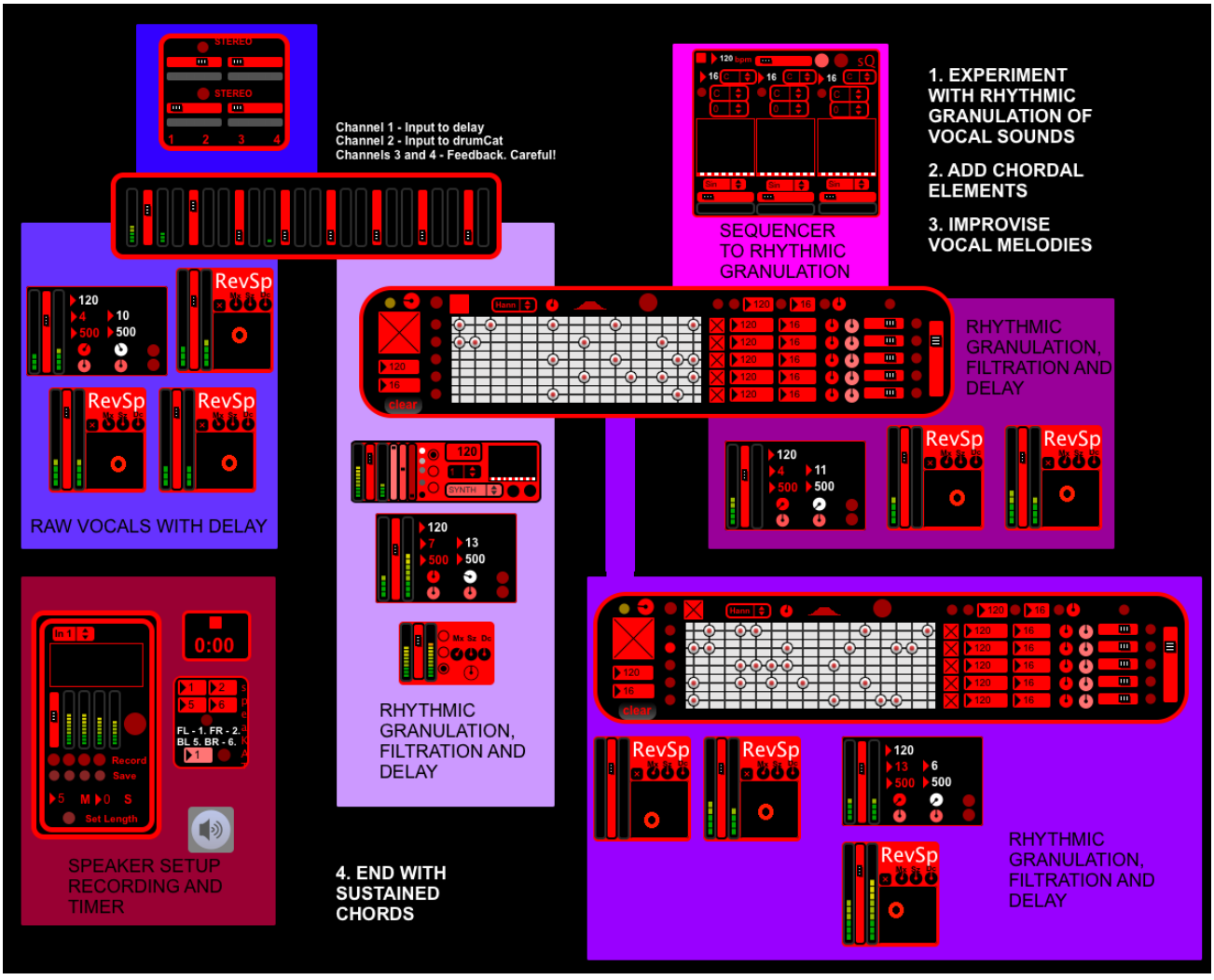
This piece does not use any kind of borrowing *per se*. There is no prior material upon which it draws and the work is derived from a small palette of sounds; a sine and saw wave generator in addition to the voice input through microphone. It could be argued that the drum beat that occurs within *Boom-Ti* is a synecdochal evocation of popular music (a sonic souvenir) but as a whole the live suite serves not as an attempt at a necessarily hybrid work but at a composition that explores continuum ambiguity in realtime via several parameters.

6. 3 Live Suite Section One: White Horses

Length: 6:54

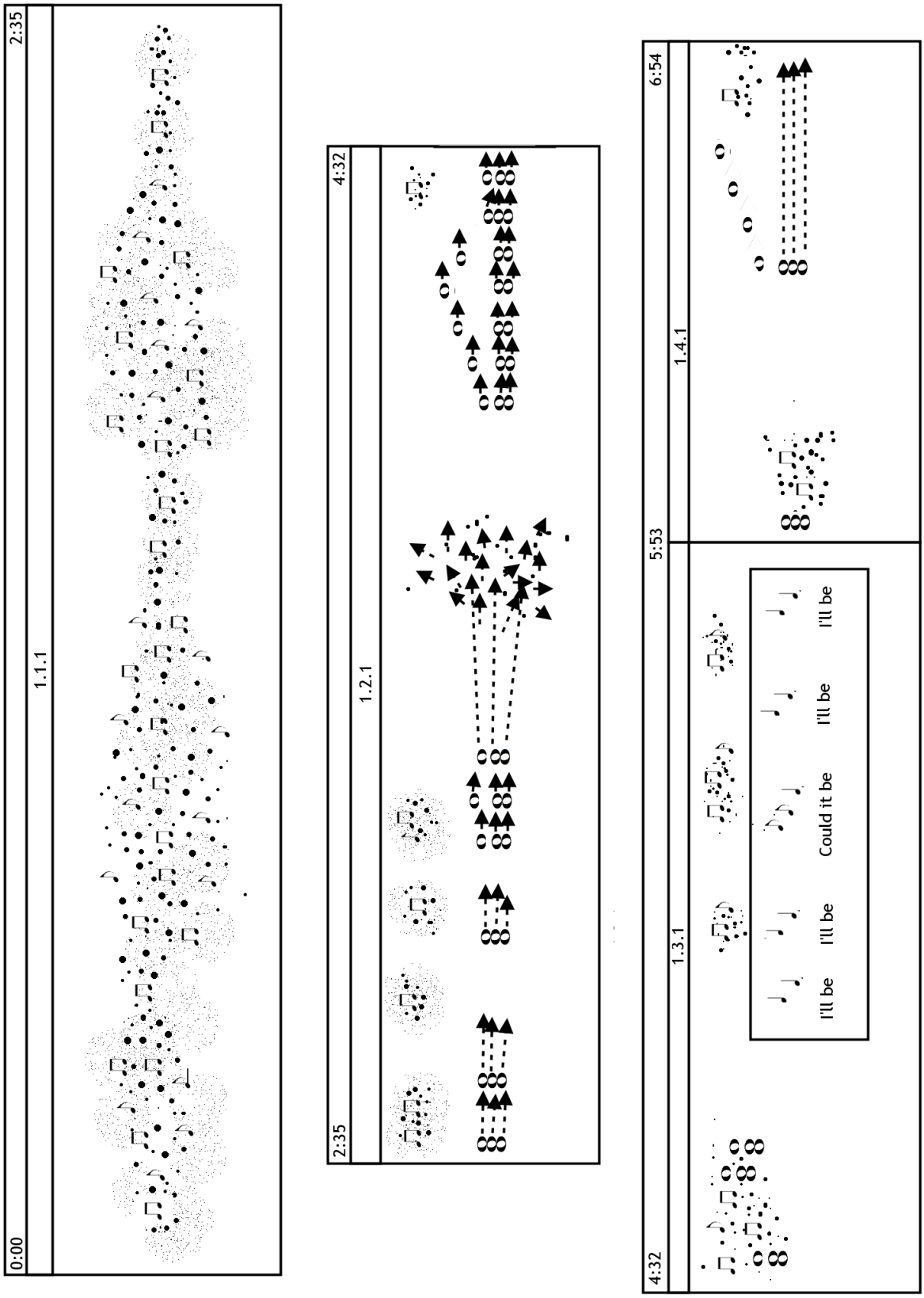
Format: 4.0

6.3.1 Patch



The input module, in the top left corner on the purple background, produces the majority of the material for this patch with vocal sounds. This is passed onto a number of delays and rhythmic granulations. Furthermore, there is also a sequencer module.

6.3.2 Schematic score (overleaf)


0:00
2:35
1.1.1
2:35
4:32
1.2.1
4:32
5:53
1.3.1
I'll be
I'll be
Could it be
I'll be
I'll be
5:53
6:54
1.4.1

6.3.3 Overview

White Horses examines the use of rhythmic qualities within granular textures; these rhythms are created predominately using vocal input via microphone with real-time processing. Tonality is introduced as well as elements of sung material, though on the whole the piece primarily investigates rhythmic plasticity.

6.3.4 Analysis

Section	Timing	Analysis
1.1.1	**0:00 - 2:35**	The first section sees the gradual expansion of a rhythmically pulsating granular cloud which increases in intensity. There is a gradual introduction of elements of pitch toward the end of the section.
1.2.1	**2:35 - 4:32**	Pitched material is introduced via the seqCat module fed into drumCat; the chords operate both as an electroacoustically explored sonic object and as a tool for tonal emergence. They also interact with the granular percussive sounds introduced in 1.1.1.
1.3.1	**4:32 - 5:53**	Pitched content has been added to the granular clouds (via the imprinting of tonality through the resCat module) resulting in an intertwining of the previous two sections. The entry of the vocals at c. 5:00 presents a further shift of the global continuum toward the popular. This treatment is clearly linked to that of the material found in

		the previous sections, forming a conjunct thread throughout the various materials through similar processing.
1.4.1	**5:53- 6:54**	The work ends with chords built from feedback with a rising frequency profile, a gesture that acts as a closure of the section.

6.3.5 Conclusion: *White Horses*

White Horses acts as a single conjunct, morphological thread which takes a traversal around the ambiguous zone of the continuum, approaching the outer perimeters of the popular pole from the outer perimeters of the electroacoustic pole. It achieves this through a stream that has a consistently ambiguous but notably rhythmic character to which tonal synthesised elements are added first, culminating in vocal statements. The continuum traversal is not definitive, but the journey itself is entirely morphological.

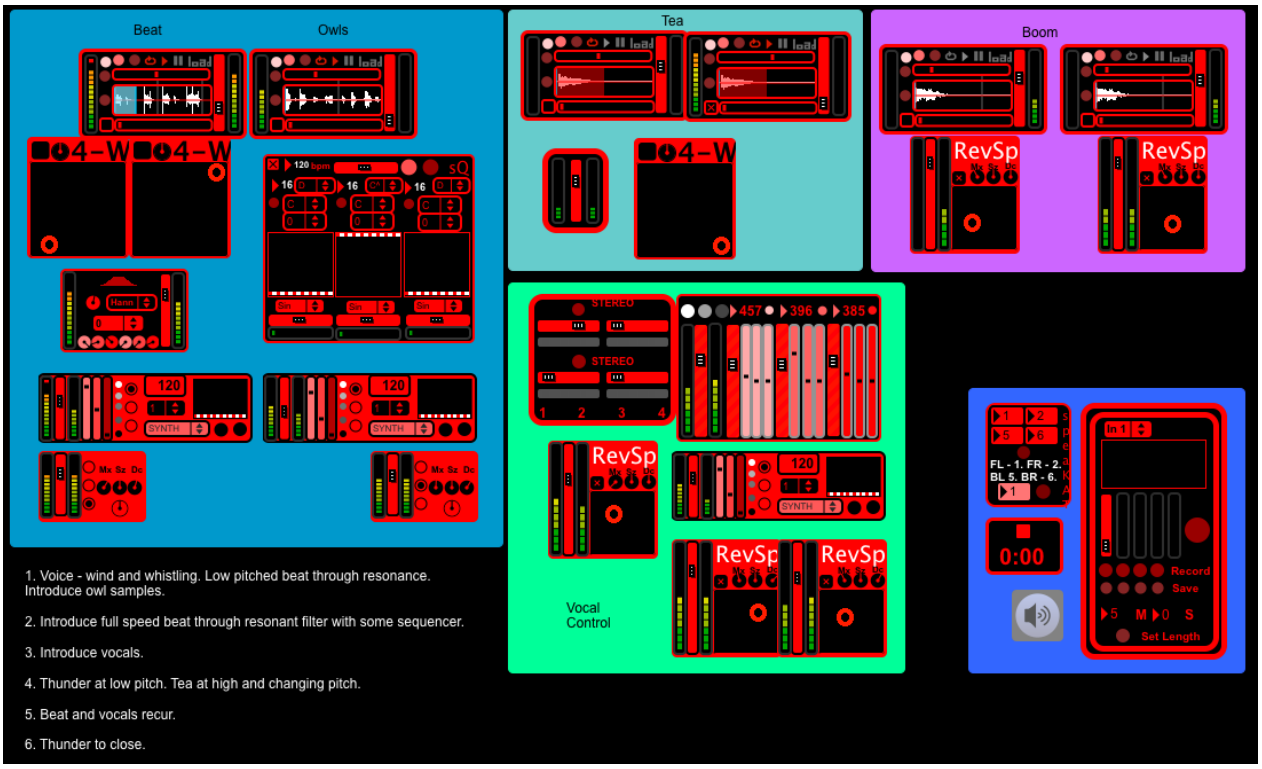
The piece is reminiscent of *Temazcal* by Javier Alvarez, in its use of a semi-constant rhythmic figure. The use of a constant feeling of rhythm disrupted by granulation is reminiscent of such works as Datach'i's *Lillian* and Autechre's *Parhelic Triangle.* Rather than simply exploring the rhythmic domain, the emergence of tonality and lyrico-melodic content marks the work out as hybrid. Whilst the rhythmic parts of the work operate at the rhythmic intersection of glitch and electroacoustic works, it is these presences that more distinctly define it as having a combinatory, hybrid and continuum mobile nature.

6.4 Live Suite Section Two: *Boom-Ti*

Length: 8:56

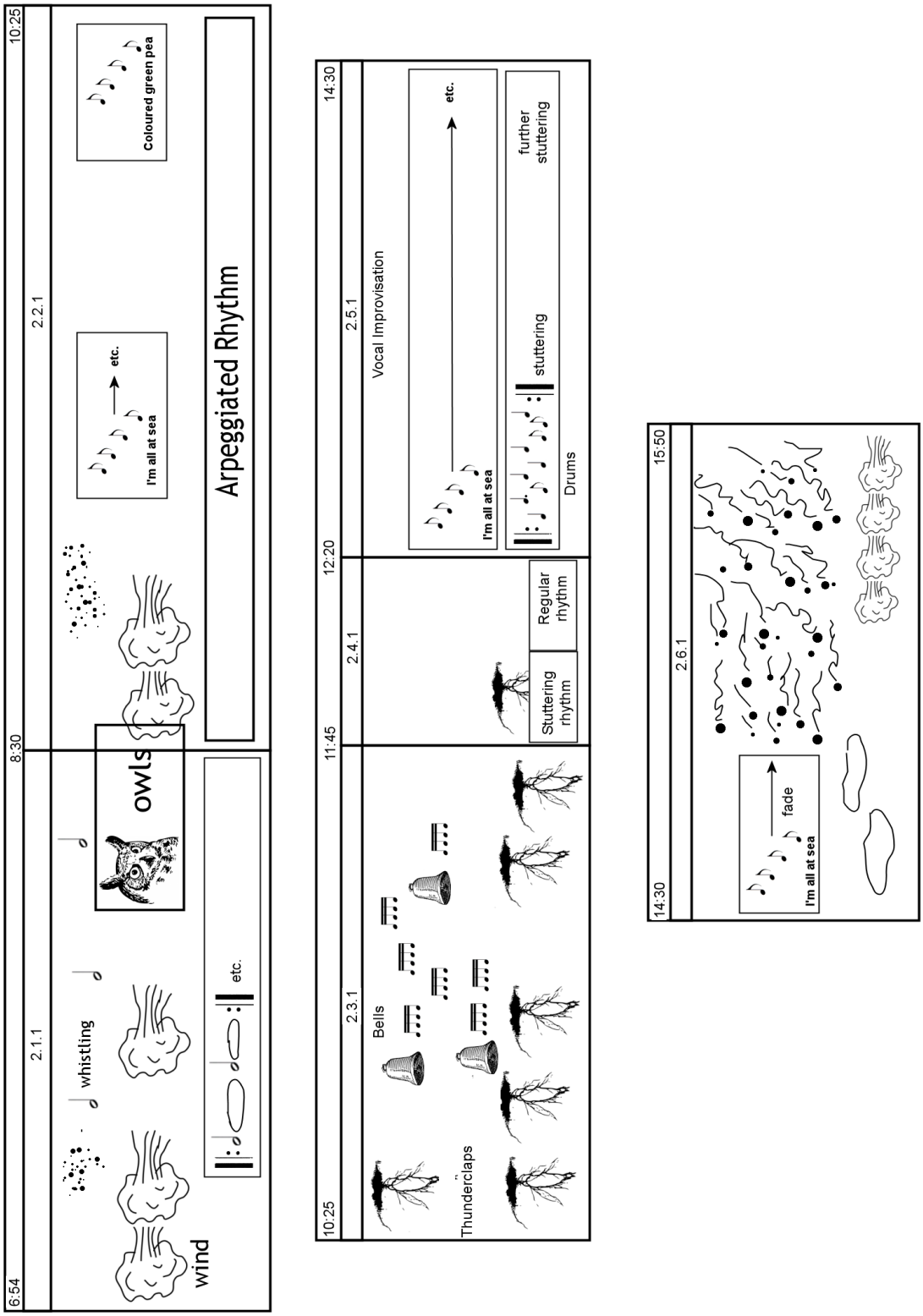
Format: 4.0

6.4.1 Patch



This patch is dominated by file players. It has 4 distinct module sets (not including the speaker set up, timing and recording module.) On the far right the modules allow exploration of the beat and owl sounds, their granulation and filtration in addition to a sequencer module. The light blue set of modules controls the playback of the tapped teacup sample, used extensively to suggest a ringing bell. The purple module set controls the booms of thunder. Finally, the module set on the light green background controls the vocal input with delay, filtration, reverberation and output.

6.4.2 Schematic Score (overleaf)


6:54
8:30
10:25
2.1.1
2.2.1
wind
whistling
owls
etc.
I'm all at sea
Coloured green pea
Arpeggiated Rhythm
10:25
11:45
12:20
14:30
2.3.1
2.4.1
2.5.1
Bells
Thunderclaps
Stuttering rhythm
Regular rhythm
Vocal Improvisation
I'm all at sea
etc.
stuttering
further stuttering
Drums
14:30
15:50
2.6.1
I'm all at sea
fade

6.4.3 Overview

Boom-ti , similarly to *Happy Robot*, predicates hybridism on narrative structure. It depicts an owl and cat in a boat during a storm: this moves into popular music inspired sections with a vocalist.

6.4.4 Analysis

Section	Timing	Analysis
2.1.1	**6:54- 8:30**	*Boom-Ti* opens with the sound of a breath, which is delivered through the microphone and serves two roles: it operates as a segue from *White Horses* (linked through vocal content) and as programmatic representation of wind announcing the stormier central section of the work. This is joined by a low pitched rhythm suggesting the rocking motion of the boat. Whistling is introduced by the voice to suggest the sound of the owl, to which various pitch-shifted samples of real owls are added.
2.2.1	**8:30 - 10:25**	A consistent rhythm through arpeggiation is introduced, Filtration imprints tonality on the arpeggiation which serves as a pitch linking device, becoming a backdrop to the vocal line that is introduced singing *I'm all at sea, I'm all at sea.* This section represents a traversal toward the popular pole.
2**.3.1**	**10:24 - 11:45**	Explosions representing thunder, joined later by the sounds of repeated bells imitating a ship's bell, interrupt the popular

		music oriented section to shift the listener back into the diorama.
2.4.1	**11:45 - 12:20**	As a segue into the following section, this uses textural emergence from the spectral cluttering of the sound to introduce a fragmented rhythm section which gradually becomes consistent and less fragmented.
2.5.1	**12:20 - 14:30**	The vocals re-enter with the line *I'm all at sea, coloured green pe*a.
2.6.1	**14:30 – 15:50**	As the rhythm disperses, arpeggiated clouds enter to suggest trickling water and the repeated thunder like figures iterate several times.

6.4.5 Conclusion: Boom-Ti

Whereas the environmental or programmatic quality of *White Horses* was somewhat incidental, *Boom-Ti* is predicated on narrative or diorama. As with *Happy Robot*, sections of this diorama are assigned to particular parts of the popular music material or electroacoustic material (with the electroacoustic sounds generally used for environmental emergence). This links with the control surface: the exploration of the sounds that provide narrative implications is more focused when the performer is not singing, whilst this is more difficult whilst singing. Thus the graduation of the traversal to set up the backdrop occurs before the singing enters. The combination of *White Horses* and *Boom-Ti* act as a continuous exploration of the voice and vocal sounds, and their use in continuum mobility.

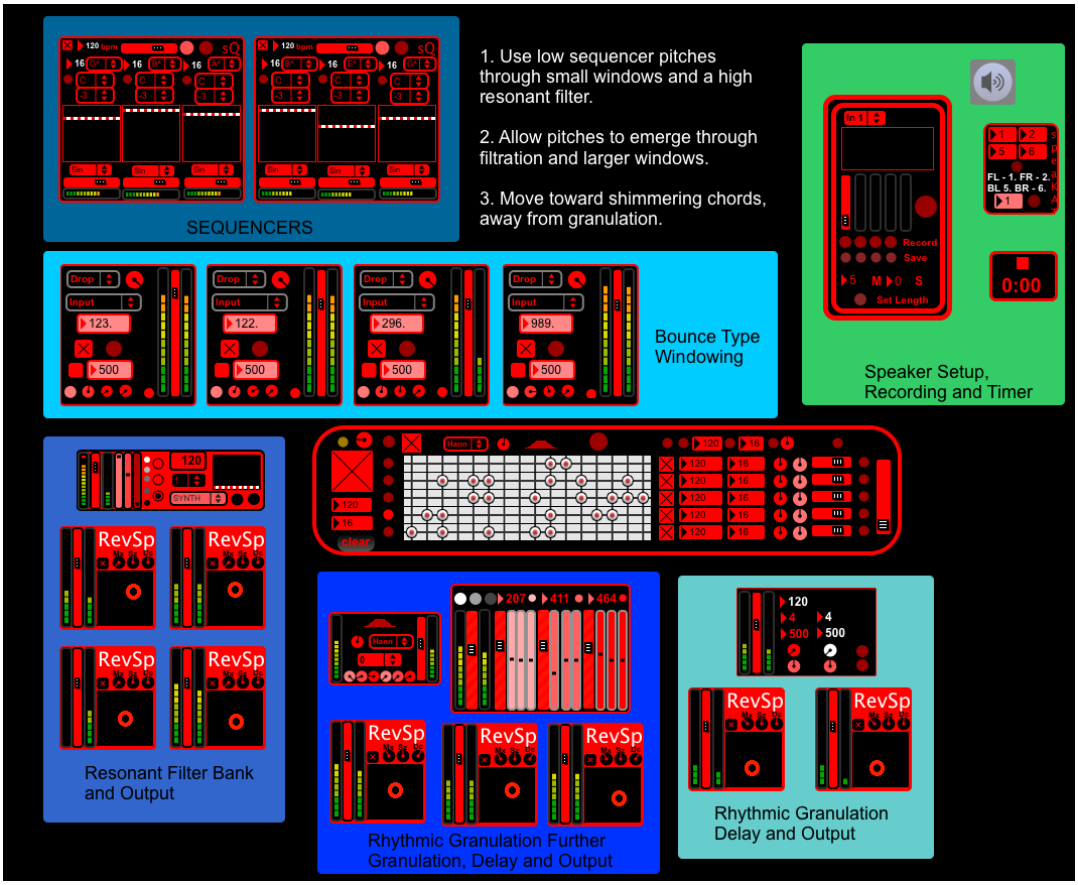
The use of rhythm as specifically delineating parts of a narrative process, in this case the rocking sea being rhythmic and facilitating the introduction of the drum beat, has similarities with the use of the rhythm in *Swamp Process* by Weinel. Where rhythmic material is directly linked with an aspect of narrative. The difference here is the use of transition, the use of the rhythmic elements becoming the background for vocals.

6.5 Live Suite Section Three: Sunrise Over the Water

Length: 5:29

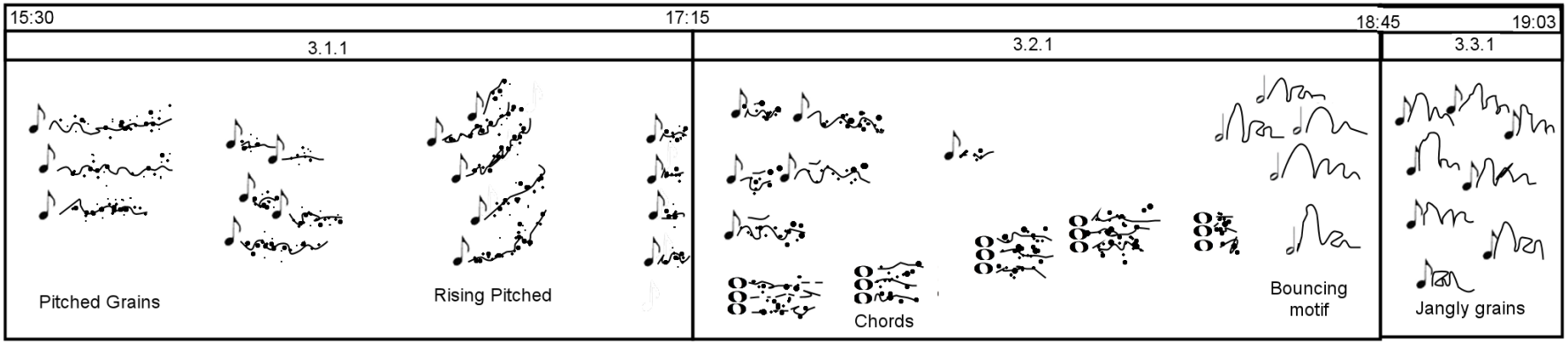
Format: 4.0

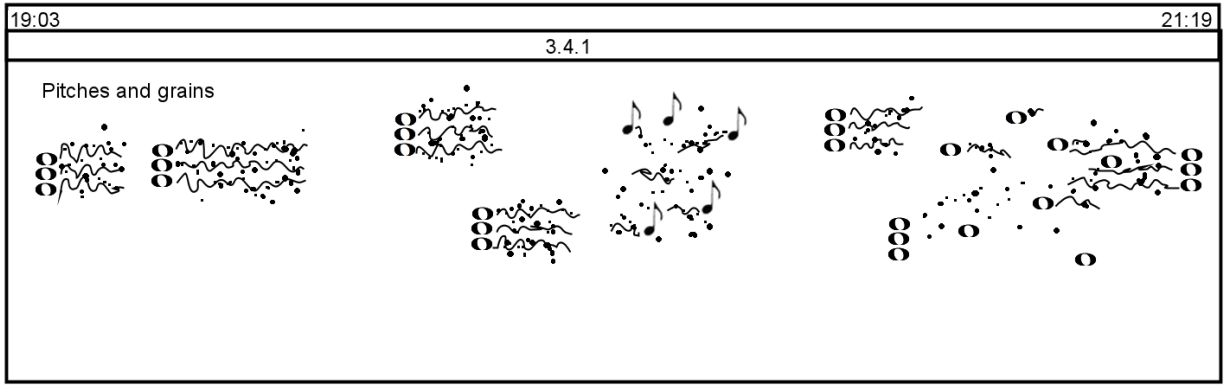
6.5.1 Patch



This work generates all of its content from the two sequencers in the top left corner, which produce sine waves that are passed to the catNip bouncing modules. When the sequencers are set to low pitches and the catNip modules set to narrow filters, the resonant filters produce glass like granular sounds. These are experimented with, whilst gradually more and more of the pitched sounds are let through with an increase in envelope duration to end with the shimmering chords.

6.5.2 Schematic Score (overleaf)


15:30
17:15
18:45
19:03
3.1.1
3.2.1
3.3.1
Pitched Grains
Rising Pitched
Chords
Bouncing motif
Jangly grains


19:03
21:19
3.4.1
Pitches and grains

6.5.3 Overview

The final panel of the triptych,similarly to the first, evokes a dioramic representation of water with the absence of the owl and cat. The material is exclusively produced by sine wave generators, the sound of which is manipulated and explored through granulation, bouncing patterns and delay.

6.5.4 Analysis

Section	***Timing***	***Analysis***
3.1.1	**15:50- 17:15**	The piece begins with a delicate introduction of a stream of comb filtered grains (belonging to the electroacoustic pole of the continuum), emerging from the granular pitched clouds that closed *Boom-Ti*. In the second half of the section the streams become denser.
3.2.1	**17:15 - 18:45**	The granular streams are now counterpointed with more defined sine pitches.
3.3.1	**18:45- 19:03**	here the continuum is traversed back toward the electroacoustic pole by virtue of the removal of the pitched elements and a return to granulation.
3.4.1	**19:03- 21:19**	This closing section features chords that move between granulation and static entities in order to convey the impression of still water under a rising sun, occasionally disrupted by swirling waves.

6.5.5 Conclusion: Sunrise Over the Water

This piece investigates the emergence of pitch via the alteration of enveloping in a windowing module; together with delay and filtration processes. This journey, the traversal (from electroacoustic pole to ambiguity) takes place as a morphological, conjunct stream whose IDT potentialities are explored. Its inclusion in the suite is facilitated by its environmental suggestion. This increase in tonal content bears similary to Dhomont's *Chambre D'Enfants* (Dhomont, 1996).

6.6 Conclusion: Ocean Triptych

The pieces that represent the external panels of this triptych are similar in a number of ways. Programmatically, they both involve the evocation of water in different states (choppy and still respectively), by which they are incorporated into the narrative of the triptych. Musically they are also similar: they both investigate morphological, conjunct continuum traversal predominantly via granulation. In *White Horses*, rhythmic emergence is a focus (with tonal and vocal emergence a secondary investigative strand) whilst in *Sunrise Over the Water* the investigation is into continuum ambiguity provided by the manipulation of pitch introduction. *Boom-ti* presents a less linear developmental journey, sectionalised more definitively with areas given over to one or other of the poles; the continuum is traversed by investigation of rhythm but in general the sections have a relatively clear delineation and continuum position. *Boom-ti*, on the other hand, focuses on sectional delineation and structural traversal built upon narrative.

Compared with the fixed media works, the external panel pieces demonstrate the possibilities inherent within *catLitter* for producing morphological streams that can delicately and continuously explore gradual continuum traversal. The ability of the composer/performer to

control all aspects of the sound allows a tactile experience, complicit in the production of highly morphological streams. *Boom-ti* demonstrates that *catLitter* can be used in a hybrid piece based on narrative. The sophistication involved in the traversal of the continuum found in the works created outside of real time is less achievable in live performance; this is counterbalanced by the wealth of possibility for spontaneous creation and interpretive variability found here.

6.7 Remix - Rock Robot

Length: 6:41

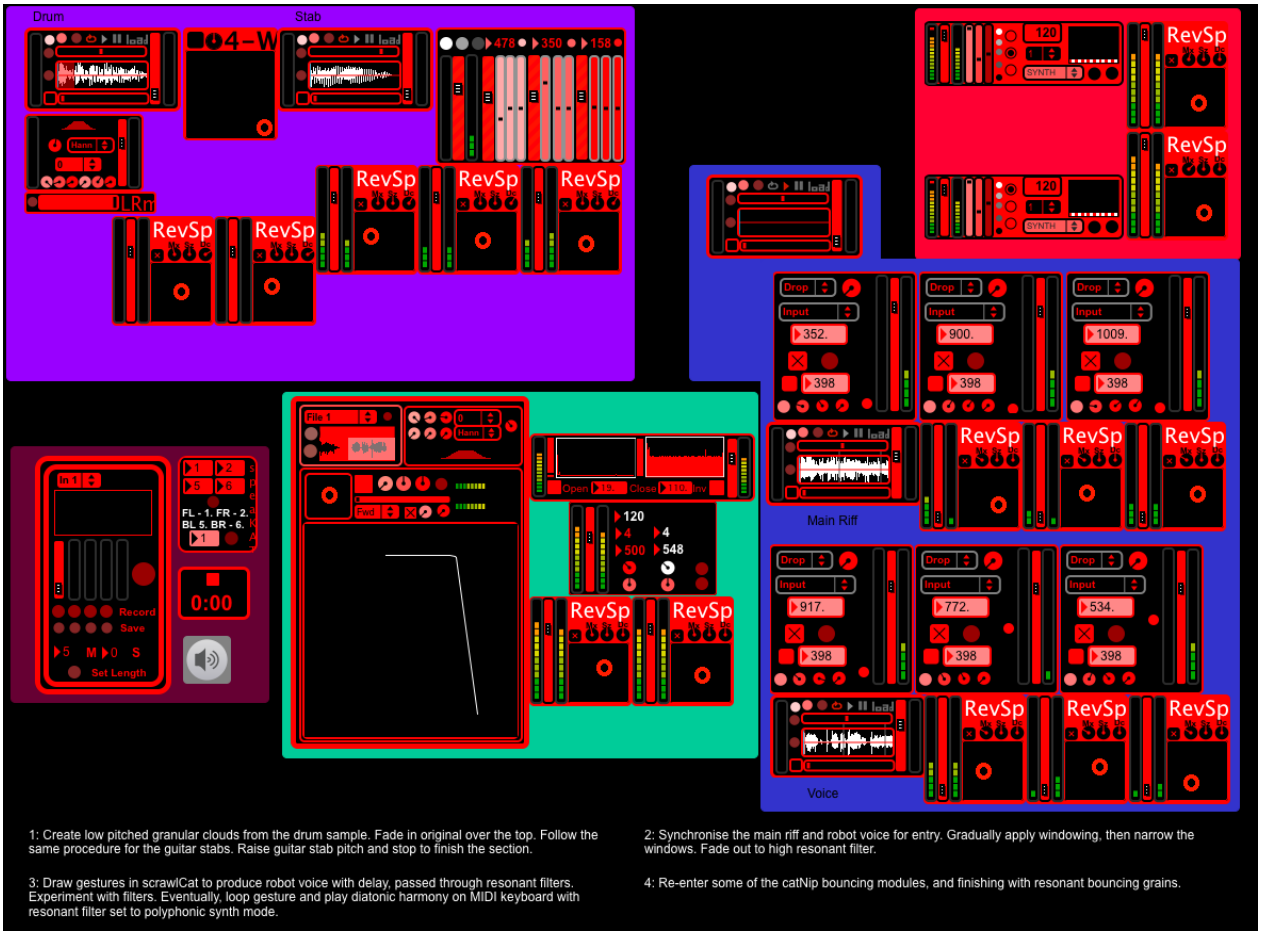
Format: 4.0

The remix is a feature of contemporary popular musical language, often employing synecdoche to facilitate hybridism (between individual works as in the mash-up, or between genres as in the cross-genre remix.) A common method is re-setting a vocal line with backing instrumentation of a noticeably different genre from the original, often between sub-genres of popular musical language. The production of a remix here is an obvious choice, since it represents a common form of popular music hybridism approached with the compositional logic and tools found within this project. This could have been achieved in a fixed media environment, but live performance was chosen instead, somewhat recalling the combinatory or manipulatory live language of the DJ.

6.7.1 Overview

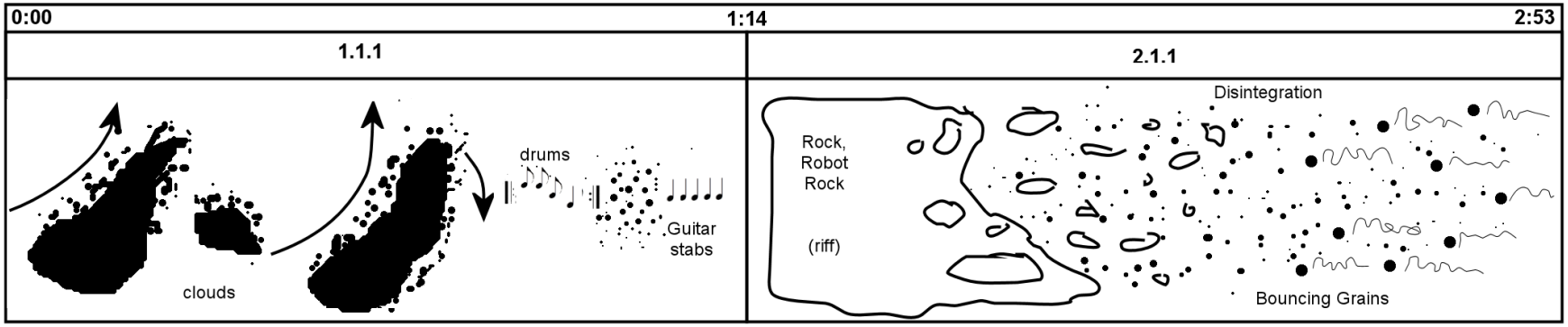
Using a particular configuration of the CatLitter environment, this work uses the concept of the remix as a method for creating hybrid work. It takes samples exclusively from Daft Punk's *Robot Rock* (Daft Punk, 2005), and through the use of the software creates a remix that traverses the hybrid continuum in various ways.

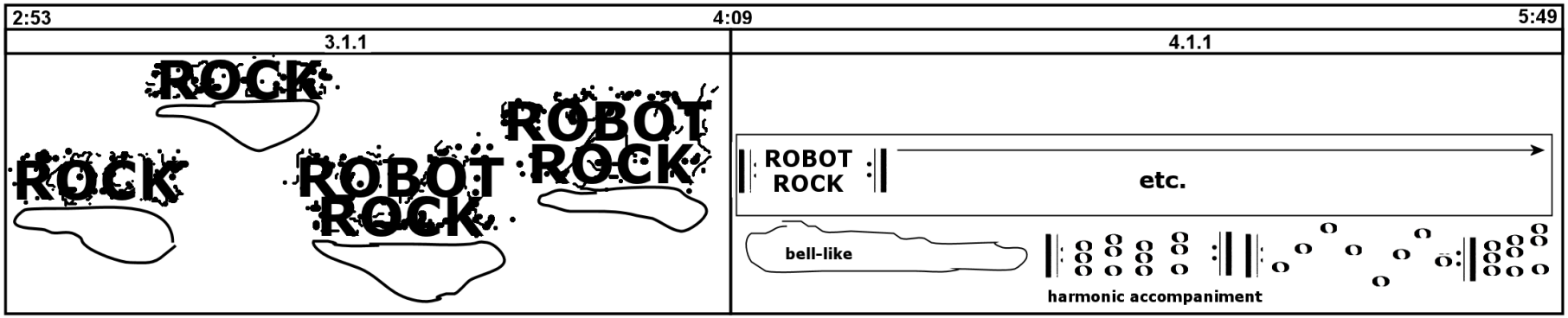
6.7.2 Patch

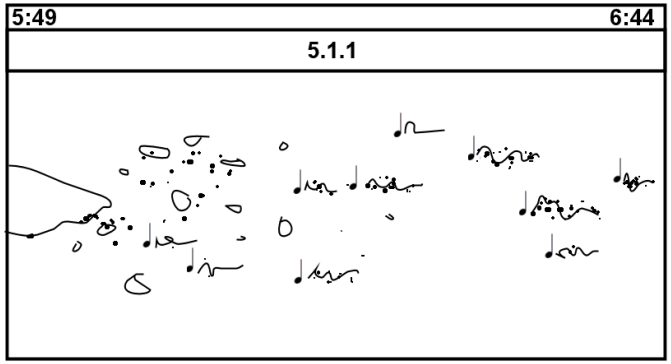


The purple set of modulesat top left controls the opening; the fading, transposition and manipulation of the drum and guitar stab samples. The blue set of modules controls the playback of the full riff, and its gradual bouncing granulation. The set of modules on the green background is used for the Robot Rock statements, their delay and output. At the top right, on the red background, are a set of resCAT8's used with MIDI control to manipulate the tonality at the close of the piece.

6.7.3 Schematic Score (overleaf)


0:00
1:14
2:53
1.1.1
2.1.1
drums
Guitar stabs
clouds
Disintegration
Rock, Robot Rock
(riff)
Bouncing Grains


2:53
4:09
5:49
3.1.1
4.1.1
ROCK
ROCK
ROBOT ROCK
ROBOT ROCK
ROBOT ROCK
etc.
bell-like
harmonic accompaniment


5:49
6:44
5.1.1

6.7.4 Overview

The piece uses recognisable samples from Daft Punk's *Robot Rock*, as well as being compositionally informed by the structure of *Robot Rock*, to create a new setting of musical aspects of the original work in line with the concept of the remix.

6.7.5 Borrowing

The opening is an example of modelling, based as it is on the original Daft Punk track. Furthermore, it contains an example of setting towards its conclusion, when the repeated *robot rock* refrain is set to a different harmonic and textural backdrop. It uses sampling as a basis for material exchange (the material from which the piece is derived is all sampled from *Robot Rock*). The second section comprises textural dispersal and may be described as a cumulative setting in reverse.

6.7.6 Analysis

Section	Timing	Analysis
1.1.1	*0:00-1:14*	The opening of this piece is modelled on the opening of the work from which the samples are taken, Daft Punk's *Robot Rock.* It is a remix of both the material found in the original work, and a conceptual remix of the idea of emergence on which the section is built.

2.1.1	*1:14-2:53*	This segment sees the full *Robot Rock* statement heard, albeit briefly, which subsequently undergoes a process of granulation wherein the original sounds disappear gradually into a soundscape resembling numerous bouncing sonic objects.
3.1.1	*2:53-4:09*	This section sees the words *rock* and *robot rock* modified; clearly related to the original sample but extended and reshaped.
3.1.2	*4:09-5:49*	The *robot rock* statement becomes a regular refrain presented with consistent rhythm. This is a setting of the original sample, closer to the popular music than the electroacoustic music pole.
3.1.3	*5:49-6:44*	As the *robot rock* statements fade, the piece moves back along the continuum toward the electroacoustic pole.

6.7.7 Conclusion

Rock Robot examines the possibilities for continuum "remixing" as found in the implementation of the *CatLitter* software environment using sound samples as referents to existing work. Its progression between sections is highly morphological; there are few abrupt segues but rather a continuous conjunct morphological journey between the two sound worlds, and the proximity to either pole is continually ambiguous due to the nature of the material. This suggests that the usage of *CatLitter* as a control device for an entire piece creates a work that operates as a single, conjunct, morphological unity; it does not have a transitional pivot but operates as an entirely morphological, continuum-ambiguous musical work.

The use of material from an original work to build an alternative realisation of its character resembles that in Viñao's *Hendrix Haze,* a set of variations on the opening of Jimi Hendrix's *Purple Haze*. It also has clear links with Trythall's *Ommaggio A Jerry Lee Lewis,* particularly with his description of material as where "the material could present itself intact, then dissolve and reassemble in new, vaguely familiar shapes. Moving back and forth along this line, controlling this movement, was what fascinated me." (Trythall, 2002) This piece works similarly, taking fragments of the work and manipulates them along a continuum between the recognisable, irrecognisable and the vaguely familiar but new. The work is most clearly related to plunderphonics, in particular to Trythall, Tenney and Oswald. There are similarities here; for as with Tenney the emergence of the full referential material is not immediate but occurs after an opening section. Furthermore, this referential material emerges and disappears from an electroacoustic soundscape as in Tenney's *Collage* #1. In the first part of the work, up until the disappearance of the samples into bouncing granular clouds, the work strongly resembles Trythall and Tenney's use of referential samples as basis for electroacoustic exploration and creation. Something that it does not share with these works is a pulse-based regularity; Trythall and Tenney both keep a strong feeling of pulse in their works, retaining the groove of the original when the material reference is lost. The rhythm within this work is emergent and dispersive, using granulation techniques in order to produce non-rhythmic soundscapes. The re-emergence and re-contextualisation of the riff at the end, with a different harmonic backdrop, makes this work distinct as a plunderphonic approach; the material is more wholly incorporated into a new composition - it is manipulated as gesture and then reconfigured such that the new material bears both resemblance to the former but exists anew in a new configuration.

Chapter 7: Conclusions

This project has investigated a particular practice-led approach to hybrid composition, using the concept of continuum mobility. This has been split into a set of broad stages.

Stage 1: Theoretical underpinning of the concept of hybrid traversal using the concept of modulation in different realms of musical perception, together with the delineation of a terminology of borrowing forms in order to discuss manifestation of large scale structures of hybrid composition.

Stage 2: A practical investigation into varied approaches to this form of hybridism using different sets of compositional informants; involving structural decisions, narrative and style referents. This represents the *From Time to Time* album, containing *Take It All Away, Happy Robot* and *Blackened Box.*

Stage 3: The creation of a software environment with the specific aim of producing a toolkit which allows real-time exploration of the hybrid continuum, and whose output may be used as a method for generating material for incorporation in real-time composition or as an instrument in its own right for the live performance of works investigating continuum mobility. This is manifest in the *catLitter* software environment.

Stage 4: The composition of a large scale fixed media work allowed for an investigation into gradual interpolation of genres and delicate forms of continuum mobility, represented by the work *Drop The Towel, Come to Poppa.* A second function of this work is the use of *catLitter* as a device for producing material for fixed media work.

Stage 5: The building of a set of three software patches, through which three pieces were composed, as a triptych, for live performance. This presents the *Ocean Triptych,* incorporating *White Horses, Boom-Ti* and *Sunrise Over the Water.* The set of live works also includes the remix *Rock Robot.*

7.1 Vocal presence, absence and Emergence

The importance of vocal content within these works is paramount: there is a degree of vocal presence in almost every piece (if the live suite is considered a unity). Furthermore, the treatment of the vocals in each work presents a critical method of continuum traversal. In the reductive delineation of the electroacoustic pole as conceptualised in this portfolio, the absence of foregrounded melodic-lyrical vocals is a fundamental criterion and its presence a criterion for the polar opposite; consequentially the transition between the two is an axis upon which continuum traversal can rest.

In *Take It All Away,* the vocals remain restricted to particular sections within the piece: though they are occasionally used as transitional material using various procedures, this is not far reaching. The vocals in this work remain mainly intact as a source bonded melodic-lyrical corporeal presence used solely within specific sections allied to the popular pole. At the close of the piece, the vocals are processed and ultimately convolved with the sound of the bell presenting a continuum shift from popular toward electroacoustic, with the vocals as a single stream. However, for the majority of the work they remain recalcitrant, an immobile popular music synecdoche. In *Blackened Box*, this is true to a greater extent. To facilitate the integration of the vocals into this work, they are backgrounded through their relative amplitude and treatment with reverberation (implying their presence within a soundscape rather than the

foregrounded presence one might expect in popular music). They are often used as the principal signifier of popular music, and the electroacoustic sections that make continuum traversal toward the popular music pole often do so via vocal content. *Happy Robot* is different, since the vocal material it uses is not melodic-lyrical but rather an electronic voice repeating a single statement (owing to the fact that this work is intended as a popular instrumental music hybrid rather than a popular vocal music hybrid.) This voice is important to the work since it introduces the protagonist and implies narrative, indicates the robot's functionality and is used as source material for the pastorale that recurs. In *Drop The Towel, Come to Poppa* the voice is continuum-mobile; it is an important exploratory principle of the work which is introduced and transformed in numerous ways. It is a disjunct, morphological stream within the work as a whole and is crucial to the fullest popular music statements, in part due to the wealth of vocal material created in the initial recording session. It is also crucial in the use of *CatLitter* in investigating manipulations of the material. Furthermore, the extended nature of the work allows extended exploration of the voice as potential continuum traversal mechanism. In *Rock Robot*, the repetitive robot voice provides an essential basis for transition since it exists in the announcement of the entire sample proper in addition to its use during the transitory phrases. It aids in the maintenance of the ambiguity of the transitory phase by maintaining reference to the original work and is used as the basis of the harmonic reframing that occurs at the close of the work. Vocals are important within the live suite. *White Horses* has sung vocal elements to it, with the majority of the piece created using live processing of vocal noises including clicks and pops. This forms a link with the opening of *Boom-ti* which uses the breath figure to segue between the pieces narratively. There is an improvised vocal melody sung in *Boom-ti*, the moment in the suite with the position closest to the popular music pole of the continuum.

7.2 Rhythmic plasticity and genre morphology

As with vocal presences, rhythm is highlighted in the delineation of the poles and thus the creation or removal of metric regularity is central to the identification of areas of popular music material. Furthermore, the morphology of rhythm is central to continuum traversal throughout the portfolio.

Take It All Away uses rhythm to facilitate sectional transition; one sees this explicitly in the close of the first chorus and the segue into the third chorus wherein the rhythmic percussion track has its pattern modified so that rhythm may be morphologically removed from or imprinted into the work. These parts of the work are sectional transitions facilitated predominantly by the possibilities of rhythmic plasticity. The disruption of rhythm is used throughout the popular music areas of the work as a primary method of introducing genre ambiguity into sections (including the use of a 5/4 time signature). The increasing rhythmic disruption of the chorus sections introduces greater continuum ambiguity. *Blackened Box* uses rhythm differently; ignoring the strongly rhythmic cumulative setting, the rhythmic consistency found within the work is found generally with the vocal line. Many of the electroacoustic sections of the work are created from samples of percussive sounds, which have a notional link with rhythm whilst being treated arhythmically. The arrangement of the electroacoustic gestures gives this piece something of a steady meter, though not that associated with popular music. *Happy Robot* is effectively predicated on the cumulative setting of a rhythmic statement; as a consequence rhythmic morphology is critical. Morphologically conjunct rhythmic streams are often in evidence as segue between electroacoustic sections and sections of popular music material. However, the entirety of the piece is concerned with rhythm: in a sense the common thread of the work is a morphologically conjunct stream of rhythmic organisation beginning with the rhythmic vocal statement that opens the work, which alters morphologically

into the pulsating textures present in the pastorale. The first electroacoustic section investigates a different form of rhythmic organisation, an increasing delay time facilitated by narrative implication of bouncing, and similarly the grinding sounds of the second electroacoustic section investigate accelerating rhythms whereas the techno sections investigate the apotheosis of straight rhythm, the four-to-the-floor bass drum. The differentiation between sections is that of a semi-continuum between pulse-based and non pulse-based groupings. *Drop the Towel, Come to Poppa* uses rhythm as a central component of morphological identity; it is rhythmic emergence from granular arhythmia found in the opening statement of the work that begins the theme of continuum traversal. The constant presence of the comb filtered stream is central to this work and the role than the rhythmic morphology of the stream has is pivotal to continuum traversal. The work as a whole examines the emergence of rhythm from the arhythmic as a strategy for continuum traversal, facilitated by the rhythmic morphology possible within *CatLitter*. The accompaniment to PMSA is not a consistent rhythmic pulse but rather a granular stream moving in and out of rhythm (and thus continuum mobile as a stream, and capable of inducing continuum ambiguity in this context). The final cumulative formation of the piece in PMSB is approached by the gradually increasing metric regularity of a granular vocal statement. In *Boom-ti*, rhythm is used to demarcate popular music sections, but this rhythm is preceded by its iteration at lower pitch utilised as a disjunct method of joining sections by a link between a narrative component and an explicitly rhythmic component. *White Horses* is a work that entirely investigates the use of rhythm as a method for producing a work that moves around ambiguous points on the continuum.

The rhythm in *Robot Rock* is critical in the segue between sections of material; the emergence of constant rhythm from the granular cloud signals the continuum traversal toward the popular, and it is the removal of constant rhythm by the transformation of the full statement to a granular soundscape that traverses the continuum back from the popular pole to the

electroacoustic. As rhythm is introduced to the iterations of the vocal statements, the continuum is traversed toward the popular pole once more. Once again, these emergences and morphologies are facilitated as linear transitions by the use of *CatLitter.*

7.3 Instruments as Genre Connotation

Take It All Away uses instrumentation similarly to its use of vocals as popular music synecdoche. In opposition to the use of vocals which rarely undergo much processing the usage of instrumentation is significantly more plastic, representing a system of sounds with continuum mobility. Furthermore, the closure of the first chorus transitions through both rhythmic plasticity and timbral convergence with the sound of the drums transforming into a heartbeat. The guitar is highly continuum-mobile via its morphology and remains a critical part of genre identity creation in both the popular and electroacoustic sections. Furthermore, non-standard popular instrumentation emerges at 5:37 as reference to contemporary instrumental music. This is a convergence of the two sound worlds on an implied continua, mediated through contemporary instrumental ensemble work. In *Happy Robot* there is less continuum flexibility of individual instrumental content; the bass drum has continuum mobility in a similar fashion to the percussion in *Take It All Away* but emerges similarly at each sectional transition. The claves are somewhat mobile as they have periods of partly rhythmic, arhythmic and rhythmic content; however, in general the instrumental content of the work is fairly continuum-static - it is the vocal line and rhythm that present continuum mobile streams . *Blackened Box*, based upon the idea of the treatment of instruments as synecdoche, owes much of its identity to the continuum mobility of instrumental sounds. Firstly, the fact that the majority of the piece is built from sounds that come from a distinct popular music pedigree introduces a consistent \ambiguity. It is this convergence that facilitates genre transition. The principally popular music statements make use of some of the sounds found in the

electroacoustic soundworld of the piece but not to a high degree; for example, the electronic claves never exist as percussion but rather as treated sound object. Therefore, whilst dominated by samples from the popular music domain, the piece actually owes the majority of its hybrid nature to a relationship of implication. *Drop The Towel, Come To Poppa* uses instrumental emergence within its continuum traversal. The emergence of the drums as recognisable takes place gradually through granular streams; the synthesiser is announced slowly, and the wandering organ and sine-wave melody all act as precursors to the general idea of instrumentation. As with the rest of the continuum traversing factors found within this piece, the instrumentation is another place wherein gradual morphologicalical change and textural emergence operate to facilitate continuum traversal.

7.4 Tonality and polar identity

The axis of tonality is an important principle in signaling the different poles of the continuum within these works; the pieces examined approach this possibility in different ways. Within *Take It All Away*, tonality is asserted from the start within the accompaniment to the chorus elements of the piece. During the broadly electroacoustic sections this tonality is less present but still recognisable since the electroacoustic material is built from the guitar sample that establishes tonality within the chorus. As such, tonality is a consistent presence throughout the work. Within *Blackened Box* tonality is given by the distorted guitars and the vocals. The continuum presence of the guitar is made somewhat ambiguous via heavy processing but the tonal content is clear. In *Happy Robot*, there are chordal elements, and the textures of the pastorale have a clear sense of tonality (because they are derived from the *happy robot* statement that begins the work.) However, since this is a piece that investigates rhythm in particular, the use of tonality as a continuum traversal device (particularly the idea of tonality as producing harmonic backdrop) is largely absent from the work. *Drop The Towel, Come to*

Poppa is focused on the emergence of tonality, in particular a gradual introduction of tonality into the work, making use of a large number of techniques for such introduction. The works within the live suite demonstrate some of the ways that the continuum may be traversed using tonality via catLitter modules. In *White Horses*, emergence of granulated chords is a form of pitch introduction complemented by the addition of the vocal melody. *Sunrise over the Water* investigates a specific emergence of tonality via an expansion of window size to allow increase of pitched content into a granular texture. *Boom-ti* explores tonal emergence through tonal imprinting via a high-Q filter bank which, in addition to rhythm, creates the basis for the popular music oriented sections of the work. In *Rock Robot* tonality is used to indicate a remix proper, a traversal of the continuum from popular to electroacoustic, and back to an alternative manifestation of the popular material.

7.5 Similar processing as emergent stream

The use of similar processing is a consistent theme throughout the works as a method of creating unifying streams. Creating a common thread around which to integrate their content serves to create unity from multiplicity. The auto-convolving prevalent in *Happy Robot*, for example, creates a particular sonic marker that recurs throughout the work, importantly opening and closing it. The relationship of this to its derivation from the opening vocal phrase serves as a method of including the protagonist throughout the work and embedding that protagonist within the musical landscape. The comb filtering applied to the granular streams in *Drop the Towel, Come to Poppa* is a consequence of having a comb filter tuned to a particular frequency as a module within *catLitter* (catFX.) This gives that comb filtered frequency an important role in bringing a unitary strand to the work, especially important since the work is not only multiplistic between poles on the continuum but also between two distinct popular music statements. *Blackened Box* uses distortion as a common method of processing, not

only creating a unifying thread but also of bringing material into ambiguity on the continuum. The extremely heavy processing applied to the guitar sounds serves to create a texture that has some continuum ambiguity; applying distortion to the other sounds serves to relate them to the guitar sound and thus create an implied continuum between electroacoustic and popular via the electric guitar distortion. Similar processing occurs within the live suite, with aspects of resonant filtering and sequenced delay ensuring a perceptual unity.

7.6 Zones of Stasis

The relative weight of stasis in these works may be noted. Stasis occurs in many of the works; the pastorale of *Happy Robot,* the first verse of *Take It All Away,* numerous recurrences in *Drop the Towel,* within *Sunrise over the Water*, etc. This frequently occurs using semi-pitched material, material that has some harmonic idea yet is rendered ambiguous since the tonality is unclear. These sections of stasis are also used as relief points or periods of calm (as in *Happy Robot, Drop the Towel* or *Sunrise Over the Water*) or as backdrops upon which to build (such as in *Take It All Away.*)

7.7 Conclusion

The use of the concept of continuum traversal in developing hybrid works is an interesting and useful compositional methodology. There is great richness in the number of different ways the composer may explore mobility between defined poles in order to create work. Furthermore, the composer may construct different schemes for organising content (such as the structural methods found here) allowing for discrete outlines for the way the continuum may be explored. The idea of the plasticity of features that define continuum position coupled with the concept of the global continuum gives the composer a great degree of control of how aspects of the hybrid work may be manifested.

The usage of a software environment for the tactile exploration of these parameters provides an excellent pathway for further exploration. Seen within the portfolio, it is clear that the use of the software in making continuum exploration tactile can be employed to produce works that have a high degree of ambiguity and continuum mobility; it is also clear that the possibility of fully exploring material electroacoustically or creating densely structured live works is less convincing and more complex within the *catLitter* environment. As expected, the fixed media and live media approaches to the use of the continuum have strengths and weaknesses. The combination of these two types found in the large scale work *Drop the Towel* shows how the tactility of continuum traversal demonstrated in *catLitter,* in combination with the possibilities for complex, multiple continuum investigation and traversal in a fixed media environment can produce a work with a high degree of technical complexity and a large variety of continuum traversal techniques resulting in compositions with a high degree of hybrid morphology.

Since the elucidation of the properties for hybrid traversal involved defining genre parameters at the outset, this process may be applied to any hybrid compositional technique. This could be used as a broad outline for two large categories that may be hybridised in a set of works (as set out in this folio) or may be used as a principle for defining a single work. By outlining two genres as a set of dualistic parameters (such as those encountered within this project), and imagining these parameters as poles on a continuum rather than as oppositions, the composer can navigate this continuum musically to create works with a high degree of genre ambiguity. This may go some way toward avoiding the Oedipal hybrid, by serving as a mixture of various types of material that retain identity whilst providing seamless transition, richness and variety.

7.9 Future Work

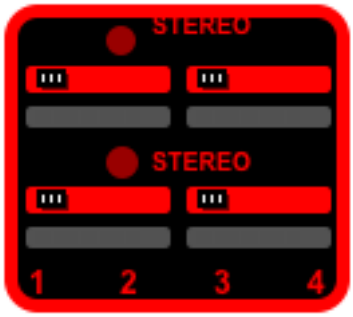
This investigation focuses on a set of parameters to define popular music and electroacoustic music - this set of parameters could be expanded, producing a larger set of categories within which to explore continuum mobility. At the same time, micro-level examinations could take place; for example, large scale pieces solely investigating rhythmic morphology without any other parameters could be produced. Thus far, the project has principally examined convergence and conjunction: investigating the inverse of these processes (disjunction and divergence) could have interesting compositional results. Furthermore, this project principally investigated global continuum shifts facilitated by the synchronisation of local continua shifts or transitional pivots. This could be widened to the use of un-synchronised continuum mobility, wherein several streams move around the continuum but do not encounter any global continuum traversals by the avoidance of synchronisation. *CatLitter* may be expanded in a number of ways, facilitated by its modular nature; interactive control would be of interest, to facilitate live performance by an instrumentalist-singer; a set of modules may be produced that act as controllers for sound processes which could be driven by any number of control mechanisms; gesture controllers, MIDI information, tactile information from a performance and so on.

Appendix – CatLitter Manual

Use the drop down menus to select a desired module, and the circular button to create it in the workspace.

Sound Input Modules

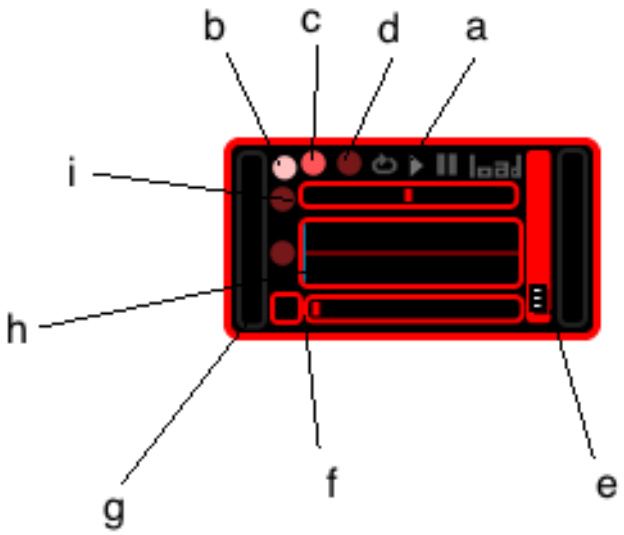
inCat



This has a set of four inputs, from line or microphone. These each have adjustable gain, with input metering, and may be stereo paired (chains gain controls together.)

Sound Generation Modules

FileCAT



a – Load, loop, play and pause a soundfile.

b – Play soundfile 2 octaves lower, at a quarter of the speed.

c – Play soundfile an octave lower, at half the speed.

d – Restart soundfile playback from beginning

e – Output gain and output meter

f – Degree of shuffle; toggle box starts shuffled playback.

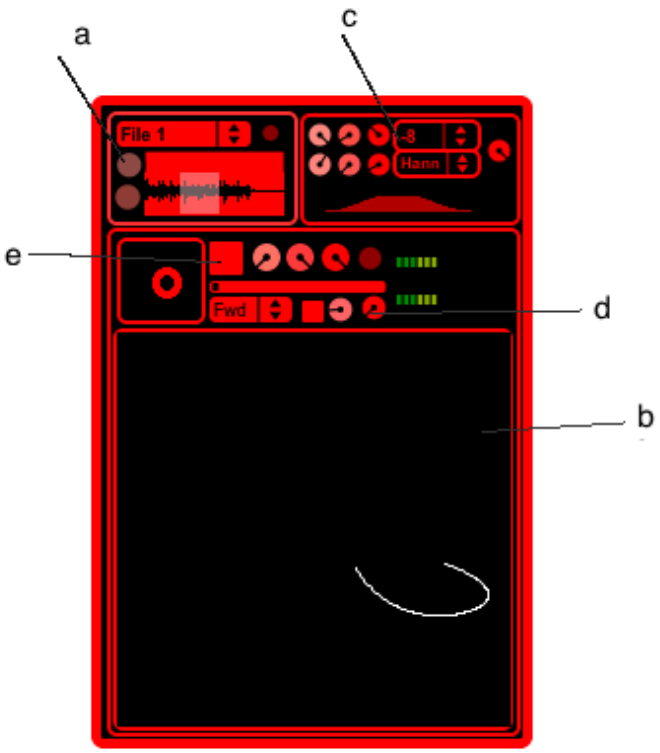
g – Pre-gain meter

h – Select a region of the soundfile for playback; the circular button plays or loops that region.

i – Pitch/speed of playback. Circular red button resets to normal.

The bottom right of fileCat can be connected to the top right of another making it act as a master control, with various parameters linked together (for synchronized playback and manipulation.)

scrawlCAT



a – Loads two files from which the granulator draws its material. Also has the option for recording material into the buffer; this is not yet fully functional and will be made so in future updates.

b – By drawing within the 200X200 black grid, the gestures will be created from the sound. Within the soundform graphic in region a of the module, the region of the soundfile used for playback can be chosen.

c – Control of the granulator at the heart of scrawlCat. The dials control (left to right, top to bottom) Density, Pitch, Grain Size, Random octave pitch, Total Random Pitch and Grain Playback Location Randomization. The two drop down menus control grain pitch by octave, and window shape. The dial controls window size.

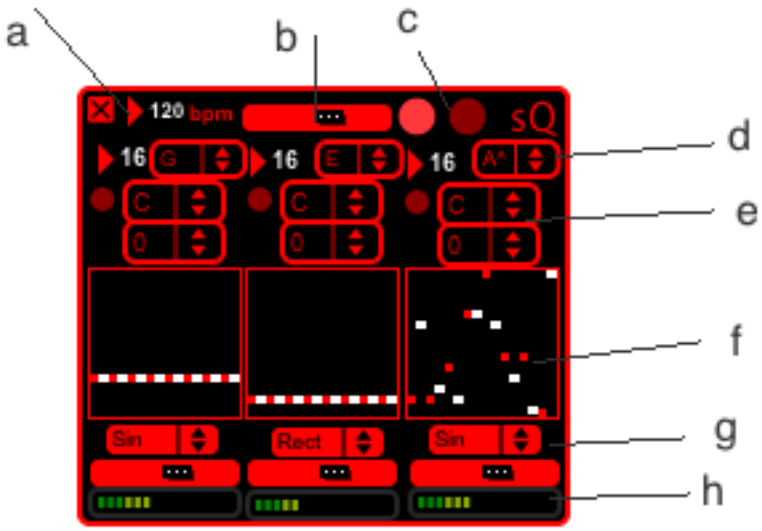
d-.When a gesture is drawn into scrawlCat it is recorded. It may then be scrolled through using the scroll bar, or looped forward or backward. The speed of this looping may be changed using the dials, as may the level of drunkenness of the walk.

e – A random constant walk may be generated using 6th degree Bezier curves. This is turned on and off with the toggle box, with the centre of the walk controlled by the box on the right. The dials control speed

of walk, radius of walk and drunkenness of walk whilst the red circle simply resets the gesture space in case it becomes too cluttered.

ScrawlCAT outputs a mono left and right channel from its two left most outlets. From the rest of the outlets it outputs single grains for future treatment.

SeQat



a – Toggle the sequencer on, choose tempo.

b – Main gain – master controller for gain sliders.

c – Randomise a chord, or randomise all step sequencers.

d – Choose single pitch to playback, number choose loop point of single sequencer.

e – Round button randomises single sequencers. Drop down boxes control (major) key and octave transposition.

f – Step sequencer to - be drawn in.

g – Choose shape of wave form (Sine, rectangular or saw waves.)

h – Individual gains and out meter.

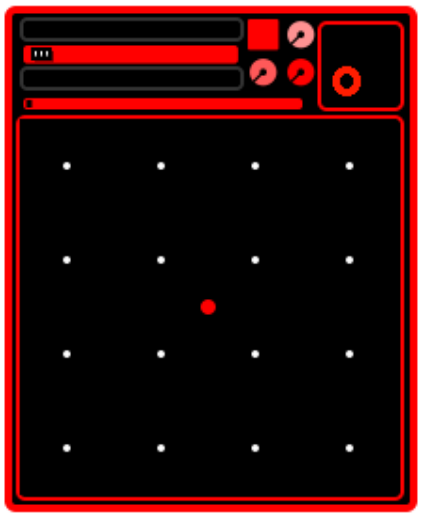
This module outputs a mix of all oscillators through the left most outlet. Through the next three it outputs individual oscillators. The final outlet may be chained to the inlet of another seQat, thus becoming a master controller for various parameters.

Sound Manipulation

catFLAP

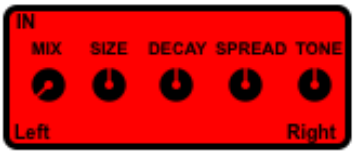
A simple gate, with a sidechain, that may be inverted (built around noizgate~)

catFX



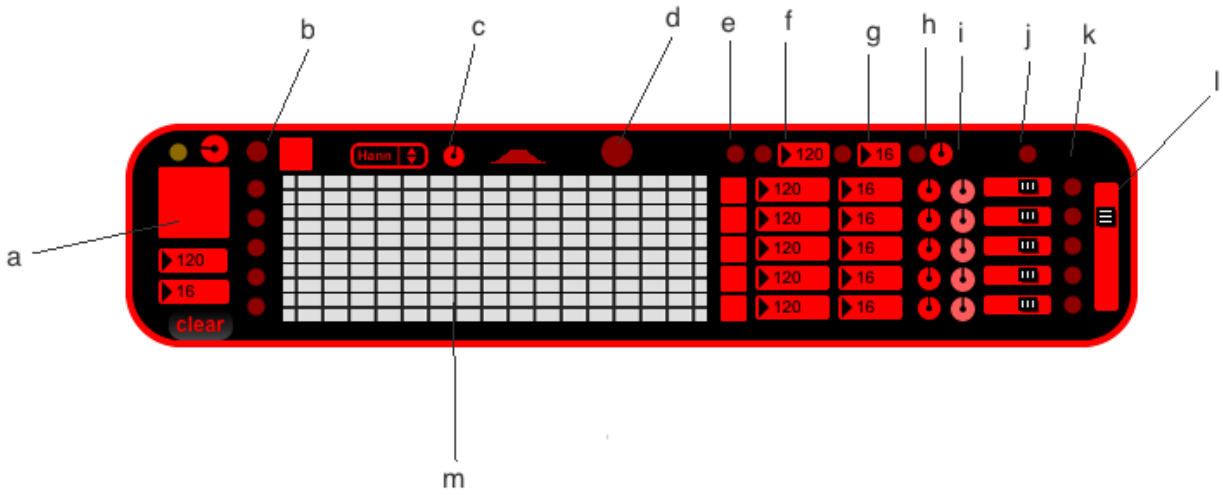
A two-dimensional effects unit. Proximity from each of the outer square of dots controls particular effects applied to the sound. The slider directly above this controls the amount of effects. The user may drag the red circle around to explore effects or alternatively the controls in the top right apply a random path, with dials controlling path radius, speed, drunkenness and path centre. There is an input and output meter with output gain.

catSPACE



A reverb module that controls the timeverb.vst effect, with stereo output.

drumCAT



a – Controls on/off of the drum machine, with tempo and overall loop point definable below this.

b – Controls recording from input into the drum channels. The dial controls the speed between each channel being recorded into, or individual channels may be recorded into. The toggle box controls constant recording, creating a rhythmic input granulator rather than one-shot input drum machine.

c - Controls the enveloping, with window shape and size definable, and an image representing the window displayed on the right.

d – Generates a random beat pattern in the drum grid.

e – On off toggles for each track in the 5x16 grid, with the red button randomizing these toggles.

f – Definable tempo for each track in the 5x16 grid. The top is the master control, with the red button randomizing tempos (double click to return to value of master control.)

g – Loop point specifiable for individual tracks, master is at the top. Red button randomizes this, with double clicking returning all to the master value.

h – Transposition amount for each track. Master at top, randomization via red button, return to master via double click.

i - The pink dials are transposition, only affecting some hits in the track rather than all of them.

j – Track gain. Red button randomizes, double click makes all the same (0 gain.)

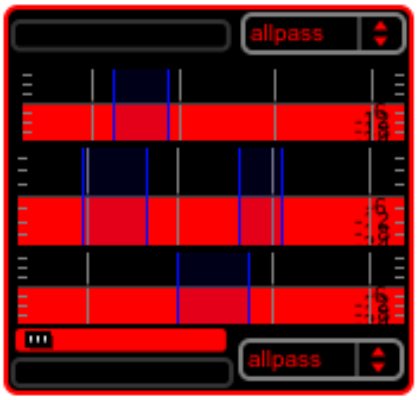
k - Randomise pattern for individual track.

l – Overall gain

m – 5X16 grid for drum pattern, may be draw into or randomized.

drumCAT can take one input (leftmost) to be applied to each track or one input for each rhythm track. Likewise, it can output a mix of all tracks, or each track individually.

eqCAT



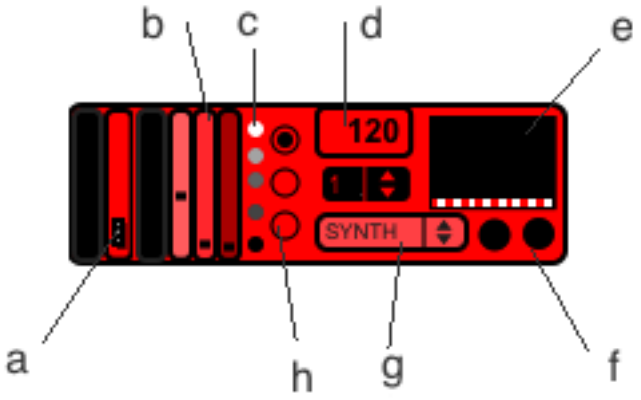
Input equalization through a bank of three filters, with the shape of the first and last user definable. Has input and output meters, and output gain.

liveCAT

A live input granulator. At the top is the window shape and size, with a representation of this window at the very top. Below this is octave transposition. Granulation control dials at the bottom are, from left to

right, density, pitch, grain size, random octave transposition, random general transposition, random grain position. It also has input and output meters, and gain control.

resCAT8



Takes 8 inputs (particularly useful for outputs from the granular modules liveCAT and scrawlCAT) and applies resonant filters to each one.

a - Input output meters and gain.

b - 3 sliders controlling filter gain, filter Q and portamento time between filters.

c – Filter bank shape, including major chord (second button down), single tone (third down) and bell-like (bottom.)

d – Tempo of sequencer.

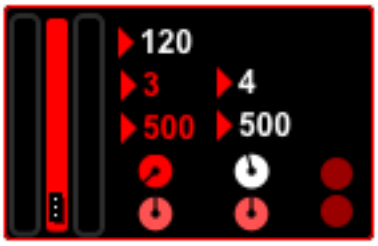
e - Sequencer to apply melodic patterns to filter banks for imprinting melody.

f – Right hand button turns the sequencer on, left hand produces a random sequencer pattern.

g – Allows the filter bank to be controlled by a MIDI keyboard, either polyphonically, monophonically with a single tone and monophonically with octave tones.

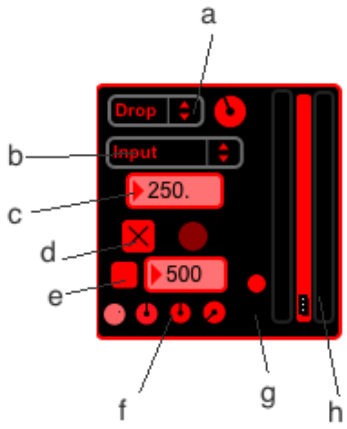
h – Defines the filter bank shape for the sequencer, choose from single tone, bell-like and major chord.

catDEELEY



A delay module. On the left are input output meters and gain. At the top is tempo designation, with delay in beats below this. This delay may also be set in milliseconds (below this.) The top dials control feedback amount for each delay, the bottom controlling delayed signal levels. On the right are two red buttons; the top one resets the delay to 4 beats, the bottom resets the levels of the delay to the centre of the dial.

catNip



This module uses a physically modeled bouncing simulation to create increasing/decreasing delay patterns.

a – Window shape and size via dial.

b – Apply bouncing window to input, or capture a sample and “bounce” said sample.

c – Height particle is dropped from.

d – On-off toggle for module, red button records a new sample to bounce in One Shot mode.

e – Loop a portion of the bouncing simulation (defined in milliseconds) to create a repeating pattern.

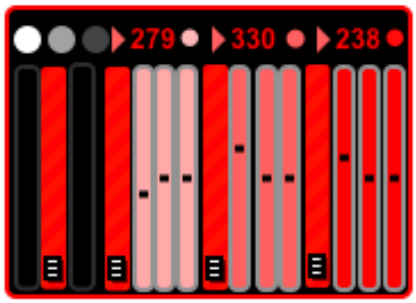
f – Pink button randomizes parameters. The dials from left to right control the coefficient of restitution, the value for acceleration under gravity, and the rightmost one applies a degree of rising pitch transposition to the bouncing particle.

g – A representation of the bouncing particle.

h – Input/output meters and overall gain

These may also be chained to use one as a master control.

CatDEELER

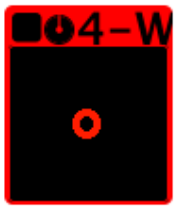


This delay module takes an input and provides three delay lines. On each delay line, from left to right, the slider control feedback amount, pitch of delay line and increasing or decreasing pitch of feedback. The milliseconds delay time is definable for each track at the top. The grey and white buttons provide randomisation - from left to right, randomization of delay time, randomization of all parameters, resets to no transposition.

The ouput may be as a mix, or one may output each delay line individually.

Sound Mixing

4WayMix

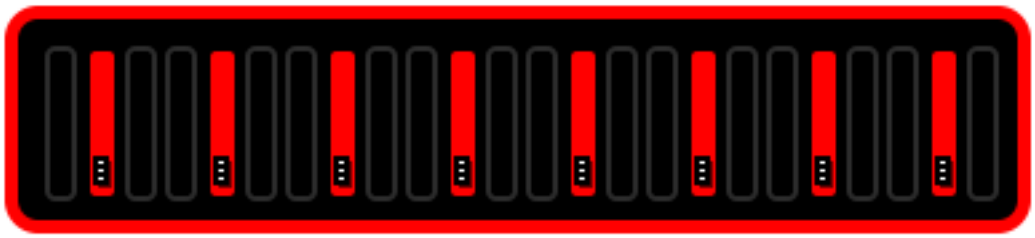


With four inputs, proximity to the corners of the square are associated with relative levels of each input. From the left-most outlet these are given as a mono mix, from the right they are given as individual faded versions of the input signals. The toggle box and dial allows a random walk, with the dial controlling the speed of the walk.

LRMix

A one-dimensional version of the 4WayMix. Takes two input signals and crossfades them, with output of either a mix of the files or mono faded versions of the input. The button resets the slider to the middle.

MixCAT



A simple mixing module, taking 8 inputs, applying gain, and outputting them. Has input and output metering for each channel.

LFOCat

Applies an LFO to an input signal. Frequency of the LFO is controlled by the large dial. The circular pink button switches off the LFO. These may be chained through their right inputs, making one act as a master controller for on – off purposes.

Sound Output

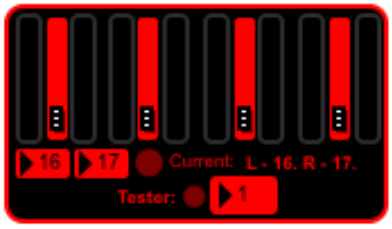
CloudCat

Takes 8 inputs and spatialises them, particularly designed for use with liveCat or ScrawlCAT which have 8 grain outputs. Spatialisation pattern is controlled by the radio buttons, which represent stasis (no movement, spatialisation is at static points), random path and circular. It has inbuilt reverb with controllable mix, room size and decay. The bottom dial controls the overall speed of motion. Has gain control with input and output meter.

revSpace

A combinatory module allowing spatialisation and reverb from the same control. Has input and output metering with a gain channel. Toggling the on switch allows random walk spatialisation, or spatialisation may be user defined or drawn into the larger square box. The inbuilt reverb has controllable mix, room size and decay .

PhoneCAT



Allows the user to send a specific mix to two specified channels, designed for headphone auditioning. Channels for headphone output may be defined.

spaceCAT

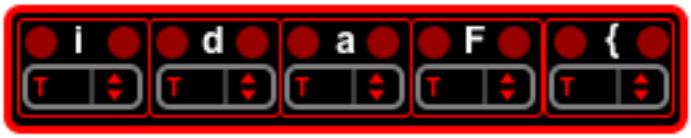
A spatialisation module; the dials at the top control the random path that the input will walk with a toggle on/off, drunkenness, speed and radius. The square with a circle in controls the centre of the path. The larger square with a circle in allows the user to control spatialisation (4 channel.)

Miscellaneous

Clock

A clock module. Turns on and resets with the toggle box.

KeyCAT



KeyCAT is to allow the control of various parameters using the position of the mouse; this is not yet fully functional and will be updated in future versions.

monoCAT

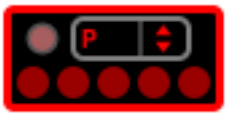
Can take several input and output them as a single mono stream, perhaps for future processing.

monoreCAT

Records a single mono sound file from one or multiple inputs. Useful for capturing streams that are to be

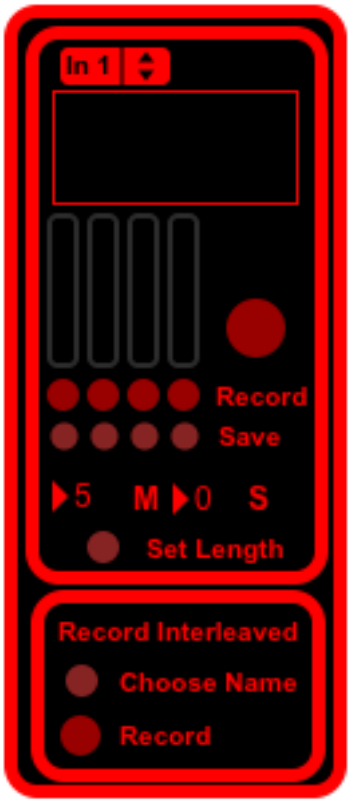
used and/or spatialised later in a digital audio workstation.

recataCAT



As yet not fully functional, this patch will be used to allow modules to be controlled by parameters from input sound such as pitch, amplitude or impulse detection.

recordCAT

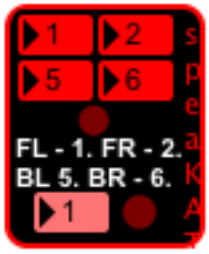


For recording 4 channel spatialisation. The top drop down menu displays a particular input. Moving horizontally down, the 4 meters are for the 4 inputs. These may be recorded individually with the red

buttons below the meters, or all together with the large red button to the right. Below this are the save controls. Below this allows the setting of length for these buttons.

The bottom panel allows interleaved recording after choosing a name.

speakerSETUP



This module allows the setup of the speaker designation for 4 channel output. The channels are chosen at the top, with the red button setting the outputs to these channels. The bottom number and button is used as a tester for channel numbers, outputting a short saw wave for testing purposes. The spatialisation modules in catLitter are all linked to speakerSETUP such that when speakerSETUP is used, their output designation is changed automatically.

recordSPEAKrev

This module is linked to the revSPACE modules automatically such that this has its input configured as the output of these modules and the cloudCAT module. Thus it may easily be imported into a project to capture output sound at any point with a minimum of fuss.

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