Drum Programming and Groove Template Assignment

OVERVIEW
The purpose of this assignment is to familiarize students with the tools necessary to create convincing MIDI drum parts that are dynamic and have a human feel. Students will convert drum notation into MIDI, apply velocity editing, and then extract and apply Groove Templates with Beat Detective.

To get started, on the following 7 pages - read about the development of two sound levels, taken from the book *Future Sounds,* by David Garibaldi, a well-known session drummer who plays with Tower of Power, as well as how to extract Groove Templates using Beat Detective, and how to apply them using the Quantize feature in the Event Operations window.

Next, create a new session:
Sampling Rate: 44.1 kHz
Bit Depth: 24-bit
File Type: WAV
I/O Set Up: Stereo (not last used)

> Save the session as: *your name_MIDI drum exercise* to your student folder on the Glyph drive.

Step 1: Programming the Drum Parts
On the last page of this document there are 6 drum patterns, some of which are 2-bar patterns and others, which are one-bar. Each has it's own unique tempo, except for the last two, which are both at 96 BPM. Note that the first three have an even 1/16th note feel, while the last three have a shuffle or triplet feel.

1. First - set up the session so that you have pre-roll before bar one (as we covered in the previous exercises – move the song start marker as necessary).
2. Import the drum MIDI and Aux tracks from your MIDI Blues template.
3. Verify the MIDI and audio routing is set up correctly for your drum MIDI instrument.
4. At bar-one, beat-one set up the tempo for the first pattern (98 BPM).
5. Using the pencil tool, program the notes in for the first pattern. *Note: you will have to use the 1/16th note tuplet grid for the 4th pattern, and the 8th note tuplet grid for the last two patterns.*
6. Check to see if you've accurately programmed in the rhythms by comparing your track to the reference beat which is inside a folder called *Drum Exercise Reference Beats*, in the class pick up folder.
7. After you've programmed the pattern in, apply velocity editing to create the accented and unaccented notes as notated in the drum pattern. Remember that accented snare and kick notes should be at a velocity level of 127; the unaccented snare notes should be at the same loudness as the unaccented hi-hat notes. Look at the graph provided on page 3 to see the relative levels between the drum parts.
8. Duplicate or loop the pattern so it repeats 4 times (use grid mode).
9. Leave a one-bar empty measure after the 4th time around and then repeat the step #s 4-9 until you have all 6 parts programmed in on the same MIDI drum track.
There should be a one bar gap in between each pattern. Make sure you're adding a tempo event at the downbeat of each new pattern as notated.

Step 2: Extracting and Applying Groove Templates
The goal for this step is to extract two groove templates from pre-recorded drum loops. One will serve as a straight 1/16th note template which will be applied to the first three drum patterns, the other will be a shuffle feel template which will be applied to the last three patterns. There are collections of drum loops on the server that can be used as source material to extract groove templates from (Audio Disciplines server>Music and FX>Samples and Loops>Drum Core>Rex Loops). The Matt Sorum folder has good funk loops that can be used to extract a straight 1/16th note template. In order to find a suitable shuffle template - audition loops in the other folders and pick one of your choosing (make sure it is a shuffle feel). Please note that the Rex Loops are only being used as source material to extract a groove from – once the groove template has been extracted - these tracks should be muted and hidden. Also - make sure you've thoroughly read pages 4-8 of this document before proceeding.

1. First, in the Processing Tab of the Preferences window, turn on:
   – *Automatically Copy Files on Import*
   – *Import Rex Files As Clip Groups* and *Automatically Create Fades*
2. Open the Digibase Browser and turn on the *Audio Files Conform To Session Tempo* button (i.e. the metronome icon at the top of the browser).
3. Drag and drop the Rex Loop into the tracks list area and the loop will appear on a new track and will play back at the session tempo. *Note: Rex Loops will appear as Clip Groups, each note in the loop is it's own clip and each clip maps out to the session's tempo grid. Notice that the time base for the Rex Loop track is set to ticks.*
4. Make sure the Rex loop starts right on a downbeat (use grid mode to position it if necessary).
5. Use Beat Detective to extract the template and save the template to the clipboard – do not save to disk! **(Students do not have the permission to modify the Mac hard drive).** – See pages 4-5 of this document.
6. Apply that template to the MIDI drum pattern. – See pages 6-8 of this document.

Note: When you apply the groove template, leave the timing set to 100% and turn off duration and velocity options in the Quantize window.

Step 3: Finishing Up

Have the instructor check your work and then drag and drop this session to the drop box on the Audio Classes server

CONTEMPORARY DRUM-SET PLAYING
Development of Two Sound Levels

There are three basic sounds in contemporary drum-set playing: 1. snare drum (S.D.) 2. bass drum (B.D.) 3. hi-hat (H.H.) In a contemporary music setting, these drum-set components require the most attention because most drum-set music is based on these sounds. Most of the material in the book is written for S.D., B.D. and H.H., with the occasional addition of cym. bell (C.B.), ride cym. (R.C.), cowbell (C.B.) and tom-tom (T.T.) These sounds will expand the tonal possibilities of each exercise. To produce the type of drum-set sounds heard throughout today's music, you must develop two sound levels: accents and non-accents. In a playing situation there will be more than two sound levels, but for our purpose (building foundational drum-set technique) we will be using only two levels. The two sound-level technique gives you a place to begin building a consistent approach to striking the playing surfaces. It not only deals with what is played, but the way in which the playing surfaces are struck and where they are struck, so that your drum sound is compatible with contemporary music. You will find this technique widely used among the top players of the day. The following guidelines will help you develop two sound-level playing.

1. Accents should be played approximately 8"–12" from the playing surface, and non-accents should be played approximately 1/2" from the playing surface.

2. Blend the sounds of the hi-hat and snare drum on the unaccented notes. The snare drum must be played lightly so that it sounds like the hi-hat.

3. The difference in volume between the two levels should be the same as forte (f) to pianissimo (pp). The overall volume will be controlled by the dynamic level of each performance situation, while the relative distance between the two levels of playing will remain more or less the same.

Here are some specific ideas that will help you develop two-level playing on each instrument within your drum set.

SNARE DRUM
Accents—Use rimshots for live playing and some studio situations.

Strike the center of the snare drum with either end of the stick (the butt-end of the stick can thicken the snare drum sound) while the shaft simultaneously strikes the rim between two lugs. This technique produces a slightly lower and thicker snare drum sound.

Non-Accents—Play as an extremely soft, light tap near the center of the snare drum.

To do this, all tension must be released except for the amount required to hold the stick while playing a light tap.

HI-HAT (played with the stick)
Accents—Strike the edge of the hi-hat with the shoulder of the stick.

Non-Accents—Strike the top of the hi-hat (not to be confused with the bell) with the *tip* of the stick.

BASS DRUM
The two-level concept isn't as critical with the feet because most of the time the bass drum is playing notes that require accents. The distance between the sound levels in the feet is less than with the hands [forte (f) to mezzo-forte (mf), or forte (f) to mezzo-piano (mp)]. In any case, the bass drum must be blended with the hands in order to balance all of the sounds properly. The same rules apply when playing the hi-hat with the foot.

RIDE CYMBAL

Playing on the bow
Accents—Ride the cymbal approximately 2" to 2-1/2" below the bell. This produces a more controlled "ping" sound and will help avoid crashing the cymbal each time an accent is required. The cymbal must be played lightly enough in order to avoid sound "buildup."

Also, instead of playing 8" from the surface, go down to approximately 5."
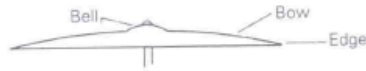
Non-Accents - Play 1/2" above the playing surface as described before.

Playing on the bell
The stick heights are the same as described above for the ride cymbal.

Accents—Strike the bell with the shoulder of the stick.

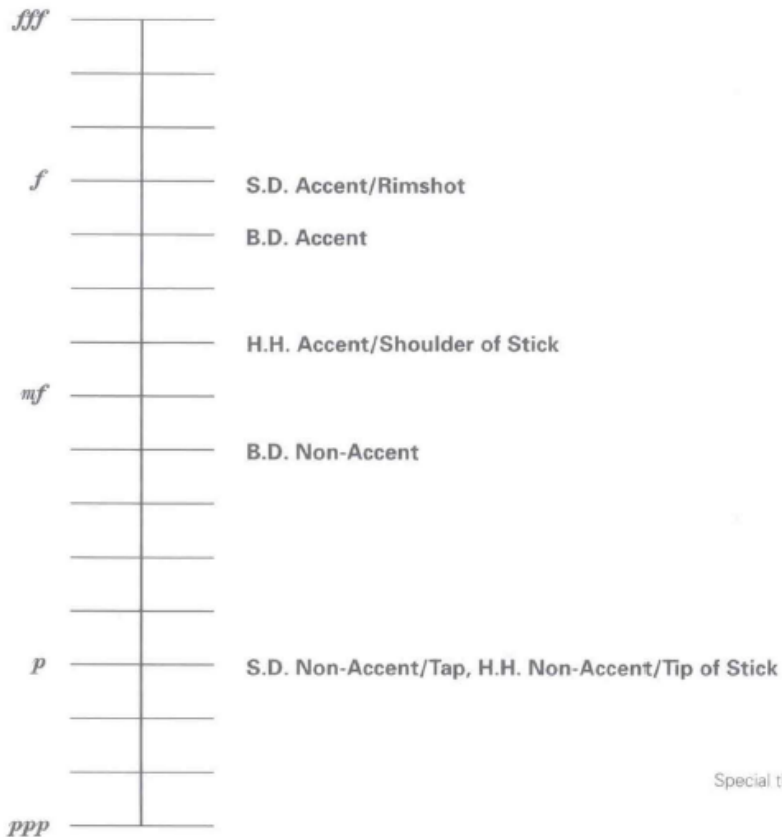*Non-Accents*—Strike the bell with the tip of the stick.

THE TWO SOUND-LEVEL CONCEPT REVIEWED

The "thick" sounds in the "Two Sound-Level Concept" combine:
- B.D. accents
- S.D. rimshots/accents
- H.H. accents w/shoulder of stick
- H.H. played w/foot accents
- R.C. accents with shoulder of stick on bell, tip or bow
- T.T. accents (no rimshot)

The "thin" sounds in a "Two Sound-Level Concept" combine:
- S.D. non-accents (tapping drum lightly)
- H.H. non-accents w/tip of stick
- R.C. non-accents w/tip of stick on bell and on bow
- B.D. non-accents
- H.H. w/foot
- T.T. non-accents

fff

f   **S.D. Accent/Rimshot**

         B.D. Accent

         H.H. Accent/Shoulder of Stick

mf

         B.D. Non-Accent

p   **S.D. Non-Accent/Tap, H.H. Non-Accent/Tip of Stick**

Special thanks to Roland Henkel for this graph.

ppp

DigiGroove Templates

Beat Detective allows the fine timing nuances of a rhythmic performance to be extracted and saved as a groove template, called a DigiGroove template. DigiGrooves can be saved locally to the Groove Clipboard, or saved to disk as Digi-Grooves.

Groove templates can be used to transfer the feel of a particular performance to:

• Selected audio clips using Groove Conform.

• Selected MIDI data using Groove Quantize (see page 6 of this document).

Groove templates are "quantization maps" de-rived from real musical performances. The rhythmic character of each performance is analyzed and stored as a groove template. Beat Detective analyzes an audio selection for transient peaks according to a defined threshold and maps the rhythmic relationships to a 960 parts per quarter note (ppq) template.

When creating DigiGroove templates, Beat Detective also analyzes the dynamics of a performance. MIDI velocity data is saved from MIDI tracks, and accents and peak levels in audio data are incorporated into the groove template as velocity data, which can be applied to change the dynamics of MIDI tracks.

Beat Detective translates the amplitude of signals in audio tracks to MIDI velocity according to a linear scale. For example:

• A 0 dBFS signal equals a MIDI velocity of 127.

• A signal at –6dBFS equals a MIDI velocity of 64.

• A signal at –12dBFS equals a MIDI velocity of 32.

• A –48 dBFS equals a MIDI velocity of 1.

Capturing this information is very important to preserving the feel of a performance, and can add life to MIDI tracks that lack dynamics.

Beat Detective only captures duration data from MIDI tracks, not from audio tracks.

To extract a Groove Template:

1 In the Edit window, make an Edit selection (including audio or MIDI). The selection should consist of one or more complete bars, starting and ending on downbeats.

When extracting Groove Templates, the captured selection must not include Bar|Beat Markers. Otherwise, the accuracy of the Groove Template will be compromised.

2 In the Beat Detective window, select Groove Template Extraction.

3 Define or capture the selection.

4 Configure the Detection options so the selection's peak transients (or MIDI Note Ons) are accurately detected

5 Click Extract.

6 In the Extract Groove Template dialog, enter comments about the groove. You can enter a maximum of 255 characters to describe the groove. Comments can be viewed using the Show Info button in the Beat Detective window.
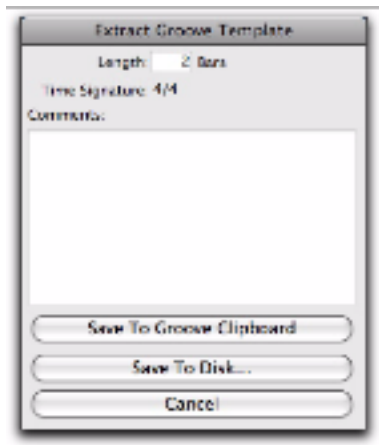
Extract Groove Template dialog

7 Do one of the following:

• To save the extracted template for use in the current session, without writing the template file to disk, click Save To Groove Clipboard. (This template will be lost when you close the current session.)

• To save the extracted template to disk in order to use it in other sessions or share it with other Pro Tools users, click Save To Disk. Enter a name for the template and click Save. (Do not change the location of DigiGroove template files and folders or they will not be available in your sessions.)

• Click Cancel to cancel without saving the template.

• *Use folders and subdirectories to organize DigiGroove templates. However, be sure they are always located in C:\ Program Files\Digidesign\Pro Tools\ Grooves (Windows) or Applications/ Digidesign/Pro Tools/Grooves (Mac). Groove template files located elsewhere will not be available in either Groove Quantize or Beat Detective.*

Swing Content for Generating Groove Templates

When defining swing content of the selection, select the Contains eighth-note option if the audio selection has a heavily swung eighth-note groove. If the audio selection has relatively straight eighth notes, use the Contains sixteenth-note option. This lets the resultant DigiGroove template be applied more easily else- where. Although a groove might be based upon non-swung eighth-note material, you might want to apply the template to material that contains sixteenth notes. If a template only has eighth-note resolution, but the material being conformed contains sixteenth notes, adjacent sixteenth notes will be mapped to the same eighth-note location.

Groove Extrapolation

Beat Detective's ability to extract tempo data from a wide range of material is enhanced by its powerful "groove extrapolation" logic. Groove extrapolation automatically generates beat triggers for inclusion in groove templates even if a peak transient is not detected. For example, a drum loop might not have a hit on beat 3, consequently no peak transient is detected and no beat trigger is generated. Beat Detective will extrapolate from other beat triggers in the selection and create a trigger for beat 3 in the groove template.

In addition, extrapolated triggers preserve the feel of triggers generated from detected peak transients. For example, if a bar of kick drum detected three beat triggers, all of which were 20 ticks ahead of the beat, any extrapolated beat triggers will also be mapped 20 ticks ahead of the beat.

Groove Quantize

In the Quantize window, you can apply Groove Quantize when a groove template is selected in the Quantize Grid pop-up menu. Groove quantize adjusts MIDI note locations and durations, Elastic Audio events, and audio regions according to a *groove template* rather than a strict quantization grid. Groove templates extract the particular rhythmic feel of a recorded audio or MIDI performance so that is can be applied to another MIDI sequence or audio selection. Digi- Groove templates can be generated using Beat Detective.

Quantize options with a groove template selected

Numerical Sound's Feel Injector Templates (960 ppq) are supported in Pro Tools, but DNA Groove Templates (192 ppq) are not.

Groove Templates

Groove templates (such as DigiGroove templates) are "quantization maps" derived from real musical performances. The rhythmic character of each performance is analyzed and stored as a groove template. Groove templates can be used to transfer the feel of a particular performance to MIDI notes (Timing, Duration, and Velocity), Elastic Audio events, and audio clips.

DigiGroove templates can be created using Beat Detective. Beat Detective analyzes an audio selection for transient peaks according to a defined threshold and maps the rhythmic relationships to a 960 parts per quarter note (ppq) template. Beat Detective can also analyze a MIDI selection for Note Ons and velocities to generate groove templates. This template can then be used with Groove Quantize, as well as with Beat Detective.

DigiGroove templates are also available from Digidesign and third-party manufacturers.

Numerical Sound's Feel Injector Templates (960 ppq) are supported in Pro Tools, but DNA Groove Templates (192 ppq) are not.

Quantize Grid

Quantize Grid Pop-Up Menu Determines which groove template to use for quantization. All groove template files in the Grooves folder are available in the Quantize Grid pop-up menu.

The directory path for the Grooves folder is: • On Windows:C:\ProgramFiles\

AVID\Pro Tools\Grooves

• On Mac: Applications/AVID/ Pro Tools/Grooves

If you organize your groove templates in sub-folders in the Groove folder, they appear as sub-menus in the pop-up menu. Once you have selected a groove template, specific information about the template's meter and duration (in bars) is displayed under the pop-up menu.

Show Comments The Comments field displays any comments saved with the groove template from Beat Detective. The Comments field can- not be edited in the Quantize page, but can be edited when saving a groove template from the Groove Quantize page.

Pre-Quantize Enable to hard quantize the selected MIDI notes to a sixteenth-note grid before applying Groove Quantize.

Options

Timing Enable to apply Groove Quantize to the selected MIDI notes, Elastic Audio events, or audio regions. Use the slider to change the amount of quantization applied to the selection. If the slider is set to 0%, there is no change in timing. A setting of 100% moves notes to the underlying template locations. If the slider is set to 200%, events move to a tick location that is twice the difference between the original event location and the position of the referenced tem- plate event.

For example, if an event was played at Bar 1|1|060 (a 16th note), and the corresponding template event is at 1|1|073, a slider value of 100% results in the event being shifted to 1|1|073 (a slider value of 200% shifts the note to 1|1|086).

The default value for the Timing slider is 100%.

Duration Enable to influence the durations of the selected MIDI notes. The Duration option does not apply to audio selections. At a setting of 100%, durations are changed to match the current groove template. Set to 200%, durations increase and decrease based on the ratio of the original duration of the selected notes and the durations in the template.

The default value for the Duration slider is 100%.

Beat Detective does not extract duration in- formation from audio performances. DigiGroove templates created using Beat Detective contain a fixed duration value that is 50% of the selected template

Duration Enable to influence the durations of the selected MIDI notes. The Duration option does not apply to audio selections. At a setting of 100%, durations are changed to match the current groove template. Set to 200%, durations increase and decrease based on the ratio of the original duration of the selected notes and the durations in the template.

The default value for the Duration slider is 100%.

Beat Detective does not extract duration in- formation from audio performances. DigiGroove templates created using Beat Detective contain a fixed duration value that is 50% of the selected template resolution (see "Defining a Beat Detective Selection" on page 552).

Velocity Enable to influence the velocities of the selected MIDI notes. The Velocity option does not apply to audio selections. If the slider is set to 0% there is no change to the selected velocities, a setting of 100% sets all velocities to match the current groove template. A velocity setting of 200% typically results in over-exaggerated velocities—loud notes increasing and soft notes decreasing in volume.

For example, if two adjacent notes have equal velocities of 80, and the two corresponding tem- plate velocities are 70 and 90, setting the slider to 200% changes the velocities to 60 and 100.

The default value for the Velocity slider is 100%.

Slider Settings

To Save the groove template with the current Options Slider Settings:

1 In the Quantize window, select Recall with Template if you want to restore all Groove Quantize Options to the settings that are saved with the current template

2 Click the Save button.

3 Enter or edit any comments you want to save with the template.

4 Do one of the following:

• Click the Save button to save the groove template with the current Options Slider Settings.

– or –

Click the Save As button to make a copy of the groove template with the current Options Slider Settings. In the resulting Save dialog, enter a name for the copy and click Save.

Slider settings can be lost if any of the following operations are performed without saving the settings first:

• Another Event Operations window is selected.

• The Event Operations window is closed.

• You switch to another groove template.

Applying Groove Templates

Groove templates can be of any length and can be applied to any number of bars. Typically, you will apply groove templates to selections of the same bar length and meter. However, groove templates can be applied to different meters— for example, a groove template in 6/8 can be applied to a selection in 4/4. Also, it is not necessary to start on the downbeat when making a selection to apply a groove template.

To apply Groove Quantize:

1 With the Grabber or Selector tool, select the MIDI notes, Elastic Audio events, or audio regions you want to Groove Quantize.

2 Choose Event > Event Operations > Quantize.

 3 Select a groove template from the Grid Quantize pop-up menu.

4 Enable Timing, Duration, and Velocity, and adjust their sliders to the percentages you want.

5 If desired, enable Pre-Quantize.

6 Click the Apply button.

Key:

RANDOM IDEAS

Random Ideas are a collection of beats. Some are individual grooves, while others are in groups of two, three or four ideas that go together. All can be developed even further by substituting one voice for another (for example: L.F./H.H. for B.D. or vice versa; T.T. for S.D.; C.B. for H.H.) and/or using the permutation concept.

#18 The R.H. plays quarter notes on cym. bell; the L.H. plays H.H. and S.D.