



numerical s o u n d

archeological sound engineering

What Are DNA Groove Templates

This software technology was originally developed in 1992 by Ernest Cholakis (President of WC Music Research) in order to give midi sequences more of a human feel. DNA grooves represent the human touch that makes live music interesting and compelling. DNA grooves bring the feel of live music into the realm of MIDI sequencing. It provides the fastest and the most convenient way to humanize your sequences.

As of 1999 Cakewalk, Performer, Cubase, Logic and Vision have implemented this feature. Only one company Numerical Sound still actively develops and sells DNA Groove Templates.

If you want to make any of your midi files sound real and compelling then read on.

Ernest Cholakis
Numerical Sound

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Numerical Sound
P.O. Box 1275, Station K, Toronto, Ontario, Canada M4P 3E5
phone 416.444.6644 fax 416.444.7045
email: ernest@total.net web site: www.numericalsound.com

What is feel ?

All musicians have their own individual styles of playing. A C-major scale played by two different musicians contains many differences in rhythm and dynamics. Some musicians have a distinctive way of playing melodic/rhythmic phrases. There are subtle distinctions that some musicians impart to music phrases that change dynamically over the course of a performance. The entire mix of conscious and sub-conscious articulation that musician possess is called their feel.

Musicians develop their feel through experience and interplay with other musicians. A musician who spends many years playing with a jazz ensemble invariably develops a Jazz feel which is different and easily distinguishable for example, from a Rock musician or Classical Musician. An ensemble that has played together for years develops a composite feel, to which each musician contributes his/her particular feel.

This feel is not easily transported. For example, most Opera singers will not make great Pop singers. They have tunes their vocal feel for Opera. Great Rock musicians may not necessarily be able to translate their talent into a definitive Reggae style. But great feel is instantly identifiable. When we hear it, we recognize it and we *feel* it. Great feels move us, they gives music emotions, character and substance. They compel us to listen.

Since the advent of sequencers and drum machines, this fundamental, essential and defining aspect of music has been sidelined by a phenomenon called *Quantization*.

Quantization

Quantization is the process where notes are moved into precise rhythmic patterns, based on exact sub-divisions of the bar. This eliminates any rhythmic "*inaccuracies*" in a performance and aligns all the notes to a mathematically defined rhythmic grid.

Quantization has become a formidable fixture in sequencing and is used extensively. Primarily, it saves time. Many years ago when musicians *had* to play music directly onto multi-track tape, they had to get it right. When they didn't, they had to retake the passage several times and resort to punching in. It could be very time consuming to get a complicated musical passage recorded right.

With quantization, most musicians can complete most of their work within one or two takes. This has dramatically reduced the length of time it takes to record a song. Quantization also allows all the musicians to produce perfectly timed music. However it has resulted in a universal *feel* and a precision all musicians can easily attain with their midi sequencer.

The problem with submitting your creative process to this rhythmic *standardization* is that quantized music has no distinctive rhythmic character, no real feel. All the notes are aligned perfectly to the ever present quantize grid. The only inaccuracy that enters into the picture is whatever MIDI delay is caused by a particular sequencing system.

Groove Quantization

Groove Quantization allows for the movement of notes based on a user defined grid. This means that each point in the *grid* can be precisely defined in the number of clock pulse (ticks) ahead or behind each quantized point each note should be.

Most Midi sequences in the mid nineties implemented the groove template feature in their programs. These offer musicians tremendous potential for individual expression. A composer can design a particular rhythmic signature and *apply* it to music. For example, shuffles can have different strengths at different points of the groove "loop". Several visual representations of Bernard Purdie famous shuffles are included on the following page. Note that the last graph is a drum machine playing a shuffle. Which do you think sounds better ?

To create a certain feel, it is not uncommon for sequencer users to move notes individually. Sometimes a suitable quantization grid cannot be found to match the groove of the drum loop. Applying a DNA Groove templates is the fastest and most efficient way to match a feel. As most midi sequencers provide this feature, musicians can now develop a library of grooves to suit many musical situations.

DNA Groove Templates

Designing a groove template from scratch can be a hit and miss affair. If you know from past experience exactly where each grid point should be, then you can easily create a template. You can use the *create template feature* (available on most midi sequencers) to design very obvious rhythmic signatures, like shuffles, lags, etc. However, beyond this it is difficult to know where to place each *grid* position.

With DNA Beat Blocks, we created templates that are based on actual acoustic performances, that already have "proven" feels. The timing of each pulse is extracted and provided in the form of a quantized template. All the DNA groove template are two bars long.

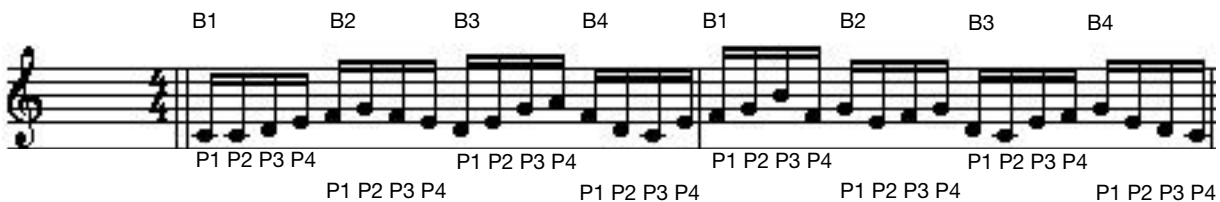
The purpose of the DNA grooves is not simply to reproduce original music exactly. DNA grooves represent the human touch that makes live music interesting and compelling. DNA grooves bring the feel of live music into the realm of MIDI sequencing. It provides the fastest and the most convenient way to humanize your sequences.

DNA Groove Template Terminology

What Pulses and Beats Are

A bar of 16th notes are made up of 16 events called pulses. A beat is defined as the pulses at the quarter note positions. For example, in a 16th note template, every 1,5,9,13,17,21,25,29 position are beats, all other points are considered pulses.

The first 16th note after the downbeat is called P2. The next pulse is P3 (the 8th note position) after the downbeat and the 16th note before the next downbeat is called P4. P1 is the downbeat. The Beats in a one bar phrase are B1 B2 B3 B4.



Notes Modified by the DNA Groove Templates

When a groove template states Move B2 & B4 it implies B2 & B4 in both of the two bar patterns (B2,B4,B6,B8).

When a groove operation states that it **Moves Pulse 2&4** (P2,P4) it is primarily the P2 and P4 note in all the beats of a user selected passage of music (to be grooved) which is moved. These pulses are moved to the predefined *Groove Template Points*.

Groove File Naming System

If the Groove File Name contains ends in [Name]p.Grvt then the groove file is a Pulse Motion File.

If the Groove File Name has [Name]b.Grvt then the groove file is a Beat Motion Groove.

Contents of Each DNA Groove Template

Each Drum Loop on this CD contains two types of DNA groove files. The first set is called the Pulse Motion, which primarily processes pulses. The second is called Beat Motion which primarily processes Beats. In some grooves the Pulses sometimes affect the Beats and vice versa.

	Pulse Motion	Beat Motion	
	Original	Original	<p>“Original” is the syncing groove, which is meant to lock other midi events to the drum loop as heard on this CD. Note that your sequencer must re-trigger this audio loop every 2 bars and the tempo must be the same as listed in this user manual.</p> <p style="text-align: center;">Beat Motion</p> <p>This is the set of DNA Groove variations that primarily process the quarter notes. The pulse often move slightly in order to retain the balance in the groove.</p>
<p style="text-align: center;">Pulse Motion</p> <p>This is the set of DNA Grooves variations that primarily process the three 16th notes between each beat.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="margin: 0;">Shuffles</p> </div>	Move P2	Move B1&2	
	Move P2	Move B1&3	
	Move P3	Move B1&3	
	Move P3	Move B1&4	
	Move P4	Move B2&3	
	Move P4	Move B2&3	
	Move2&3	Move B2&4	
	Move23&4	Move B2&4	
	Move23&4	Move B2&4	
	ShflS2&4	Move B3&4	
	ShflM2&4	Move B3&4	
	ShflH2&4	Move All 1	
	ShflS2M4	Move All 2	
	ShflM2S4	Move All 3	
	ShflM2H4	Move All 4	

Real Word Examples of DNA Goove Templates of Legendary Drummer Bernard Purdie

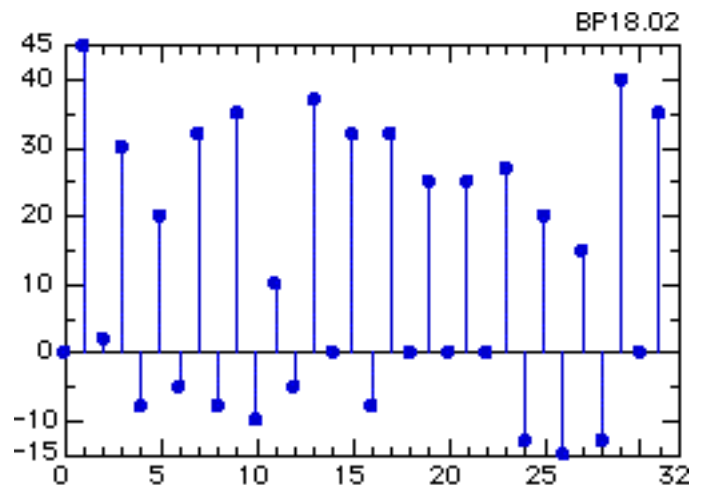
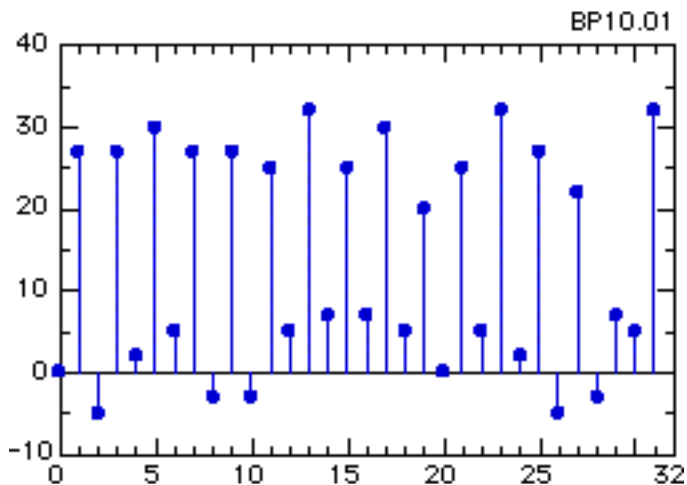
Bernard “Pretty” Purdie, legendary drummer, teacher, producer and performer, is perhaps modern music’s most recorded drummer with over 3,000 album credits. Originator of the “Purdie Shuffle”, Bernard is internationally known for his unique style and technique on percussion.

Called by many the modern father of funk, Bernard has produced many artists including Gil Scott Heron, Jersey Blue and Peaches & Herb. You have heard him play with artist such as Paul Simon, James Brown, Stelly Dan, BB King, Jeff Beck, Quincy Jones, Miles Davis, Duke Ellington, Marvin Gays, The Supremes & Aretha Franklin. A consummate performer, Bernard moves with ease from Rock and Pop, to Funk and Jazz.

Feel chart Examples of Bernard Purdie's Shuffle

These charts show a graphic display of the feel in several Bernard Purdie shuffles on this CD. Any vertical values less than zero represent an event before the quantized point and a positive value means that the event is played after the quantized point. The resolution in these graphs is 182 ticks per quarter note.

The horizontal axis represents the number of events in the 2 bar groove (8 beats of 16th notes). The midi files and the DNA groove templates contain these subtle timing features which are essential for a **human feel performance in midi sequencing** .



The chart below is a drum machine shuffle. Note the lack of nuance, variation and overall shape to the 2 bar pattern.

