drumKAT

OWNERS MANUAL

Version 2.0

KAT

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INTRODUCTION

Hello. Welcome to the **drumKAT**. The **drumKAT** is a sophisticated musical instrument. It has a collection of features designed and developed for the needs of a drummer/percussionist.

The **drumKAT** can be as simple or as complex as you want. There are so many features that a beginner in the world of electronics and MIDI might at first be intimidated by the extent of the possibilities. **If you're a novice, don't lose heart! Since the tutorial was written with you in mind, it is worth the small amount of time it takes to read.**

Regardless of your MIDI knowledge level, you will find that it is very difficult to remember *all* the features in the **drumKAT**. That is entirely normal. All you should expect of yourself is to learn what you need to use *right now*. The features that you don't regularly use are difficult to remember--don't expect yourself to remember all that is in this manual. Just remember that when you want to start to do more advanced things with the **drumKAT**, the features you will need are waiting in there for you to discover and rediscover.

PRODUCT OVERVIEW

The **drumKAT** is a velocity sensitive MIDI controller with a layout that is comfortable for drummers. It is small enough to be mounted on most snare drum stands or onto a tom-tom stand using the optional **drumKAT** mounting bracket. The playing surface responds to a wide dynamic range and is very comfortable to play on. Since the 10 playing pads are physically adjacent to each other, they can be "zoned" in larger playing areas by simply copying the same characteristics into neighboring pads. The black light-gray color contrast allows you to see the pads easily even on a darkened stage. The nine independent trigger inputs have been given the same extensive control possibilities as the **drumKAT** pads. This allows you to physically spread out your playing area. These nine trigger inputs can be combined with the ten pads on the **drumKAT** itself for a total of nineteen independent playing surfaces .

There are four FOOTSWITCH inputs. One gets you in and out of the edit mode. A second footswitch advances you forward or backward through the kits that you programmed. The third footswitch is programmable in each kit (options include High Hat, Sustain, External Sequence Start/Stop, and Home Base). The fourth footswitch provides a variety of External Sequence controls, MIDI Clock controls, and Internal Motif controls. There are two MIDI IN jacks and two *pairs* of MIDI OUT jacks. This allows the **drumKAT** to be a powerful MIDI mapper. The **drumKAT** also comes with a removable power cord . You can easily select either 110v or 220v AC power. The **drumKAT** has built in surge protection. There is an easily accessible fuse on the back of the instrument and an on-off switch.

The **drumKAT** has a backlit display with four lines of sixteen characters per line. The four lines allow you to see a lot of information in an easy-to-read format . Even the viewing angle of the display is adjustable.

The software in the **drumKAT** allows you unbelievable control and potential. You can play from one to three totally independent notes per pad with delay times for each of the three notes. You can have notes sustained from 25 milliseconds to 6.4 seconds. You can have your playing dynamics control the pitch of the note sent out, or the gate time of the note as well as the velocity information sent out. You can also have your dynamics control which (or all) of three notes to be sent from each pad. There is a high hat mode combined with the use of one of the footswitches which provides you with realistic high hat play.

The **drumKAT** has 16 velocity curves (two of which are user programmable) which are used to correlate your playing dynamics to MIDI velocity information (as well as internal note shift, gate shift, etc.) .

As you step through the various kits in your **drumKAT**, you can instantly access the different features the **drumKAT** is capable of performing. With the **drumKAT**, you can control anything that has a MIDI input: synthesizers, drum machines, samplers, sequencers, transcription software on personal computers, and so on. You can connect the **drumKAT** up to an array of instruments and control them all simultaneously. By simply stepping into the next kit you not only can change which devices you are controlling, but you can also change the programs selected on the instruments as well.

The **drumKAT** was conceived to answer the drummers' need for a compact, responsive, and powerful means to control the vast MIDI potential available. It will enhance your possibilities and unleash your imagination so that your playing and creativity can reach a new level. Enjoy!

UNPACKING AND SHIPPING

When you receive your **drumKAT**, check to be sure you have the following:

1 **drumKAT**	1 **power cord**
1 **manual**	1 **Single Footswitch**

Optional:

> **Heavy duty drumKAT case**
> **Mounting bracket for tom tom or cymbal stands**
> **European power cord**
> **T-shirt**
> **Extra Single Footswitches**
> **Triple Footswitch**
> **Head Mount Triggers for Acoustic drums**
> **Shell Mount Triggers for Acoustic drums**

You also should find a warranty card. Please fill it out and send it in so we can keep track of you. If you ever have to ship the **drumKAT** back in for a repair or an update, use care and good judgment. It is best to save the original packing material to make shipping easy and safe. If you do not have the original packing material, box the **drumKAT** in tight with packing noodles, paper, etc. so that it is not flopping around in the box during shipping.
Shipping expenses and proper shipping are the responsibility of the consumer.

STANDS

The size of the **drumKAT** is big enough to play comfortably and small enough to be mounted on a snare drum stand. Using the optional **drumKAT mounting bracket**, the **drumKAT** can be mounted on any tom tom or cymbal stand with an extended multi-clamp adaptor. Where and how you mount the **drumKAT** is largely a matter of personal taste.

CASES

Again this is a matter of personal taste and needs. A specially made **drumKAT** case is available from **KAT**. (**Remember the life of your instrument will reflect the care that you give it. If you choose not to use a case in transit, the drumKAT could get damaged).**

BACK PANEL CONNECTIONS

POWER
The **drumKAT** comes supplied with a removable AC power cord to plug the **drumKAT** into a 110v outlet. An optional European power cord (for 220v operation) is also available. The **drumKAT** can operate under 110v or 220v power. Look at the back power module and verify your **drumKAT** is properly set for 110v operation (USA) or 220v operation (foreign). If you desire to change the voltage selection, refer to the **APPENDIX**.

After you have connected the power cable from the **drumKAT** to a clean power source, switch on the power switch on the back right of the instrument. If your instrument does not turn on refer to the troubleshooting section in the **APPENDIX** to check for fuse, etc.

FOOTSWITCHES
Personal taste again. Any momentary on-off type will work if you plug them in before turning the **drumKAT** on. (The "normally open" variety are slightly more reliable than the "normally closed"). A single and a triple footswitch are both available from KAT.

MIDI IN
The **drumKAT** has two MIDI IN jacks to receive MIDI information from another controller, a sequencer, or a computer. The **drumKAT** can merge and/or filter this information and send it to either (or both) of the pairs of MIDI OUT jacks.

The MIDI mapping and MIDI filtering abilities of the drumKAT allow you to interconnect a vast array of MIDI modules together and side step echoing problems and have complex controlled interactions of your equipment.

MIDI OUT

The drumKAT has two pairs of MIDI OUT jacks. This allows you to actually perform 32 channel MIDI if you want. Or you can map these two pairs of MIDI outputs to be four identical MIDI OUTs. These options allow you to chose how you would like to set up your equipment. The MIDI OUT can contain a merge of selected drumKAT information as well as selected MIDI IN information from either (or both) of the two MIDI INs .

CLICK OUT

The **drumKAT** also has a line level click output to provide tempo information when sequencing. This click out, as well as the internal beeper on the **drumKAT,** can be selectively enabled or disabled.

TRIGGER INPUTS

The **drumKAT** has nine trigger inputs. Each one of the nine trigger inputs are totally independent. On the **drumKAT** you "TRAIN" each of the trigger inputs for the type of trigger you have plugged into each trigger input. To "TRAIN" the triggers the **drumKAT** will ask you for a "soft" and a "hard" hit to define your playing dynamic range and to allow the **drumKAT** to memorize the decay envelope of your trigger for optimum trigger response. The trigger inputs each have independent gains, dynamic range settings, mask time, and threshold settings to allow you to connect a variety of triggering sources including foot triggers, trigger pads, or acoustic drum triggers (such as the **KAT** KDT-1 and KST-1). Each of the trigger inputs can perform the same powerful software control as the playing pads on the top surface of the **drumKAT.** When using the triggers, all of the playing pads on the **drumKAT** remain active.

CONNECTING TO MIDI

To have your drumKAT control another MIDI device, perform the following:

Connect a MIDI cable from one of the **drumKAT** MIDI OUTs to the MIDI IN of the device which you would like to control. On the device you are attempting to control make sure that it is selected to be on MIDI Channel 10. Most of the **drumKAT** factory kits are set up for MIDI Channel 10 because many of the current drummachines default to Channel 10.

When you power up the **drumKAT**, it will say:

```
* PLAY MODE ON *
   drumKAT v2.0
FOOTSWITCH 1 for
    editing
```

On the second line you see which version of software is currently installed in your drumKAT.

Then after 3 seconds that screen will change to:

```
* PLAY MODE ON *
k01:ROL R8 Rock
SONGMODE is OFF
clktempo=92.6bpm
```

Whenever you are in PLAY MODE you should be able to play on the **drumKAT** pads and MIDI information will be sent out to the MIDI devices to which you are connected.

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The second line tells you which "KIT"is selected. A KIT is a collection of MIDI settings for all your pads and triggers. The drumKAT holds 32 KITs. Each KIT has a user-defineable "KITNAME" that is associated with the KIT. In this case KIT 01 has the KITNAME of "ROL R8 Rock ".

The third line tells you that the "SONGMODE" (which allows you create your own chains of KITs) is OFF.

The fourth line tells you what your current "clock tempo" is. If you are playing an internal "MOTIF" in the drumKAT or controlling an external sequencer with the drumKAT this tempo is the speed of playback or recording in beats per minute.

For now make sure your receiving device is set for MIDI Channel 10. After you have done this you should be able to play on the drumKAT and have the device that you are connected into respond by playing its programmed sounds. If you don't hear anything, first make sure that your sound source is connected to an amplifier or headphones. Check to see that both the drumKAT and the sound source are on the same MIDI channel. Find out what MIDI notes you are sending,and what MIDI notes your sound source wants to see (especially in the case of a drum machine). Most of the drumKAT factory settings use Midi notes between 35 and 67. The MIDI device you are attempting to control may only respond to a limited range of MIDI notes. For example, some drum machines may have eight drum sounds and may only respond to eight specific MIDI note values. If this is the case, you will need to adjust the drumKAT settings to change the MIDI note numbers sent out by the drumKAT to correspond to the MIDI note numbers that the drum machine wants to see. To do this you will need to refer to the drum machine's manual and also learn how to edit the pad settings of your drumKAT (refer to editing section of drumKAT manual or see SESSION 2 on "MIDI In Note # AUTOLOAD").

EDITING TUTORIAL

This tutorial is divided into sequential short lessons that take you
through editing all of the drumKAT's internal settings. The easiest
way to understand your drumKAT is to follow every step of the
tutorial.
Follow through this tutorial exactly as it says--each individual
section builds on the ones before it--so take the time to go through
the whole bunch , in a couple of consecutive, separate sittings if you
like.

You should also be aware that a **drumKAT Video-Manual** is now
available to make it even easier to use the power of your drumKAT.
See your dealer for details.

The rest of this page summarizes what the TUTORIAL will explain in
depth in the following SESSIONS. Once you understand these 3 uses of
your pads you will be able to easily find your way around the
drumKAT and start really utilizing its power.
The playing pads on the **drumKAT** have 3 main uses depending on what
mode the **drumKAT** is in.
   (1) In "PLAY MODE" the pads all play MIDI information as specified
   in the "KIT" you are currently using.
   (2) In "PRE-EDIT MODE" (if you press FOOTSWITCH 1 down and
   release you enter "PRE-EDIT MODE") the pads are used to select
   which group of SCREENS you want to look at or edit.
   (3) As soon as you have selected a set of SCREENS you enter the
   "EDIT MODE" in the selected set of SCREENS. Now the pads
   perform the editing functions (printed on the labels on the pads):

                    Pad 1 = SCREEN ADVANCE
                    Pad 2 = CURSOR ADVANCE
                    Pad 3 = REVERSE
                    Pad 4 = SOUND ADVANCE
                    Pad 5 = HEAR SOUND
                    Pad 6 = VALUE ADVANCE
                    Pad 7 = SAVE
                    Pad 8 = DEFAULT
                    Pad 9 = DUPLICATE
                    Pad 0 = RECALL

SESSION1:

What you will learn in this first tutorial is (1) **How to select a set of EDIT SCREENS** including the **numbering scheme** for the 10 pads, (2) How to perform the basic editing functions of **CURSOR ADV**ance, **REVERSE, VALUE ADV**ance, and **SCREEN ADV**ance, and (3) the **KIT EDIT shortcut** to quickly get at your pad settings.

REVERSE SCREEN ADV CURSOR ADV VALUE ADV
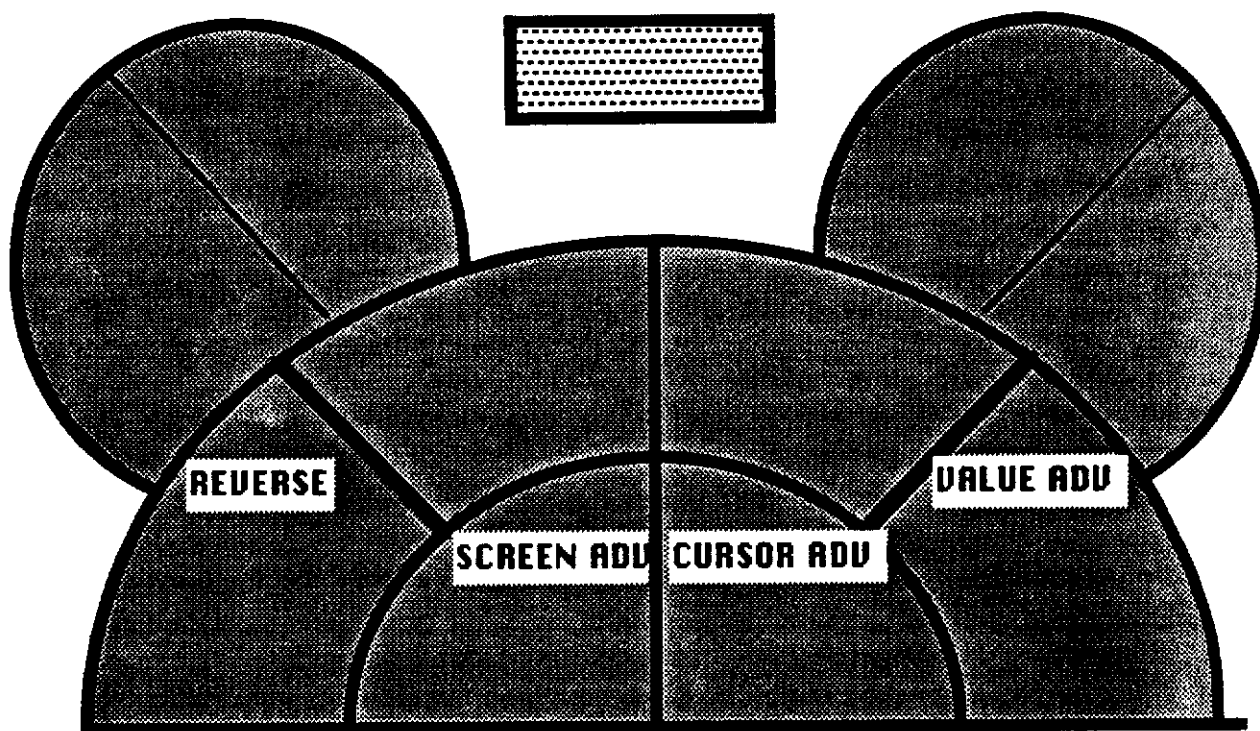
HOW TO SELECT A SET OF EDIT SCREENS

If you do not already have a FOOTSWITCH for your **drumKAT**, stop everything and go get one. You need a FOOTSWITCH with a **drumKAT** to get into the EDIT MODE and you also need a FOOTSWITCH to advance through your kits. There are four footswitch inputs in the back each with its own useful function. The most useful setup is one single footswitch and one triple footswitch.

Plug a FOOTSWITCH into FOOTSWITCH number 1. This FOOTSWITCH will get you back and forth between the PLAY MODE and the EDIT MODE. When you are in the PLAY MODE all the pads will play MIDI notes as

defined in the kits that you can create. In the EDIT MODE the pads do editing functions as detailed in this tutorial and as indicated by the stickers that come with your **drumKAT**.

If you have not already done so, connect a MIDI cable from any of the four MIDI outs in the back of the **drumKAT** and connect the other end of the cable into the MIDI in on whatever device you intend to control with the **drumKAT**. Also plug a power cord in the back of the drumKAT. Plug that into a wall socket and turn the power on the **drumKAT** on. The last remaining thing you need to do to get yourself set up is to make sure the device you are trying to control is set on MIDI Channel 10. Most of the factory kits that are supplied in your **drumKAT** are set up on MIDI Channel 10 to make it easier for you to get up and running quickly.

When your **drumKAT** turns on it will display a message that tells you that you can press FOOTSWITCH 1 to get into EDIT MODE. Do that now. You will then see three screens, called the "PRE-EDIT SCREENS" alternating as shown below.

```
SELECT EDIT TYPE
BY HITTING A PAD
   all pads are
assigned numbers
```

Then the screen will change to:

```
 78              90
    4         5
3    1    2       6
    PAD  LAYOUT
```

Then the screen will change to say:

```
1=GLOBAL2=KITEDT
3=NTEOFF4=DEFALT
5=COPY   6=RECORD
7=PADS   8=TRIGRS
```

These **PRE-EDIT** screens are indicating that you can choose what type of screens to edit by hitting one of the ten pads on your **drumKAT.** It is important for you to learn the numbers that correspond to the individual pads on your **drumKAT.** One of the three screens shows you these numbers which is also shown in the figure below:
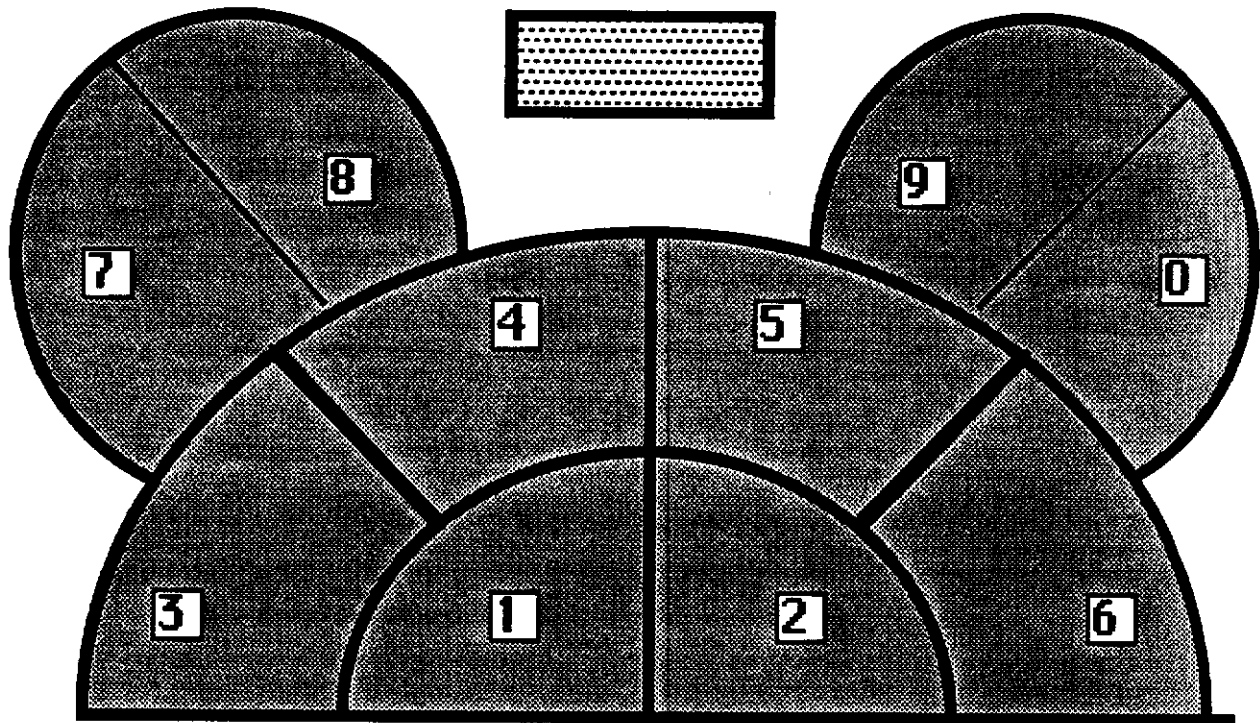
drumKAT PAD NUMBERING SCHEME

At this time hit a pad, any pad, just once, and the screen will stop and tell you which number of pad you have hit and what types of screens you can get into through that pad.

Hit another pad once and you will find out what number that pad is. If you hit any pad twice you will get into that set of screens. If you do that, at this time, hit the FOOTSWITCH again to get back into PLAY MODE. Then hit the FOOTSWITCH one more time to get back into EDIT MODE and spend your time right now making sure you understand the numbering scheme on the pads.

After you have familiarized yourself with the numbering scheme of the ten **drumKAT** pads and selecting sets of Screens, we will learn the four most basic editing functions you will need to know. The rest we will explain later.

To minimize confusion hit FOOTSWITCH 1 until you get back into PLAY MODE. Then hit FOOTSWITCH 1 again to get back into the **PRE-EDIT** screens. Now hit **pad 1**. The screen should say:

```
#1 = GLOBAL EDIT
to confirm type
hit pad #1 again
FOOTSW1 TO EXIT
```

Confirm that you want to look at the GLOBAL SCREENS by hitting pad 1 again. Now you should see a screen like this:

```
permanent memory
  IS PROTECTED
prgrm chg receiv
 DISABLE ch:01
```

CURSOR ADVANCE, REVERSE, VALUE ADVANCE, SCREEN ADVANCE

Notice part of the screen is blinking ("IS PROTECTED") This is called the **cursor**. Pad number **2 (CURSOR ADV)** will move the **cursor** . Hit pad **2**. Notice the DISABLE should be blinking now. Hit pad **2** again. Now the Channel number should be blinking. Hit pad **2** again and IS PROTECTED is blinking. The **cursor** will move forward when you hit pad **2**. If you now hit pad **3 (REVERSE)** nothing happens. But now if you hit the **cursor** pad (pad **2**) the **cursor** will move backward through the screen. If you hit the **reverse** pad again, the **cursor** will move forward again.

It is important to note that on the **drumKAT** screens there is a **convention** relating to "UPPER CASE" (Capital letters) and "LOWER CASE" letters. Generally, the UPPER CASE letters are used where there is a setting you **can change** and LOWER CASE letters are used

where there is information that is fixed on the screen and **can not be changed**.

Use the **cursor** or **reverse** pad to get the Channel number blinking. Pad number **6 (VALUE ADV)** will change the **value** where the cursor is. Hit pad number 6 now and you will notice that the Channel **value** changes. Every strike will cause the Channel value to **increment** by one. If you do a fast buzz roll, the Channel numbers will change quickly. Also notice that if you *press down* on pad 6 the numbers will automatically change. If you press *lightly*, they will change *slowly*. If you press *heavily*, they will change *quickly*. The **reverse** pad works here as well. Hit pad **3**, nothing happens. But now if you hit pad **6**, every strike of pad **6** will cause the channel value to **decrement** by one. If you hit the **reverse** pad again, you will return to **incrementing** the value.

The fourth basic editing function you need to learn is how to move to the next screen. Pad **1 (SCREEN ADVANCE)** does that. Hit pad **1** now and step through the Global screens and this will give you an idea of what is in those screens.

The **reverse** pad works here as well. Hit pad **3** and nothing happens. But now if you hit pad **1** you will go *backward* through the screens. Hit pad **3** again (the **reverse** pad) and nothing happens. But now if you hit pad **1** you will again start moving *forward* through the screens.

To summarize what you just learned:

PAD 1 or **SCREEN ADVANCE** moves you through the screens.

PAD 2 or **CURSOR ADVANCE** moves the cursor around on the current screen you are on.

PAD 3 or **REVERSE** reverses the direction of any of these three actions.

PAD 6 or **VALUE ADVANCE** changes the value where the cursor is.

KIT EDIT SHORTCUT

Now let's take a quick look at the **KIT EDIT screens**. Press FOOTSWITCH 1 again to get back to the PLAY MODE (**if you are ever lost hit FOOTSWITCH 1 to get back to PLAY MODE**). Now hit FOOTSWITCH 1 again to get back to the **PRE-EDIT** screens that asks you to choose what kind of editing screens you want . This time hit pad 2 and you should see:

```
#2 =  KIT EDIT
to confirm type
hit pad #2 again
FOOTSW1 TO EXIT
```

Hit pad 2 again to confirm you want to look at the KIT EDIT screen. You are now in the KIT EDIT screens.

We will explain these screens in the next tutorial. Suffice it to say for now that these screens tell you what type of action the pads on your **drumKAT** are defined to do. In KIT 1 most of your pads are in the simple mode. At this time hit pad **1 (SCREEN ADV)** and just walk through the screens that are in the KIT EDIT screens. Go forward and backward and feel free to move the cursor, but until you understand more it is best **not** to change any of the values with the value advance pad (don't hit pad 6.) You will notice in these screens what the pads do is defined, program change and volumes assigned to each kit are contained as well as other functions. Now get back to the PLAY MODE by hitting FOOTSWITCH 1 and next we will show you a **short cut to immediately get into KIT EDIT** and edit the parameters **of any particular pad or trigger.**

First, get to PLAY MODE. Now press down on FOOTSWITCH 1 and **keep it pressed down.** While you are pressing down on FOOTSWITCH 1, hit any pad on the drumKAT. Now let up on the FOOTSWITCH. You will notice you have one of the Kit Edit screens and the pad on the top line will correlate to the pad you just hit. Press FOOTSWITCH 1 again and hit some other pad and then release FOOTSWITCH 1. You will notice that you see the parameters of that pad. This is the way you can get to any pad (or trigger) to edit what MIDI control it performs. If you hit FOOTSWITCH 1 again, you will return to PLAY MODE. Do that.

As practice, press FOOTSWITCH 1 again in PLAY MODE. Hold it down and hit pad 1. Then release pad 1. You will see the screen:

```
k01    PAD1 SIMPL
ch10 note E1= 40
vel 08-127 crv01
gate time 0.000s
```

Hit FOOTSWITCH 1 again and you will return to PLAY MODE.

Most of the editing you will be doing with the drumKAT will be editing what the individual pads and triggers do. You can easily get at the screens for these pads and triggers by pressing down on FOOTSWITCH 1 and then hitting the pad or trigger that you want to

see and edit. This **short cut** side steps the **PRE-EDIT** screens and immediately sends you to the Kit Edit Screen for the pad that you have hit. This **short cut** is provided to make it easy to do the editing that you will do most often--KIT EDITING . **This shortcut can be done from anywhere in the drumKAT: regardless of what type of screens you are in.**

What you will learn in this second tutorial is (1) **KITNAME SCREEN**, (2) **Kit Overview Screen**, (3) **MIDI Channels**, (4) **MIDI NOTES**, (including using the **HEAR SOUND** pad, and **MIDI IN NOTE # AUTOLOAD**), (5) **Velocities: Minimum and Maximum**, and **Velocity Curves**, (6) **Gate Time**, (7) Using the **SOUND ADVANCE** pad.
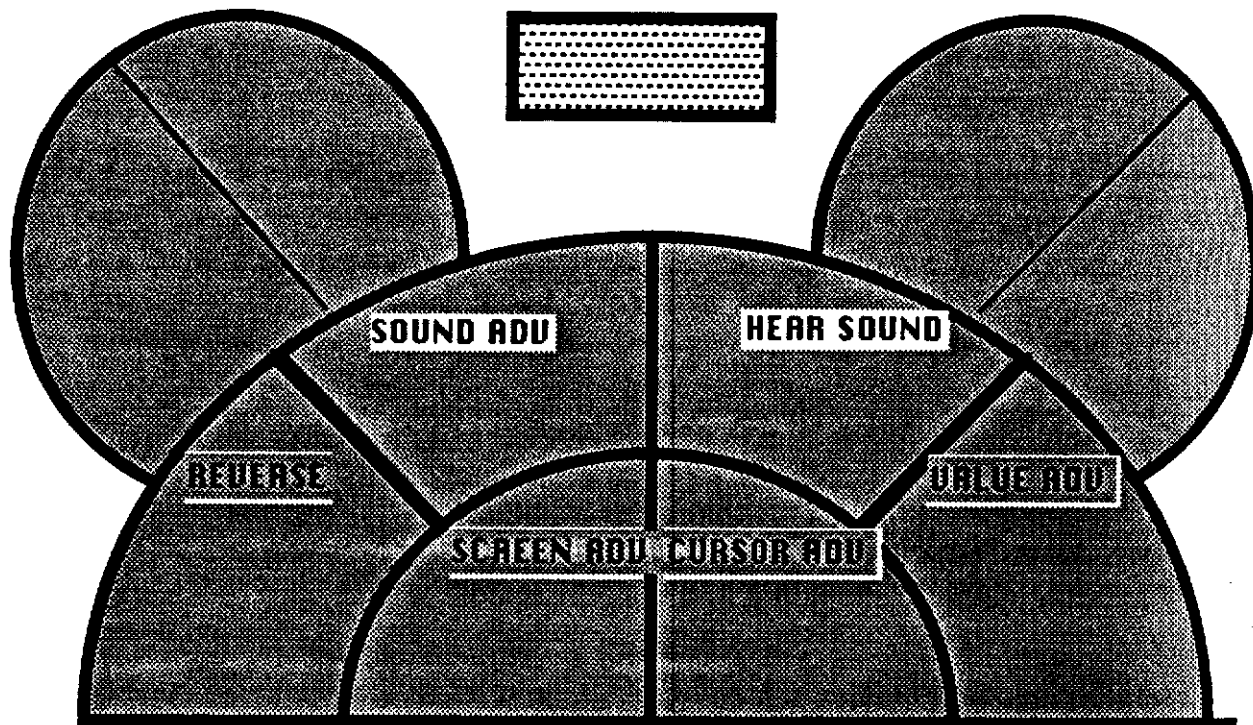
Enter the PRE-EDIT Screens by pressing down on FOOTSWITCH 1 and releasing. Hit pad 2 to see screen:

KITNAME SCREEN

```
#2 =   KIT EDIT
to confirm type
hit pad #2 again
FOOTSW1 TO EXIT
```

Hit pad 2 again to confirm. Now you will see the screen:

```
rename kit name

k01:ROL R8 Rock
```

The first screen of the Kit Edit Screens (the **KitName** **screen**)
allows you to create a 12 character name for each kit. Move the
cursor (pad **2**, remember?) to one of the letters in the KitName. Then
use **value advance** (pad **6**, remember?) to change the character.
Pretty simple, huh? The character choices include upper case letters,
lower case letters, numerals, and some punctuation. Now do a **screen
advance** (pad **1**!) to see the second Kit Edit screen:

KIT OVERVIEW SCREEN

```
k01  P1234567890
simpl ******██**
cmplx █████████HH██
cntrl ████████████
```

This second screen of the KIT EDIT screens (the **Kit Overview
screen**) shows you which pad (or pads) have been assigned which
modes. Each pad can either be in the simple mode (where the pad
plays one single midi note), or the complex mode (where a pad may
play more than one MIDI note or the dynamics may change pitch, gate

time or which note is sent out),or in the MIDI control mode where a pad can perform control functions such as Tap Tempo, play MOTIFs, do Pitchbend, etc. This screen allows you to see the type of settings for all the pads in a Kit quickly. **Note**: the "P" on the top line can be value advanced to a "T" so that you can quickly get an **overview** of the **trigger settings** as well!

To examine the specific settings for a specific pad, hit pad 1 to do a screen advance to the next screen.

The screen you should see should be as follows:

```
k01    PAD1 SIMPL
ch10 note E1= 40
vel 08-127 crv01
gate time 0.000s
```

This is the screen that you can take the KitEdit shortcut to. When you do the KitEdit shortcut you skip over the first two KitEdit screens. Of course you can see the first two screens by simply hitting the reverse pad and then screen advance (in reverse).

First hit pad **2** to move the **cursor** to see what all can be changed on this screen. You can change the kit number you are working on, which pad, what mode the pad is in, what MIDI Channel the notes will go to, what MIDI Note value will be sent, the Minimum Velocity, the Maximum Velocity, which Velocity Curve is used, and what the Gate Time is. We will now discuss the specifics of each of these parameters.

The top line of this screen has the **kit number** you are in-- $K01$, for example would be kit 1. If you change this number you will see the setting for the specific pad you are looking at in each of the various kits. Go ahead and change this kit value number by first getting the kit value number blinking, by moving the **cursor** with pad 2. Once you get this value blinking, change the **value** by hitting pad 6, the far right hand pad and advance it to kit 2. In different kits you may notice different settings for this pad. Also notice that you can go backward through the kits by first hitting the **reverse** pad (pad 3) then hitting pad **6** to **decrement** the number.

Now advance the **cursor** so that "**PAD 1**" is blinking. Hit pad **6** to change that to "**PAD 2**" and you will notice that now you see the pad 2 settings. Advance through the various pads with pad **6** so you can see what settings they have. If you continue advancing you will notice that you see the trigger settings also.

MIDI CHANNELS

Now make sure you are back to kit 01, pad 1 by using the **cursor** advance pad (pad **2**) and the **value** advance pad (pad **6**). Advance the **cursor** to the "**SIMPLe**" setting. For now, don't change that value, but be aware that you can change simple to any of the other modes. In this tutorial we are just going to deal with the simple mode; so now advance the **cursor** past simple to the **MIDI Channel** value. Press down on pad **6** *lightly* and you will see the value increment *slowly*. Press *hard* and you will see the values increment *rapidly*. If you stop and hit pad **3**, then pad **6** again, the values will **reverse** in a **decrement** fashion. **MIDI Channels** are one of the most important concepts in MIDI. Basically MIDI information can be sent to any of 16 **Channels**. If you want your synth to respond to the **drumKAT**, the **Channel** it is set on must be the same as the **Channel** as the **drumKAT** is sending on! Each pad (or trigger) on the **drumKAT** can send on any **Channel**, independent of the other pads.

MIDI NOTE NUMBERS

Now advance the cursor to the **MIDI Note** number. This value is shown in two formats: note and octave number. Different manufactures use

one or the other, so we use both to reduce confusion. If you are using a drum machine, this is the important value (along with **Channel**) to adjust. If you want to hear the different notes out of your tone generator or drum machine without returning to PLAY MODE, pad **5** (**HEAR SOUND**) will do this for you. When you are in KIT EDIT, pad **5** will always **play the sound** of the current pad or trigger **that you see** on the screen. Try hitting pad **5** now to verify this. Change the **MIDI Note** number and hit pad **5** again to see the effect of different **MIDI Note** numbers. IF you want a note to not sound at all, you can advance the note number past 127 to "**OFF**". (Believe it or not, this will actually be useful in the complex modes!)

There is a convenient way to match the **MIDI NOTE #** on your **drumKAT** to the buttons on your drummachine (or the keys on your synth for that matter) called "**MIDI IN NOTE # AUTOLOAD**". To use this feature, connect a MIDI cable from the *MIDI OUT* of your *drummachine* to either *MIDI IN* on your *drumKAT*. Next, position the **cursor** on your **drumKAT** KitEdit screen on the **NOTE #**. Now simply press the button on your drummachine corresponding to the sound you desire. If you have made the proper connections, the **MIDI NOTE #** on the **drumKAT** will visibly change to correspond to the **MIDI NOTE #** of the sound you selected on your drummachine!

VELOCITIES

The third line has the settings for **Minimum Velocity, Maximum Velocity,** and **Velocity Curve.** The **APPENDIX** contains a lengthy discussion of velocity, but simply put: **Minimum Velocity** is generally a measure (out of 0 to 127) of how *loud* your *softest hits* should sound. **Maximum Velocity** is a measure of how *loud* your *hardest hits* should sound. **Velocity Curves** are a correlation of *as you hit harder, how fast the sound gets louder.*

A **Minimum Velocity** to **Maximum Velocity** of 08-127 gives you maximum dynamics. However there are a lot of instances where other ranges are more appropriate. Often a velocity of 08 will be barely audible. In live situations where you need to cut through to be heard, your minimum should be raised to 32 or more. Also some synths do not respond well to velocities above 100, so sometimes you will want to limit your maximum to less than 127. It is all a matter of personal taste and the particular situation you are in.

The best way to get an understanding of **Velocity Curves** is to get a responsive sound, use min to max of 08-127 and play soft to loud using different curves. You will find some of the curves are **reverse Curves!.** This allows you to do cross fading and other interesting effects. **Velocity Curves** are documented in the **APPENDIX.** For playing the **drumKAT** playing pads **curve 01** is a nice "linear" curve. For trigger inputs from **piezo trigger** pads **Curves 8 or 9** are best.

One last comment on velocity. Not all patches or presets in tone generators respond to velocity information. Some just play with a fixed volume regardless of the velocity sent to it. So don't assume that something is broken if all of your sounds are not dynamic!

GATE TIME

The last line contains the **Gate Time** setting. Generally this is a measure of how long the note should sustain from .025 seconds (25 milliseconds) to 6.325 seconds. After the **drumKAT** sends a "note on" command, the **drumKAT** will wait this length of time before sending a "note off" command. For synths, tone generators and samplers this is an important setting (especially for string or horn sounds with a gradual buildup). For a lot of drum machines, this setting has no effect. When a **Gate Time** has no effect, it should be set to 0.000 or "NO OFFs".

You can "manually" control **individual Sound sustain** by continuing
to **hold down** on the pad. If you are going to do this you should raise
the Minimum Velocity of the pad up because dynamics on the pads are
measured in the first 2 milli-seconds of your contact with the pad. On
a staccato hit this is fine. However, if you are trying to press down on
the pad in a "sustaining way" your *push* has not amounted to much
(compared to a strike) in the first 2 mS.
You can also determine the length of time a note is sustained with
FOOTSWITCH 3 in the **SUSTAIN** setting.

SOUND ADVANCE

The last feature in this session is pad **4 (SOUND ADVANCE)**. In KIT
EDIT, you can advance from pad setting to another pad by putting the
cursor on the pad number and advancing the value. A **shortcut** (to
avoid constantly moving the cursor back and forth) is simply to hit
pad **4** to advance the pad number. If you hit pad **3** and then hit pad **4**,
you will go **backwards** through the pads. You will find that the
SOUND ADVANCE pad will make your editing much more efficient by
allowing you keep your cursor on the particular value you want to edit
for each of your pads.

There is one **potentially confusing exception** to how the **SOUND
ADVANCE** pad works! If you are in the pad definition for a "COMPLEX"
pad with more than one SOUND assigned to that pad (such as MUL, ALT,
VSH, or H(igh hat)) the **SOUND ADVANCE** will rotate through the 3
SOUNDS associated with that pad. To get out of that pad simply do
the KitEdit **shortcut** to get to the next pad. This is setup this way
because generally when you are editing the SOUNDs of a "COMPLEX" pad
repetitive changes of the three sounds are required to get the
combination just right.
There are several other screens where the **SOUND ADVANCE** pad
helps make Editing easier. Check the **INDEX** for these.

First, let us **summarize** what you learned from sessions 1 and 2:
Footswitch1 switches you back and forth from **PLAY to EDIT
MODE**. When you get into the edit mode, you can choose from a variety
of screens such as global screens, kit edit screens, and copy screens.
You are also shown a **KitEdit shortcut** which immediately gets you
to bypass screens and gets you to the pad that you want to edit. The
shortcut is to press FOOTSWITCH 1 down and while you are still
holding it down, hit the pad or trigger you want to edit and then
release the FOOTSWITCH. When you are done editing that pad, simply
press FOOTSWITCH 1 again to return to PLAY MODE.

You learned the 6 basic editing functions of **SCREEN ADV, CURSOR
ADV, REVERSE, SOUND ADV, HEAR SOUND** and **VALUE ADV.** You
also learned the characteristics of SIMPLE MODE notes.

In this tutorial, you will learn (1) How to use the **SAVE PAD** to
SAVE an edited **Kit**, (2) How to **advance** to other **Kits**, and (3) How
to use the **DUPLICATE PAD**.
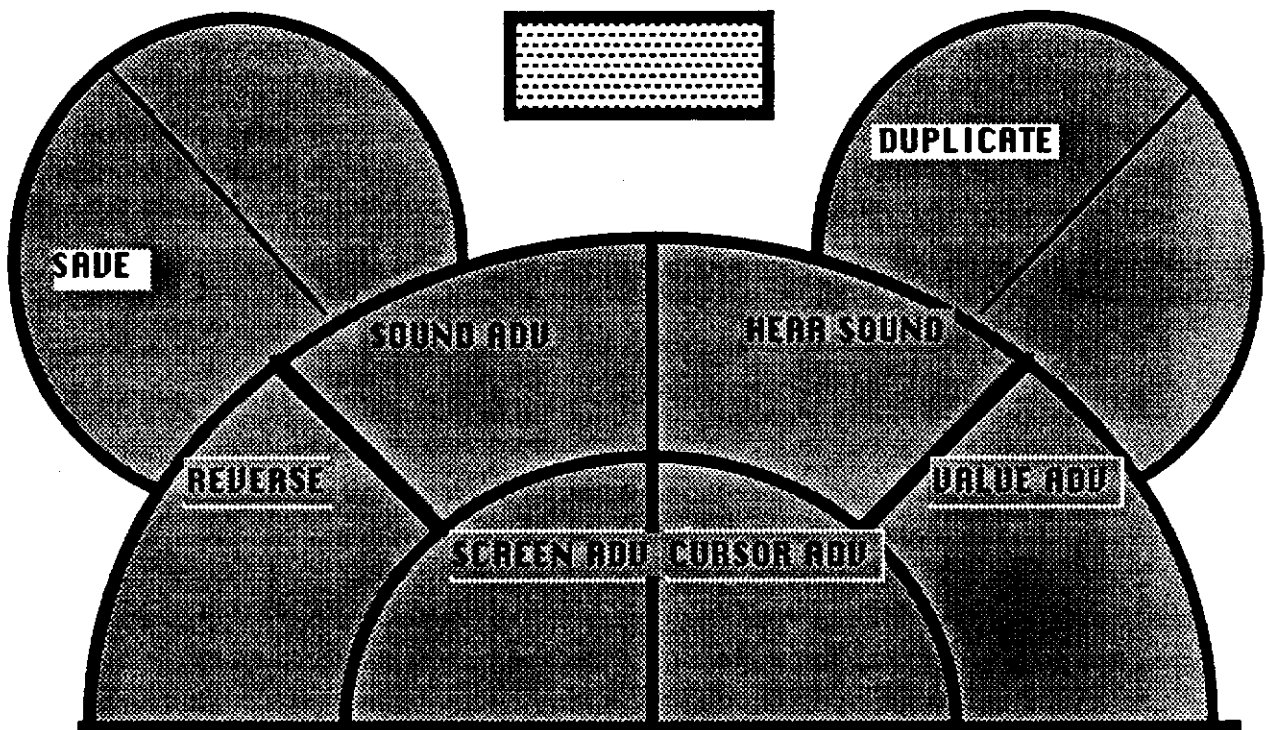
SAVE

Press FOOTSWITCH 1 and while you are holding it down, hit pad 1,
(then release FOOTSWITCH 1). You should see this screen:

```
k01   PAD1 SIMPL
ch10 note E1= 40
vel 08-127 crv01
gate time 0.000s
```

At this time hit pad 7, which is the left half of the left hand "ear",
the "SAVE" pad. The screen will say:

```
can't save until
permanent memory
"can be changed"
(do ScreenAdv)
```

This is to indicate to you that you **cannot save** this kit because your
permanent memory is protected.

Every time you turn the **drumKAT** on, it will start out with
permanent memory *protected*. This is so you will not inadvertently
change your kits or that someone else will not inadvertently change
your kits when you are off stage between sets. Pad 7 is the pad to
save a kit. Before you are able to do this, you need to **enable** the
permanent memory to be **changed.** To do this you have two
choices: 1) Get to the global screens and change this selection, or 2)
Do this within the KitEdit screens. The 2nd choice is actually easier
but it is a recent addition to the **drumKAT** so you **drumKAT** old-
timers will probably continue to do it the first way out of habit.

First, method #1:

To get to the GLOBAL SCREENS, first press
FOOTSWITCH 1 to get back to the PLAY MODE.
Now press FOOTSWITCH 1 again and let up to get
to the **PRE-EDIT** screens. You want to get to
the GLOBAL SCREENS, so hit pad 1 now.   You
should see the screen :

```
#1 = GLOBAL EDIT
to confirm type
hit pad #1 again
FOOTSW1 TO EXIT
```

Hit pad 1 again to confirm you want to get into
the GLOBAL SCREEN. Now you will see the
screen:

```
permanent memory
   IS PROTECTED
prgrm chg receiv
   DISABLE ch:01
```

 Hit pad 6 to change the value to PERMANENT
MEMORY *"CAN BE CHANGED"*. Now press down on
FOOTSWITCH 1 and while you are keeping it
pressed down, hit pad 1 again. Now you are back
at the screen:

```
k01    PAD1 SIMPL
ch10 note E1= 40
vel 08-127 crv01
gate time 0.000s
```

Now proceed down to after method #2.

Now method #2:

If you are in the KitEdit screens and need to change to permanent memory *"CAN BE CHANGED"*, you can do this without leaving the KitEdit screens. Do several Screen Advances (5 advances if you are at the pad definition screen) until you see the screen:

```
permanent memory
  "IS PROTECTED"
```

Now hit pad 6 to change to *"CAN BE CHANGED"*. Now do a reverse (pad 3) and then 5 screen advances (backwards) and you are back at the Kit pad definition screen.

- -

Now hit pad 7 to save (as if we have done some editing) . After a short instant the screen will say:

```
TO VERIFY THAT
YOU WANT TO SAVE
   TO KIT 01
HIT PAD#7 AGAIN
```

Notice that the Kit # is blinking. You can choose to **SAVE** this edited version of KIT 01 into any kit you choose by hitting pads 6 and 3 as usual to change the number, followed by hitting pad 7 again. If you

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change your mind and decide that you *don't* want to **save** the edited kit, simply hit pads 1,2 4, or 5 or footswitch 1.

If you do hit pad 7 a second time the screen will say:

```
KIT 01 SAVED TO
PERMANENT MEMORY
```

This is to verify that you have **saved** this kit to permanent memory.

To **summarize**: to save a kit when you are in the KIT EDIT screen, **hit pad 7 twice**. If you have not enabled permanent memory to be changed, you must get to the permanent memory function. You have two choices of how to do this as detailed above. Once you have enabled permanent memory to **"CAN BE CHANGED"**, hit pad 7 twice and you will **save a kit**.

KIT ADVANCE

Now that you know how to save a kit, you will need to know how to **advance from one kit to another**. You have two ways to do this. One way is through the KIT EDIT mode. Move the cursor to the kit number in the upper left hand corner and hit pad 6 to change the kit value. Then hit FOOTSWITCH 1 to return to play mode, you will now be in a different kit.

However, this is not the **quickest** way to do this. **FOOTSWITCH 2** has been assigned to advance you through your kits (as well as a variety of other related functions). If you plug a FOOTSWITCH into FOOTSWITCH 2 and press the FOOTSWITCH down and let up, you will notice the kit number will increment to the next value. It will do this whether you are in KIT EDIT or in PLAY MODE. During performance this is the method to advance from one kit to another.

Often you will want to **back up to the previous kit** (for example, if you accidently hit FOOTSWITCH 2 twice) . To do this is simple. Press FOOTSWITCH 2 down. *While you are still holding it down*, hit pad **3** (the reverse pad) and notice that the **kit # decrements**. While you are pressing FOOTSWITCH 2 down, every hit of pad **3** will cause the kit to back up. Every time you press FOOTSWITCH 2 down without hitting pad **3**, then letting it up, you will advance kits forward. If you press FOOTSWITCH 2 down, and *while holding it down*, hit pad **6**, you can also do a series of quick Kit advances. Try this now.
Footswitch 2 *also* allows you to step through **SONGS** that you can make from your existing kits. That will be covered later with a variety of other functions that FOOTSWITCH 2 will do when other pads are hit while FOOTSWITCH 2 is *held down*.

DUPLICATE

Pad 9, the **DUPLICATE** pad allows you to **duplicate** a parameter to all the rest of the pads in this kit. To see this in action, hold FOOTSWITCH 1 down and hit pad 1 to see pad 1 parameters in KIT EDIT. Advance the cursor to the Channel #. Change it to Channel 08. Hit the SOUND ADVANCE to verify that all the other pads are still on Channel 10. Continue hitting SOUND ADVANCE until you are seeing PAD 1 parameters again. You can **duplicate** this channel value of 08 to all the other pads by hitting pad **9**. The screen will say:

```
ARE YOU SURE?
TO DUPLICATE IN
ALL PADS OF KIT
HIT PAD9 AGAIN
```

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Hit pad **9** again and the screen will say:

```
VALUE HAS BEEN
DUPLICATED IN
ALL PADS OF
THIS KIT
```

Hit the SOUND ADVANCE to verify that all the pads are now on MIDI Channel 08. You have just **DUPLICATED** this parameter to all of the pads in this Kit! Change the value of pad 1 channel back to 10 and then hit pad **9** twice again and all the pads will be back on channel 10!

Duplicate works for MIDI Channel, Note #, Minimum Velocity, Maximum Velocity, Velocity Curve, and Gate Time. If you are Editing the MIDI settings of a **TRIGGER** then pad 9 can **DUPLICATE** these settings to the rest of the **TRIGGERS** in your Kit!

Now you have learned the functions of pads 1, 2, 3, 4, 5, 6, 7 and 9 in the edit mode. It wasn't that painful, was it?

In this tutorial, we will actually **do an edit** of kit 1 and change to a different kit without saving our edit and find out how to get what we have done back, with the **RECALL PAD** (pad **10** or **0**), in the edit mode. We are going to change what pad 1 is assigned to do in kit 1. Then move to kit 2 without saving it. Then get our change back and save it.

We will also look at the **DEFAULT SCREENS** and see how to use the last edit pad, the **DEFAULT PAD** (pad 8).

Then we will examine the **remaining KitEdit screens**.
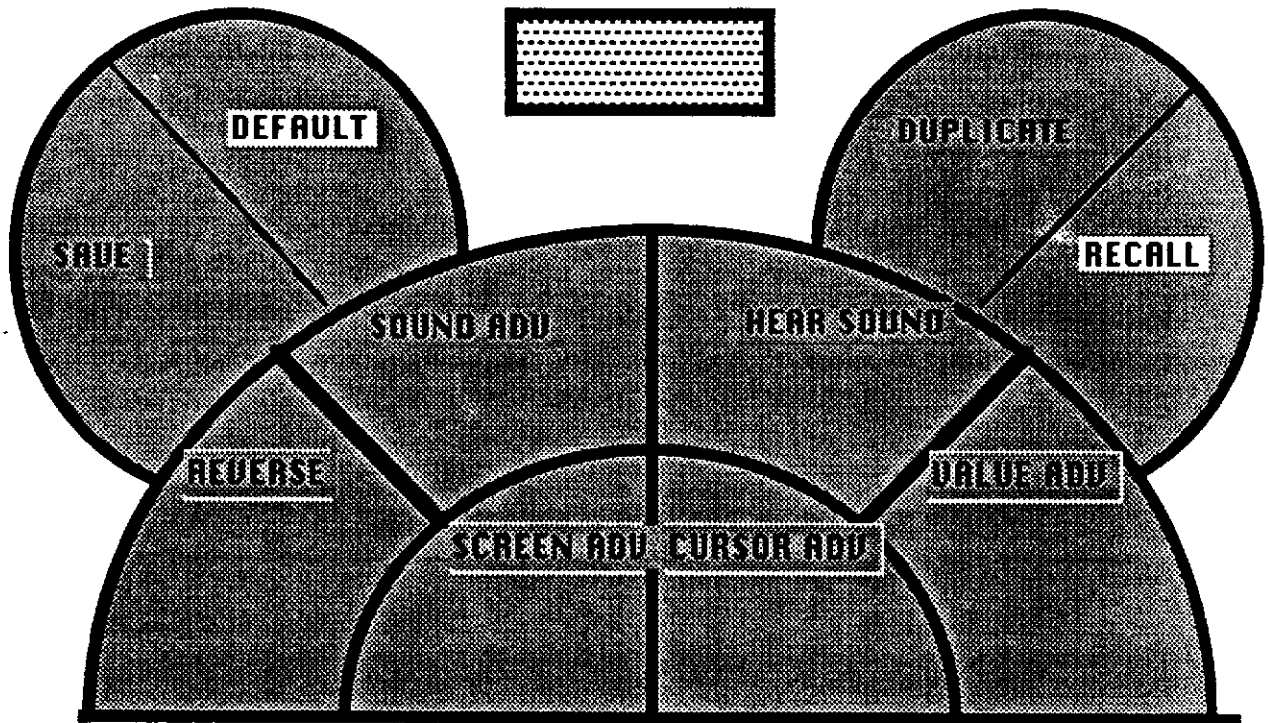
RECALL

Press down on FOOTSWITCH 1. While holding it down, hit pad 1 (KitEdit shortcut). If you are not at Kit 1 (upper left hand corner) move the cursor there and change the value with pad 6 to k01. Now use the cursor pad (pad 2) to move to the Note value on line 2. Hit pad 5 to hear that sound. If you hear nothing, it may be that your drum machine does not respond to that Note. Change the value of that Note with pad 6 and hit pad 5 to see if that gets a sound on your drum

machine or synthesizer, etc. If it does not, change the value of that Note until it does. Remember, if you need to go backward, you can use the reverse pad. Try each MIDI note number until some other new note number gives you a new sound for pad 1 that you can tell is different from the sound you had there previously. When you have a *new* MIDI note number that gives you a different sound, press FOOTSWITCH 1 again to return back to the PLAY MODE.

Now, if you hit pad 1, it now plays the *new* note that you selected. Press FOOTSWITCH 1 again to enter the EDIT MODE. While holding it down, hit PAD1 so you will be editing pad 1. Move the cursor to the Kit number in the upper left. You may find it easier to use the reverse pad first. Once you have the cursor to the Kit number, change the Kit number to kit 2. Now hit FOOTSWITCH 1 again to go back to the PLAY MODE. What you will hear now is the setting for pad 1 in Kit 2.

Now we will go back to Kit 1. Press down FOOTSWITCH 1. While holding it down, hit pad 1 and you should see the settings for pad 1 in Kit 2.

Get the Kit number blinking and using the reverse pad and the value advance pad (pads 3 and 6) move back to Kit 1. Notice that the MIDI Note number on the second line has returned back to what it was *before* you changed it. Press FOOTSWITCH 1 to return to PLAY MODE and hit pad 1. You should notice it has returned to the sound it was making before you changed it. When you went from Kit 1 to Kit 2 without saving the edit you did on Kit 1, the **edit was lost**. However, it was not necessarily lost permanently. Any time you edit a Kit, that Kit is stored in a **RECALL DRAWER**. If you then advance to a new Kit, the new Kit will be loaded into editing memory and your old edit is lost. However, if you do not do any other actual editing, the edited version of the Kit that you edited is still in the **RECALL DRAWER**. To get that kit back to editing memory, you hit pad 0 (RECALL) while in the KitEdit mode.

Let's try that now. Hold down FOOTSWITCH 1 and hit pad 1. You should see the note value that was originally assigned to pad 1. If you now hit pad 0, (the right hand half of the right ear), you will notice that the changed value that you had previously entered for the note value for pad 1 has returned. The edited kit that was saved in the recall drawer has been recalled from the drawer and put back into editing memory.

Now if you want to save this you can hit pad 7 twice to do the save.

What you have just learned is that any time you do an edit, that entire Kit is saved in the **RECALL DRAWER**. If you advance to a new Kit either in the PLAY MODE or in the EDIT MODE, the KitEdit memory is lost. As long as you don't do any edits of another Kit, the edited version of the Kit is still saved in the **RECALL DRAWER**. If you want that Kit back later to do more editing or to save it, simply hit pad **0** while in the kit edit screen.

DEFAULT PAD and DEFAULT SCREENS

The last of the editing pads is the **DEFAULT PAD** (PAD **8**). This pad you will find is very useful once you get the hang of it. For almost all of the settings that appear within any of the **drumKAT** screens there is a **DEFAULT** setting that you can easily put into that screen by simply positioning the cursor on that setting and hitting the **DEFAULT PAD** (pad **8**). Most of these **DEFAULT** values are user-defineable in the **DEFAULT SCREENS** (under pad 4).
It may seem confusing that pad 4 and pad **8** were both mentioned above in relation to the **DEFAULT** feature. Pad **8** is the pad you hit once you are **in** any set of Edit screens to **use** the **DEFAULTs**. Pad 4 is the pad you hit at the **PRE-EDIT** screens to select the **DEFAULT SCREENS** so that you can **change** the **DEFAULT** settings (that you would use later in some other set of screens by hitting pad **8**). Still confused? An example will help!

From the PLAY MODE hit FOOTSWITCH 1 and release. If you now hit pad 4 your screen will say:

```
#4 =DEFAULT EDIT
to confirm type
hit pad #4 again
FOOTSW1 TO EXIT
```

Hit pad 4 again to confirm that you want to Edit your DEFAULT settings. Now you will see the screen:

```
┌─────────────────────────┐
│                         │
│   kit defaults   1      │
│                         │
│   default kitname       │
│   character = A         │
│                         │
└─────────────────────────┘
```

Do screen advances to see the variety of settings that there are user-defineable **DEFAULTs** for. After you have looked these screens over stop at this screen:

```
┌─────────────────────────┐
│   kit defaults   2      │
│   pad mode = SIMPL      │
│    channel = 10         │
│   midi note =   38      │
└─────────────────────────┘
```

Move the cursor down to the MIDI Note value. Change that value to 64. Now you know how to **change a DEFAULT** setting!

Now we will see how to **use** the the **DEFAULTs**. Do the KitEdit shortcut to pad 1 (Hit pad 1 *WHILE* FOOTSWITCH 1 is held down, then release FOOTSWITCH 1). Move the cursor to the MIDI Note value on the pad 1 KitEdit screen. Now simply hit the **DEFAULT PAD** (pad 8) and the 64 (the **DEFAULT** setting for MIDI Note) will instantly be placed there. It is very simple but also very useful!
It will save time later if you now go back into the **DEFAULT SCREENS** (under pad 4, remember?) and change any settings you understand to values you want as **DEFAULTs**.

REMAINING KITEDIT SCREENS

Now lets look at the rest of the KitEdit screens.

Press footswitch 1 and while holding it down, hit pad 1. You will see the KitEdit screen for pad 1. If you now hit screen advance you will see:

```
k01send on entr1
Bch01 p 17 vo127
Bch02 p NO vo NO
Bch03 p NO vo NO
```

Hit the screen advance again and you will see:

```
k01send on entr2
Bch04 p 02 vo NO
Rch07 p NO vo NO
Bch10 p NO vo NO
```

These two screens contain 6 sets of **PROGRAM CHANGE** and **VOLUME** settings that can be sent to 6 different MIDI channels (out either the **Left** pair of MIDI OUTs, the **Right** pair of MIDI OUTs, or out **Both** pairs) when you enter this particular kit. If you don't want to send 6 different **PROGRAM CHANGES** and **VOLUMES**, you can select **NO** for any of them. Whenever you edit any one of these settings, all active ones will be sent out MIDI. These screens allow you to control what sounds or settings your external MIDI equipment uses.

Now hit screen advance again and you will see this screen:

```
k01  when kit is
entered, tempo is
changed to 92.6
currenttempo92.6
```

There is a **TEMPO CLOCK** running inside of the **drumKAT** at all times. This **TEMPO CLOCK** becomes an **EXTERNAL MIDI CLOCK** (out the **Left** pair of MIDI OUTs only!), controlling the speed of external sequencers, if you send a **MIDI SEQUENCE START** or a **MIDI SEQUENCE CONTINUE** by any of a variety of means (see index). This

TEMPO CLOCK will also control the speed of RECORDING and PLAYBACK of internal drumKAT MOTIFs. The speed of this TEMPO CLOCK can be changed in a variety of ways: by TAP TEMPO, by the starting of PLAYBACK of a MOTIF, or incrementally by FOOTSWITCH 4 and pads 7 and 8 (all of this has not yet been covered yet). With this screen you can choose to have the speed of this TEMPO CLOCK change instantly when you enter this Kit. You will not always want Kit Changes to change your CLOCK speed. If you *don't* want Kit Changes to change your CLOCK speed then select NO! here and SAVE the Kit.

Now do another screen advance to this screen:

```
k01 footswitch3:
   is used as
     HIHAT
```

This screen allows you to select what FOOTSWITCH 3 does for you in each individual Kit. The other choices besides HIHAT are: External Sequence Start/Stop, External Sequence Continue/Stop, Home Base Reset of Alternating pads, Motifs and Pressure, and do Sustain On/Off to up to 3 separate MIDI Channels.

Now you know how to edit what your pads do, how to save those edits, how to recall those edits, how to hear those edits, how to easily move from pad to pad,and how to include Program Changes and Volume Changes with your Kit changes. In the next session you will learn the fancier modes of the drumKAT called the COMPLEX MODES.

MULTIPLE MODE

In SESSION 5 we will cover the **COMPLEX MODES** for pads and triggers in the **drumKAT**.
First, get to PLAY MODE with FOOTSWITCH 1. Now, using the KitEdit shortcut (described in SESSION 1) with FOOTSWITCH 1, get to edit pad 1 (do this by holding the FOOTSWITCH 1 down and then hitting pad 1 while FOOTSWITCH 1 is still held down, then release FOOTSWITCH 1). Now move the cursor to the right hand end of the top line and get **SIMPLE** blinking. The screen you are seeing shows you what a simple note consists of--a MIDI Channel, a MIDI Note value, a Minimum Velocity and Maximum Velocity, Velocity Curve, and a Gate Time. Basically, you choose which instrument you want to play with the Channel, what sound or pitch with the Note value, and what loudness range to correspond to your dynamics with the Minimum to Maximum Velocity (range= 8 to 127).

The Velocity Curve is how the drumKAT correlates your playing dynamics to the velocity range that you have indicated to the left of it on the third line of the display. Basically, the Curve correlates as you hit from soft to hard, how *quickly* the instrument you are playing into will play from soft to loud . (These curves include reverse curves where as you play harder the sound will get softer.) The Gate Time controls how long the note will sound. (On drum machines this probably has no effect.)

In **SIMPLE** mode, what your pad does is relatively straightforward. It plays one Note to one MIDI Channel. If you now change pad 1 from **SIMPLE** mode selection to one of the complex modes with pad 6, (value advance), you will see the screen:

```
k01   PAD1 MUL 1
Bch10note E1= 40
vel 08-127 crv01
dly0.025gat0.000
```

Now you have changed the mode selection for pad 1 from **SIMPLE** to **MULTIPLE**. Notice that there is now a **1** in the upper right hand corner. This is the number of the sound you are editing. The **Multiple** mode contains **3** separate Sounds. The remaining three lines are similar to the bottom 3 lines of the simple mode. To compare the difference, hit the reverse pad (3) then pad 6 (with cursor on **MUL**) to go back to the **SIMPLE** mode. Note the bottom line has Gate Time and the second line has Channel and MIDI Note. Now hit pad 3 to erase the reverse mode and hit pad 6 again to advance forward to **MULTIPLE** mode. Notice lines 2 and 4 have changed.

The bottom line has **dly** for **delay** as well as Gate Time. Each one of the three Sounds in multiple mode that you can assign to a particular pad or trigger can also have a **delay** time from when you hit the note to when it sounds from 25 milliseconds to 6.375 seconds.

Also notice line 2 has changed in that a **B** is at the beginning of the second line in front of the Channel number. In the **COMPLEX** modes you can also choose *which* of the two pairs of MIDI outs your Sounds will go to. In the **SIMPLE** mode, which we have dealt with up until now, all of your Sounds go to *both* pairs of MIDI outs. However, now in the **COMPLEX** modes, you have the choice of going to the Left pair of MIDI outs, to the Right pair of MIDI outs, or to Both. Giving you 2 separate outputs of 16 Channel MIDI effectively gives you 32 channel MIDI. The other function for giving you separate MIDI outputs is to give you the flexibility of routing information through the **drumKAT** from the MIDI Ins as well as from the pads to individual pairs of MIDI outs in a totally flexible way to give you more options in interconnecting your MIDI equipment (including routing of signals, as well as filtering of signals).

The three notes that you can define in the **Multiple** mode are totally independent. Remember, in a previous tutorial we learned that pad 4 advanced you forward to the next pad. If you're in a mode that has more than one Sound associated to a pad, you can easily move through the 3 Sounds of that pad by hitting pad 4. If you now hit pad 4, the number 1 in the upper right corner will change to 2 (regardless of where the cursor is) and you will see the definition for Sound 2 in the **Multiple** mode for pad 1. If you hit pad 4 again you will see the definition for Sound 3.

Note that for some complex modes, SOUND ADV rotates through the 3 sounds of the pad instead of going to the next pad. To get to the next pad, simply use the KIT EDIT shortcut with Footswitch 1.

Hit pad 5, and you will hear the sound that pad 1 would make in PLAY MODE with the current set up settings. To make sure this responds on your drum machine or synth, hit pad 4 to get to note 1 of the multi assignment for pad 1 and move the cursor to the note value and change it using pad 6 while listening to the sound this would make on pad 5.

At this time, if you are not hearing the sound successfully by changing the note value, put the **delay** time on the bottom line at OFF and the Gate Time at 1.000. Put the Velocity range on the third line from 8 to 127. Put the Curve to 01. On the second line, make sure that you have a **B** at the beginning of the line and channel 10. Put the cursor on the Note value, the right hand end of line 2. Change the value with pad 6 (value advance) while listening to the Sound by hitting pad 5 (hear sound). After you are sure you have a Sound for Sound 1, move to Sound 2 by hitting pad 4. Repeat the above process to put a Sound you can hear for the second Sound of the three simultaneous Sounds in **Multiple** mode. For this Sound also put the **delay** time at the bottom left of the screen at 0.500 or 1/2 sec. so you can hear it separately from Sound 1. Next, hit pad 4 to get to Sound 3 of the **Multiple** mode and repeat the process except put the **delay** time at 1.000 or 1 sec. so this Sound will also be distinct from the previous two. Continue hitting pad 5 to hear the effect of your editing. If you are successful, you should hear three distinct sounds separated from each other by one half of a second. If you are not successful, make sure the Channel selections, the Velocities, and Note numbers are set up properly to cause a Sound to play on the MIDI device you are sending to. This is the **MULTIPLE MODE.** You are given three notes to do anything you want with. You can separate them in time with the **delay** feature, you can have them have different Velocity characteristics by using different Velocity Curves and different Minimum and Maximum Velocity, different Pitches or different Channel numbers, or even different Left or Right MIDI out. These 3 Sounds have been made to be totally independent of each other to provide you with the maximum range of possibilities.

ALTERNATE MODE

Advance the cursor to the pad mode on the top line. Use Pad 6 to change it.

```
k01    PAD1 ALT 1
Bch10note E1= 40
vel 08-127 crv01
gate time 0.000s
```

Now you're in the **ALTERNATE** mode. The three Sounds you just defined in the Multiple mode are now the three Sounds you hear **Alternating** with each strike. These 3 Sounds are independent from each other and are the same 3 Sounds you had in the Multiple mode with one exception. The **delay** time has disappeared. Return to the Multiple mode by hitting the reverse pad (PAD 3) and then hitting pad 6 to change **ALT** back to **MUL**.

Note that when you return to Multiple mode, the **delay** times return to the screen. If you now hit the reverse pad again (PAD 6) to get back to **ALT**, and then hit pad 4 and you will be able to see the 3 Sounds for the **Alternating** effect of each pad. If you want to **Alternate** 2 Sounds, advance the note value of one of the Sounds from 127 to **OFF**!

[If you wish to **Alternate more than 3 Sounds**, you can do as many as you want by recording those Sounds (quantized to 1/4 notes) into a **MOTIF** and then **SLICING** through the **MOTIF** in quarter notes.]

If you are using several **Alternating** pads to play some particular pattern it is very useful to be able to get back to a known state on the **Alternating** pads. That is one of the things that **HOME BASE** does. If you do a **HOME BASE**, all the **Alternating** pads will return to Sound 1 for your next strike. **HOME BASE** can be performed with FOOTSWITCH 3 (if so selected in your Kit), with a pad or trigger in a **CONTROL** mode, or with FOOTSWITCH 2 **FOOTFUNCTION**.

NOTE SHIFT MODE

Now change **ALT** with the value advance pad to **NSHFT**. This is the
NOTE SHIFT MODE.

```
k01    PAD1 NSHFT
Bch10n 40- 47,02
vel 08-127 crv01
gate time 2.350s
```

In this mode, your playing dynamics will be correlated to a change in
the note value that the drumKAT sends out. You will notice that line 3
and line 4 are the same as they were in the Alternate mode and in the
Simple mode. What is changed here is line 2. Again, you have the
choice of **Left, Right,** or **Both** pairs of MIDI outs at the beginning of
line 1, then the MIDI Channel. Now for the Note value you choose a
Note **range** indicated by a number, hyphen, and another number. The
number after the comma (at the end of line 2) is the **Curve** you will
use to correlate your playing dynamics to the change in pitch. You do
not necessarily want to use the same Curve here that you used for
Velocity because correlating dynamics to Volume and dynamics to
Pitch in the ear is done differently.   This mode may not work well
with a drum machine that has a limited number of notes that it
responds to because there will be gaps in response where your drum
machine has no MIDI note. If you are playing into a synthesizer or
sampler, where MIDI notes are assigned in groups, this will work fine.

Move the cursor to the first number after the **N** on the second line.
This number is the *beginning* of the **range** of note values that will be
sent out the MIDI line depending on how hard you hit the pad. Change
this value and the value after the dash to give you a reasonable range
of pitch while hitting pad 5 to hear the effect of what you are
creating. Note that a large range in pitch (an octave or more) can be
rather unwieldy to control. Also it is worthwhile to try different
curves to correlate your playing to pitch at the far right hand end of
line 2. Feel free to experiment. **Note:** some curves are **reverse**
curves so the pitch will go *down* as you hit *harder* instead of going up.

GATE SHIFT MODE

Now move the cursor back up to the pad's mode (far right hand end of top line) and change **NSHFT (NOTE SHIFT)** to **GSHFT (GATE SHIFT):**

```
k01    PAD1 GSHFT
Bch10note E1= 40
vel 08-127 crv01
gate0.00-1.40,06
```

In **GATE SHIFT** mode, lines 2 and 3 return to more normal settings, but line 4 now has a **range** of **Gate Times** and a **Curve** to correlate your playing dynamics to moving between this **range** of Gate Times. The *harder* you hit, the *longer* the Gate Time of the Sound becomes. The first number after "gate" is the **shortest** Gate Time you will get. The second number is the **longest** Gate Time you will get. The third number is the **Curve** to correlate your dynamics to that range. Again, **reverse curves** will cause reverse effects where the *harder* you hit, the *shorter* the sound will get. This is actually a very realistic effect.

VELOCITY SHIFT MODE

Move the cursor to the pad mode at the upper right hand corner and advance to **VSH**. This is the **VELOCITY SHIFT** mode. We are back to having three independent sounds assigned to this mode as in the Multiple and Alternate modes (the Note Shift and Gate Shift modes only play one note at a time. The characteristics of that Sound change with dynamics, but still there is only one Sound for any given hit.) These three Sounds can be in separate portions of your dynamics; they can overlap each other partially or totally. They are totally independent from each other. In the **VELOCITY SHIFT** MODE, your playing dynamics will select which of the three Sounds are played. Lines 2 and 4 have returned to normal complex settings. Now line 3 has changed.

```
k01    PAD1 VSH 1
Bch10note E1= 40
d 01- 63v 40-127
gate time 0.000s
```

At the far left is a range of **dynamic** that the Sound will respond to. You choose the range of what portion of the **dynamics** you'll be using for each of the 3 Sounds. The lower numbers from 1 to 59 being very *light* **dynamics**, the middle numbers, 61 to 91 are *medium* **dynamics** and the upper numbers 93 to 127 are the *harder* hits. You choose which range you want each of the 3 particular Sounds to respond in.

On the right hand end of line 3 is the **Velocity range** that this Sound will respond with. Each of the 3 Sounds has a **Velocity range** that it will produce in response to your **dynamics** within the **dynamic range** you selected at the beginning of line 3.

As an example, set up the three **VELOCITY SHIFT** Sounds (again remember, to easily get at the 3 Sounds, hit pad 4) to create the set shown in the following three screens. Hit pad 5 to hear the result of your actions.

```
k01     PAD1 VSH 1
Bch10note E1= 40
d 01- 81v 40-127
gate time 0.000s
```

```
k01     PAD1 VSH 2
Bch10noteC#1= 37
d 57- 97v104-127
gate time 0.000s
```

```
k01     PAD1 VSH 3
Bch10note B0= 35
d 83-127v 08-127
gate time 0.000s
```

You may need to adjust these 3 Sounds so that they all play on
whatever you are plugged into. If you are playing into a synth you may
need a longer Gate Time, if you are playing into a limited drum
machine you may need to change the Note numbers to ones your drum
machine responds to.

Once you get all 3 Sounds happening you should notice the following:

> *Soft* hits play *only* Sound 1, *medium* hits play
> either *both* Sounds 1 and 2 or *both* Sounds 2 and
> 3, and *hard* hits play *only* Sound 3. Also notice
> that when Sound 2 plays it is always *loud*
> because of the **Velocity range** selected for it.
> Also Sounds 1 and 3 *never* play at the same time
> because their **Dynamic ranges** do not overlap.

HIGH HAT MODE

Move the cursor to the pad mode and advance the value to **HOPEN**:

```
k01    PAD1 HOPEN
Bch10note E1= 40
vel 08-127 crv01
gate time 0.000s
```

```
k01    PAD8 HCLOS
Bch01noteC#1= 37
vel 08-127 crv01
gate time 0.000s
```

```
k01    PAD8 HFOOT
Bch01note B0= 35
vel 08-127 crv01
gate time 0.000s
```

Note that only the "H" is blinking. The "H" indicates **hi-hat** mode. The "**Open**" after the "**H**" indicates you are seeing the **Open** Sound. If you hit pad 4 you will now see the settings for the **Closed** Sound. If you hit pad 4 again, you will see the settings for the FOOTSWITCH Sound. If you want the footswitch to make **no sound**, select MIDI Note "**OFF**" (advance past MIDI Note 127 on the screen). If you don't have three different sounds for your **hi-hat**, you may want to assign the FOOTSWITCH Sound to the same MIDI Note as your **Closed** pad position Sound.

There are three screens for the **HI-HAT**. You can define the **Open** hi-hat, the **Closed hi-hat**, and the sound that FOOTSWITCH 3 makes when you Close it, and assign them to one pad. **(NOTE: MAKE SURE**

YOU HAVE SELECTED FOOTSWITCH 3 TO BE HIGH HAT!) When
FOOTSWITCH 3 is held down, playing the **hi-hat** pad will select the
Closed Sound. When FOOTSWITCH 3 is let up, this pad will play the
Open hi-hat Sound when it is struck.   In addition when you press
FOOTSWITCH 3 down it will play the **hi-hat FOOT** Sound with a
specific velocity (since footswitches are not dynamic) which you can
define in the **HFOOT**screen.

FOOT CAUTION:
If you have *more than one* **HIHAT** pad or trigger in a Kit, the Sound
that the **FOOT** will play when it is depressed is determined by the
highest HIHAT pad or trigger. For example if in a Kit both pad 3 and
trigger 6 are in **HIHAT** mode the **FOOT** setting for *trigger 6* is the
one that the **FOOT** will play when it is depressed, **NOT** the setting for
pad 3! The **Open** and **Closed** Sounds of the pads will respond
appropriately, it is just the **FOOT** Sound that gets tricky when more
than one **HIHAT** mode is selected in a Kit.

One interesting use of the HIHAT mode is to put two different sets of
Sounds under each of the pads in the HIHAT mode and use the
FOOTSWITCH to quickly swap back and forth between these two
groups of Sounds!

Now you have seen all of the **COMPLEX** modes. In SESSION 6 you will
learn about the **drumKAT CONTROL** modes for the pads and triggers.

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In this SESSION you will learn how to use the **CONTROL** modes on the pads and triggers. These **CONTROL** modes are: **TAP TEMPO, MOTIF PLAYBACK, EXTERNAL MIDI CLOCK CONTROL, PRESSURE,** and **HOME BASE**.

TAPTEMPO:

While holding FOOTSWITCH 1 down, hit pad 1 to see it's settings. Change it's MODE from "SIMPL" through all the "COMPLEX" modes to the "CNTRL" MODE (or use reverse). The screen will now say:

```
k01    PAD1 CNTRL
TAPTEMPO c01n 40
vel 08-127 crv01
gate time 0.000s
```

If a pad has been selected to be in **TAPTEMPO CONTROL** mode, that pad is always waiting for a hit to start a **TAPTEMPO MEASUREMENT**. When the pad is hit the MIDI Sound selected will play (if you do **NOT** want a Sound to play when you are doing a **TAPTEMPO** adjustment then advance the Note value to OFF). With quarter-note input (selected in one of the Global Screens), if a second hit occurs between .25 seconds (240 beats per minute) and 1.5 seconds (40 beats per minute), the **drumKAT's** internal **TEMPO CLOCK** will instantly be adjusted to the new **TEMPO**.

If an internal **MOTIF** is playing or an **External MIDI CLOCK** is being sent, their tempo will be instantly adjusted by any **TEMPO** change. Both the internal **MOTIFs** and the **External MIDI CLOCK** are driven by the same internal **TEMPO CLOCK** inside of the **drumKAT**.

Now get back to PLAY MODE and strike pad 1 twice at a reasonable tempo. Notice that for every pair of hits the **clktempo** value displayed on the PLAY MODE screen changes in response to the tempo of your pair of hits!

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In one of the Global Screens you can change the **TAPTEMPO** to read 1/16th notes, 1/8th note tripletts, or 1/8th notes as well as 1/4th notes.

This is not intended to act as a mind reading mode where ghost notes are ignored and revolving windows allow you to play complicated patterns on the **TAPTEMPO** pad and somehow only your tempo is magically extracted. This is a stupidly simple **TAPTEMPO** mode where you should only hit the **TAPTEMPO** Pad when you actually want to dictate a change in your clock rate.

MOTIF PLAYBACK:

Now, move get back to KitEdit of pad 1 and move the cursor to "TAPTEMPO". Value advance this to "MOTIF". The screen will look something like this:

```
k01    PAD1 CNTRL
MOTIF01,██,██,██
INFINITE _____
 tempo = SLAVE
```

A **MOTIF** is a riff or pattern that you can RECORD and assign to a pad or trigger. This screen allows you to select a pad or trigger to playback from 1 to 4 **MOTIFs** simultaneously.

First let's **RECORD** a **MOTIF!** Get back to the PLAY MODE screen, then hit FOOTSWITCH 1 to get to the **PRE-EDIT** screens (**don't** hit a pad *while* FOOTSWITCH 1 is pressed down!). Now hit pad 6 and you will see:

```
#6 =MOTIF RECORD
to confirm type
hit pad #6 again
FOOTSW1 TO EXIT
```

Hit pad 6 again to confirm that you want to **RECORD** a **MOTIF!** Now you see:

```
motif01recordOFF
countoff=4 kit01
tempo92.6 08beat
quantize TO 1/4
```

On this screen you can select which **MOTIF** you want to **RECORD (8 MOTIFs** are available on the standard **drumKAT**), which **Kit** you want to play from, a **COUNTOFF**, a **CLOCK TEMPO**, the number of **BEATS** you want in your **MOTIF**, and a **QUANTIZATION** setting. **QUANTIZATION** occurs at recording time.

When you start actual recording **avoid hitting pad 1.** We will explain why later! Now get "OFF" blinking and hit value advance (pad 6). This changes the "OFF" to "PRE" and starts the **COUNTOFF.** The **COUNTOFF** is lower pitched than the **RECORD** click track. When the **COUNTOFF** is finished the **MOTIF** starts RECORDING immediately. Now simply play on your pads or triggers (avoiding pad 1!) and you will be recording a new **MOTIF!**
When the recording stops, get back to PLAY MODE (FOOTSWITCH 1) and hit pad 1 (assuming you still have it set for **MOTIF** 1 playback). You will hear the **MOTIF** playback! There are 4 **MOTIF** playback modes: **INFINITE, LOOPED, ONCE,** and **SLICE.** In **INFINITE,** the pad (or trigger) will toggle the selected **MOTIFs ON** and **OFF.** (If one of the **MOTIFs** is already ON from some other pad and the others are OFF when the pad is hit, then it will **alternate** with the other **MOTIFs** when the pad is hit!)

In **LOOPED,** the **MOTIF** will loop the requested # of times unless the PLAYMOTIF pad is hit again during the looping which will cause the **MOTIF** to stop. If more than one **MOTIF** is controlled in **LOOPED** mode, the first **MOTIF #** from left to right will be the **MOTIF** that is counted. Any other **MOTIFs** selected with it will play along until the counted one stops.

In **ONCE** each hit of the PLAYMOTIF pad will restart the **MOTIF** to play through once.

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SLICE allows you to play **time slices** of your **MOTIF** with each hit. This is a very powerful feature that has a variety of uses: It can resemble a taptempo mode in some circumstances and can provide interesting syncopation in other circumstances. **Experiment** with different slices and tempos relative to the quantization the **MOTIF** was recorded under.

Playing the pad *slower* than the **TEMPO** of your clock may *appear* to *slow down* your **MOTIF**. Actually your **MOTIF** is being played at the specified **TEMPO**, but you are actually causing "pauses" between the quarter-note time-slices you are playing.

Playing the pad *faster* than the **TEMPO** of your clock will **NOT** *speed up* the **TEMPO** of your **MOTIF**. It will only cause your **MOTIF** to keep playing for a time *after* you stop hitting the **SLICE** pad (determined by how many 1/4 note **SLICES** were requested and how many have not yet been used).

"SLAVE" means that the **MOTIF** will playback at the prevailing **TEMPO** that happens to exist in the **drumKAT** when you start the **MOTIF**. If you specify a specific **TEMPO**, the speed of the **drumKAT's** internal **TEMPO CLOCK** will be changed to that **TEMPO** when you start this **MOTIF**.

The size of each **MOTIF** is limited to:

MOTIF 1: 380 EVENTS
MOTIF 2: 104 EVENTS
MOTIF 3: 104 EVENTS
MOTIF 4: 104 EVENTS
MOTIF 5: 104 EVENTS
MOTIF 6: 52 EVENTS
MOTIF 7: 52 EVENTS
MOTIF 8: 52 EVENTS

An "EVENT" is a NOTE ON, a NOTE OFF, or 2.5 seconds of silence (@tempo=120bpm) (5 seconds @tempo=60bpm). More events can be stored if you screen advance to the screen after the **MOTIF RECORD** screen (screens under pad 6) and select that the **MOTIF NOT STORE NOTE OFFs**. If you are playing into a **drum machine** in which NOTE OFFs have no meaning this is a **good** thing to do. If you are playing into a **synth** that needs to see NOTE OFFs to stop notes from being stuck on forever then **don't** select this!

```
┌─────────────────────────────┐
│                             │
│   recording motifs          │
│   STORE noteoffs            │
│                             │
└─────────────────────────────┘
```

WARNING: If RECORDING will not start and **"EXT"** is displayed in the **"OFF"/"PRE"/"ON"** window of the **RECORD** screen, then you must screen advance twice to the screen that allows you to select that the **drumKAT MOTIFs** be controlled by an External MIDI clock coming into the **drumKAT's** MIDI **LEFT** Input and change the selection to **"INTERNAL"**.

```
┌─────────────────────────────┐
│                             │
│   clock source for          │
│   motifs is INTRNL          │
│                             │
└─────────────────────────────┘
```

You may make the length of your **MOTIF** up to you, **LIVE** at RECORDING TIME by making the **BEATS** *larger* than the number of beats you actually intend to have and then striking a PLAYMOTIF pad (pad 1 in this example) to *simultaneously* cause the RECORDING to stop *and* playback to start!   This gives you a **real-time record/play ability** if the PLAY MOTIF pad is set up the same as the RECORD MOTIF pad. Note: If you use this method, the timing of when you hit the PLAY MOTIF pad is *critical* if you intend to loop this MOTIF!

One of the **FOOTFUNCTION**s available on FOOTSWITCH 4 allow you to **resync** any **MOTIFs** that are playing. **HOME BASE** also allows you to **resync**. Check the index for more details.

EXTERNAL MIDI CLOCK CONTROL:

Now, move get back to KitEdit of pad 1 and move the cursor to "MOTIF".
Value advance this to " EXT MIDI CLOCK".. The screen will look
something like this:

```
k01    PAD1 CNTRL
EXT MIDI CLOCK
 START / STOP
_____
```

There are three types of "EXTERNAL MIDI CLOCK" control:
"START/STOP", "CONTINUE/STOP", and "SLICE".

External MIDI Clock "START/STOP" will send a **MIDI SEQUENCE
START** command out the **LEFT MIDI OUT** the first time it is hit and
then start sending the **drumKAT's** internal **TEMPO CLOCK** out the
LEFT MIDI OUT as a continuous **MIDI CLOCK**.
The next hit of this pad will send a **MIDI SEQUENCE STOP** out the
LEFT MIDI OUT and will *halt* the sending of the **MIDI CLOCK**. The
internal **TEMPO CLOCK** is unaffected, it is just *not sent OUT*.

External MIDI Clock "CONTINUE/STOP" will send a **MIDI SEQUENCE
CONTINUE** command out the **LEFT MIDI OUT** the first time it is hit and
then start sending the **drumKAT's** internal **TEMPO CLOCK** out the
LEFT MIDI OUT as a continuous **MIDI CLOCK**.
The next hit of this pad will send a **MIDI SEQUENCE STOP** out the
LEFT MIDI OUT and will *halt* the sending of the **MIDI CLOCK**. The
internal **TEMPO CLOCK** is unaffected, it is just *not sent OUT*.

External MIDI Clock "SLICE" will send out "time-slice" bursts every
time the pad (or trigger) is hit. If you select 1/4 notes for your **time-
slices**, every hit of the pad will cause 24 MIDI Clocks (24 clocks= 1/4
note) to be sent out the **LEFT MIDI OUT**. The **TEMPO** within these
bursts is the current **TEMPO** of your **drumKAT**.
Playing the pad *slower* than the **TEMPO** of your clock may *appear* to
slow down your sequence. Actually your sequence is being played at
the specified **TEMPO**, but you are actually causing "pauses" between
the quarter-note time-slices you are playing.
Playing the pad *faster* than the **TEMPO** of your clock will **NOT** *speed
up* the **TEMPO** of your sequence. It will only cause your sequence to

keep playing for a time *after* you stop hitting the **SLICE** pad (determined by how many 1/4 note **SLICES** were requested and how many have not yet been sent).

This is a very interesting feature that probably doesn't sound very interesting until you actually fool around with it. **Experiment!**

PRESSURE:

Now, move get back to KitEdit of pad 1 and move the cursor to "EXT MIDI CLOCK". Value advance this to "PRESSURE". The screen will look something like this:

```
k01    PAD1 CNTRL
PRESSURE Bch10
    PITCHBEND  UP
range127    crv01
```

There are **16** types of **PRESSURE** control you can select. For each one, you select which Channel and Sides to send to. Also you select a **RANGE** for how much effect and a **CURVE** to correlate as you press *harder* how *fast* the effect gets *greater.*

Some of the settings have **SUSTAIN** with it. For "**PB UP / SUSTAIN**" for example, as you start to press down on the pad a **MIDI SUSTAIN ON** command is sent as you *start* to PITCHBEND. When you *release* the pad because you are done bending, a **MIDI SUSTAIN OFF** is sent.

Using different **CURVES** can give interesting results. **Reverse CURVES** will start with a lot of effect and *decrease* effect as you press *harder.* **Curves** that don't start at 0 (especially 2-5 and the reverse **CURVES** 11-13) will leave your pitch detuned after you have released the pad (if you are doing pitchbend). You can use this fact to use pads as **quick transposes** and all you have to do is strike them and your pitch setting will be instantly transposed. The **RANGE** setting will determine the transpose amount.

Some of these settings will not work on your drummachines or synths if they do not respond to these functions!

HOME BASE:

Now, move get back to KitEdit of pad 1 and move the cursor to
"PRESSURE". Value advance this to "HOME BASE". The screen will
look something like this:

```
k01    PAD1 CNTRL
   HOME BASE
resets alt pads
motifs &pressure
```

"HOME BASE" does 3 things:

(1) All **Alternating pads** are put back to **Sound 1**. That means that
the next time you hit any Alternating pad after a **HOME BASE** you will
get the first of the three Alternating Sounds from that pad.

(2) All **MOTIFs** are **resunc** to their **beginning**. This applies even if
you are **SLICING a MOTIF**. Any that are playing will continue to play,
but they will "start from the top". Also a **MIDI SEQUENCE START**
will be sent if the **drumKAT** is currently sending a **MIDI CLOCK** out.
This will resync any external sequence to your internal **MOTIFs.**

(3) A **MIDI RESET ALL CONTROLLERS** command will be sent out both
MIDI outs as well as a specific return of **PITCHBEND** to **OFF**. This
will allow you to return any **PRESSURE** controls that are *stuck up*
to normalcy (assuming your drummachine or synth responds to these
commands).

This **HOME BASE** command is also available on **FOOTSWITCH 3** and
partial versions of **HOME BASE** are available in **FOOTFUNCTION 2**
and **FOOTFUNCTION 4.**

In this session you will learn how to do two different kinds of
"ALL NOTES OFF" messages and how to COPY Kits, COPY Pad
Settings,or COPY Curves.

ALL NOTES OFF

MIDI has provision for a *"panic button* " type command that can be sent
if a note is stuck on - it is called the ALL NOTES OFF command. There
are a variety of reasons why a note can get stuck on, but when it
happens the most important thing is to *STOP IT* ! The drumKAT
provides an easy way to access the ALL NOTES OFF command.

Get to PLAY MODE. Depress FOOTSWITCH 1 and release without hitting
any pads. Now hit Pad 3 once to select the ALLNOTESOFF Screens. Hit
Pad 3 again to verify that you want to select the ALLNOTESOFF
Screens and the Screen will say:

```
sustain off and
allnotesoff sent
IF HIT AGAIN DO
INDIVIDUAL N OFF
```

This is telling you that the drumKAT sent out a SUSTAIN OFF
command and an ALL NOTES OFF command to each of the 16 MIDI
Channels. This should stop the note that is ringing. (The drumKAT
also stops all MOTIFs, sends a SEQUENCE STOP to MIDI LEFT, puts
PITCHBEND at "CENTER" (OFF) on all 16 Channels, sends a "RESET ALL
CONTROLLERS" command to all 16 Channels, and stops the internal
beeper.)

However, some equipment does not recognize this command! To get
around that problem, if you hit Pad 3 again an individual MIDI NOTE
OFF command will be sent to *each* of the 128 Notes on *each* of the 16
MIDI Channels (that is 2048 notes!). This takes about 4 seconds and
should definitely shut off the stuck note (unless one of your synths
have lost it's mind and needs to be rebooted).

After the **drumKAT** has blitzed all this information out it displays:

```
sent individual
   note off
 for all note &
for all channels
```

After 4 more seconds this message departs and your familiar PLAY
MODE message returns. Actually the **drumKAT** has returned to PLAY
MODE the instant the above message is displayed, so you can start
playing again without waiting for the PLAY MODE message.
You should familiarize yourself with all of this because when you need
to use it is **not** the time to learn because you will be in a panic.
ALLNOTESOFF can be done quickly by following these steps:

1) Depress FOOTSWITCH 1 and release.

2) Hit Pad 3 twice.

3) If the Note shuts off then depress FOOTSWITCH 1 once more and
release to get back to PLAY MODE.

4) If the Note didn't shut off, hit Pad 3 once more. After 4
seconds you can start playing again. **DO NOT DEPRESS FOOTSWITCH
1 again in this case because the drumKAT returns to PLAY
MODE for you after it sends out all those individual note offs.**

Also, "ALL NOTES OFF" is available under **FOOTFUNCTION 2**. See
SESSION 11.

COPY KITs

Now for **COPYING** ! Get to PLAY MODE. Depress FOOTSWITCH 1 and release without hitting any pads. Now hit Pad 5 once to select the **COPY** Screens. Hit Pad 5 again to verify that you want to select the **COPY** Screens and the Screen will say:

```
COPY from kit01
to kit01.
HIT COPY=PAD5 TO
VERIFY KITCOPY
```

This **KIT COPY** screen allows you to copy an entire kit to some other kit. Use the CURSOR, VALUE ADV, and REVERSE pads to select the appropriate "**from**" and "**to** "kits then hit Pad 5 to perform the **copy**. If your PERMANENT MEMORY *IS PROTECTED* you will be warned and requested to go to the GLOBAL SCREENS and enable your PERMANENT MEMORY *CAN BE CHANGED* (Session 3). If you have done this and hit Pad 5 to do the **COPY** the **drumKAT** will give you one more chance to change your mind.
The screen will say:

```
 ARE YOU SURE?
to kit01.
  FOR KIT COPY
HIT PAD5 AGAIN
```

If you really want to do a **KIT COPY** , hit Pad 5 again and the display will verify the **COPY** by:

```
┌─────────────────────────┐
│                         │
│      KIT COPY           │
│      COMPLETED          │
│                         │
└─────────────────────────┘
```

Then the message will return to the **KIT COPY** Screen with the "to kit" incremented by one (to make copying a specific kit to several other successive kits easy).

COPY PADs

Hit SCREEN ADV and you will see the **KIT PAD COPY** Screen:

```
┌───────────────────────┐
│ COPY kit01   PAD1     │
│ to kit04   PAD 1      │
│ HIT COPY=PAD5 TO      │
│ VERIFY PADCOPY        │
└───────────────────────┘
```

Again use CURSOR ADV, VALUE ADV, and REVERSE to select what specific Pad (or Trigger) you want copied to which other. When you have the correct settings hit Pad 5 *twice* and the **COPY** will be done.

COPY CURVEs

Hit SCREEN ADV again and you will see the **CURVE COPY** Screen:

```
COPY curve 01
to curve 15
HIT COPY=PAD5 TO
 VERIFY CURVECOPY
```

The **"from CURVE"** can be any of Curves 1 to 16. The **"to CURVE"** can be either Curve 15 or Curve 16 which are the two *"user definable "* curves. Two of the GLOBAL SCREENS allow you to create your own Curve 15 or Curve 16 (explained in session 8). It is a great help in doing this if you first **COPY** a curve that you kind-of like but want to modify into Curve 15 or 16. That is the purpose of this Screen.

In this session you will learn about the **GLOBAL** Screens. The **GLOBAL** Screens contain:

  PERMANENT MEMORY PROTECTION
  PROGRAM CHANGE RECEIVE CHANNEL AND ENABLE
  DISPLAY VIEWING ANGLE
  BEEPER ON/OFF
  SONG CREATION SCREEN
  TAP-TEMPO NOTE TYPE
  USER-DEFINED CURVE CREATION SCREENS
  LEFT and RIGHT MIDI IN MAPPING
  PAD THRESHOLD
  PAD LOW and HIGH DYNAMICS
  PAD INTERACTION SUPPRESSION
  SYSTEM EXCLUSIVE DATA DUMP and DATA RECEIVE

The first **GLOBAL** Screen is:

```
permanent memory
   IS PROTECTED
prgrm chg receiv
 DISABLE ch:02
```

The top two lines regarding PERMANENT MEMORY PROTECTION were discussed in Session 3.

The bottom two lines allow the **drumKAT** to be controlled by external MIDI equipment. If you enable the **PROGRAM CHANGE RECEIVE**, the **drumKAT** will move to a KIT corresponding to the PROGRAM CHANGE VALUE it receives on either of the MIDI inputs. You must also specify which Channel you wish the **drumKAT** to respond to the PROGRAM CHANGES from.

The next **GLOBAL** Screen is:

```
display viewing
angle is set for
   STRAIGHT ON
pad6 to change
```

This Screen allows you to change the **viewing angle** of the display to correspond to the position and height at which you play your **drumKAT**. To
change the viewing angle simply hit pad 6!

The next **GLOBAL** Screen is:

```
EDIT MODE BEEPER
        is
    TURNED ON
pad6 to change
```

When in the EDIT MODE the **BEEPER** can beep to give you an audible feedback that a pad hit was recognized. If you want to turn this beeper off simply hit pad 6!

The next **GLOBAL** Screen allows you to define **SONGs** made up of your **KITs** so you can step through your kits in a planned manner to be used in a song or performance:

```
┌─────────────────────────────┐
│      DEFINE SONG1           │
│      STEP01=KIT01           │
│     ─────────────────       │
│      SONG MODE OFF          │
└─────────────────────────────┘
```

As mentioned in the beginning of the manual, **FOOTSWITCH 2** (in
conjunction with Pads 3 and 6) can either step you sequentially through
KITs or Steps in a **SONG** . If the **SONG MODE** is **ON** (as set by the bottom
line of this display) then **FOOTSWITCH 2** will step you through the STEPS
of the current SONG. If the **SONG MODE** is **OFF** then **FOOTSWITCH 2**
simply steps you sequentially through your **KITs.**

You can define up to 8 **SONGs**, with up to **16 STEPs** in each **SONG.** The
STEPS of each **SONG** can consist of any of the **KITs, SONG END**, or **SONG
LOOP.** If **SONG END** is selected for a **STEP** then that is the last **STEP** of
the **SONG** and any further presses of **FOOTSWITCH 2** will have no effect.
If **SONG LOOP** is selected for a **STEP** then the **SONG** will loop back to its
first **STEP** when this **SONG LOOP STEP** is encountered.

To make the defining of your **SONG** easier, the SOUND ADV Pad (Pad 4)
will advance through the **STEP** numbers on this Screen so that you can
leave the cursor on the contents of each **STEP** and use Pad 6 to change the
contents of the **STEPs** .

When using **FOOTSWITCH 2** to step through your **SONG** , Pads 2 and 1 will
increment or decrement the actual **SONG** number if you hit them when
FOOTSWITCH 2 is held down.

The next **GLOBAL** SCREEN is the **TAP TEMPO NOTE TYPE** selection screen:

```
 tap tempo
reads 1/4 NOTES
```

This screen allows you to select what type of notes you are expected to play in the **TAP TEMPO** mode. The choices are:

        1/16 NOTE
        1/8 TRPLT
        1/8 .NOTE
        1/4 NOTE

Next come the **CURVE DEFINITION** Screens:

```
define curve 15.
64steps127values
step01/64 = 01
(see copy menu)
```

```
define curve 16.
64steps127values
step01/64 = 03
(see copy menu)
```

These Screens allow you to actually make your own **CURVEs**. Curves 1 through 14 are factory set. **Curves** 15 and 16 can be defined by you. All

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16 **CURVEs** can be used for Velocity determination, for MIDI Note selection
in the NOTE SHIFT MODE, for GATE selection in the GATE SHIFT MODE, and amount of Control in **PRESSURE** Control mode.

Each **CURVE** has 64 steps. How quickly the values of these steps rise from 0 to 127 as you progress through these steps determines the "feel" of these **CURVEs** . More information on the **CURVEs** is available in the **APPENDIX.**

The note on the last line about **(see copy menu)** is to suggest that copying one of the factory **CURVEs** into either 15 or 16 is a good way to start in defining your own 15 or 16. Then you only have to modify the **curve** instead of defining it from scratch. Copying is discussed in Session 7.

To make this easier you can position the cursor on the value of the **CURVE** step, using Pad 6 to increment the value, and use the **SOUND ADV** (Pad 4) to increment the Step #. This avoids constantly having to use CURSOR ADV to go@ back and forth from the Step # to the Step value.

There are two **GLOBAL** Screens that allow you to "map" the flow of your **MIDI IN** data. They are:

```
 left midi in
clock out to BTH
notes to out BTH
else  to out BTH
```

```
 right midi in
clock out to BTH
notes to out BTH
else  to out BTH
```

The data coming in each of the 2 **MIDI INPUTs** can be divided into 3 separate groups which can be **mapped** to the **LEFT MIDI OUT** , the **RIGHT MIDI OUT, BOTH MIDI OUTs,** or to neither (**OFF**). These settings are all independent of each other. This allows you a lot of flexibility in how you set up your MIDI system as you acquire more and more MIDI gear.

Next are three screens that control the response of your 10 **drumKAT** playing pads:

```
┌─────────────────────────────┐
│           pad 1             │
│                             │
│       threshold =    24     │
│                             │
└─────────────────────────────┘

┌─────────────────────────────┐
│           pad 1             │
│                             │
│     low dynamic=    66      │
│     hi dynamic = 204        │
└─────────────────────────────┘

┌─────────────────────────────┐
│    pad interaction          │
│      suppression            │
│    P6causesP2TP ^35         │
│    P█causesP█TP ^00         │
└─────────────────────────────┘
```

The first of these three PAD screens sets the "THRESHOLD" or *trip point level* for each of the 10 pads on the **drumKAT** playing surface. The THRESHOLD is the reading at which the playing pad will trigger as a hit. If the THRESHOLD is set *too high* the pad will *not* be very *sensitive*. If the THRESHOLD is set *too low* then the pad may *false trigger* without even being hit.
Normally the THRESHOLD setting does not need adjusting by you. It should not be too low because every time the **drumKAT** powers ON, readings are made of the "IDLE LEVEL" of each of the pads. The THRESHOLD of each of the pads is then checked to make sure that it is sufficiently higher than the "IDLE LEVEL" of the pad so that false triggering does not occur. The normal range for pad THRESHOLD is 24-36. The **SOUND ADV** pad (Pad 4) will step through the pads for you so that you can leave the cursor on the THRESHOLD.

The next pad screen holds the "LOW DYNAMIC" and "HI DYNAMIC" settings for each of the 10 **drumKAT** pads. These settings do not affect the actual sensitivity of a pad (THRESHOLD does that). These settings set the "DYNAMIC RANGE" of the pad. When you "TRAIN" your pads (see SESSION 9), you are asked to hit each pad once "SOFT" and once "HARD". This tells the **drumKAT** what your style is like. Your idea of soft and

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hard is different from how someone else plays. These settings allow you to "customize" the **drumKAT** playing pads to *your* playing style. The **LOW DYNAMIC** is the reading of your soft hit and the **HI DYNAMIC** is the reading of your hard hit.

A "table" is constructed inside the **drumKAT** to correlate the readings of your dynamics to the full range of MIDI velocity. Any hits read that are *below* your **LOW DYNAMIC** (and above the THRESHOLD, of course) reading are judged to be at the Minimum Velocity. Any hits read that are *above* your **HI DYNAMIC** reading are judged to be at the Maximum Velocity. All hit readings that are between the **LOW DYNAMIC** and the **HI DYNAMIC** are then correlated through the selected Velocity Curve to some value between your selected Minimum and Maximum Velocity settings in the current Kit.

If this entire discussion on **LOW** and **HI DYNAMIC** does not make much sense don't be too concerned. These are *not* normally settings you will need to adjust. These settings are created *automatically* for you when you "**TRAIN**" your pads. Although these settings are very important in the response of your **drumKAT** you don't specifically need to understand them to make use of them.

The last of the three pad screens allows you to stop **interaction** between playing pads on your **drumKAT** if some **interaction** develops. Normally **FSR** (the sensing material under your rubber pads) does not interact from pad to pad. However, sometimes due to wear, or temperature/humidity changes an **interaction** may develop between two pads. This screen can help stop that **interaction** from affecting the response of your drumKAT. Suppose for example that hitting pad 6 very hard also causes pad 2 to play lightly. The setting shown above (**pad6 CAUSES pad2 TP ^ 35**) will help stop that. What this setting means is that for a short time period after the strike of pad6 the Threshold Point of pad 2 will be *increased* by 35. If the interaction is even more severe the **TP** of pad 2 can be increased by more to stop the **interaction**. This setting does not affect the normal Threshold of pad 2. It only raises the Threshold temporarily for about 30 milliseconds (.030 seconds) after the strike of pad 6.

This temporary effect is not normally detectable even if you hit both pad 6 and pad 2 simultaneously because the amount of Threshold increase needed to stop **interaction** is not normally much compared to the actual dynamic range of a pad.

There are two sets of settings on this screen so that if you have two sources of **interaction** you can fix them both.

For saving and retrieving the information in your drumKAT two **GLOBAL** Screens are provided for **SYSTEM EXCLUSIVE DATA DUMPING** and **DATA RECEIVING** through MIDI to SYSEX librarian programs on personal computers or to MIDI disk drives:

```
 data dump
 dumptype=xxxxxxx
 to start dump
 hit the left ear
```

```
 data receive
 recvtype=xxxxxxx

 AWAITING DATA
```

The XXXXXXX can be a single **KIT**, all the **GLOBAL INFORMATION** that is separate from the KITs (Curves 15,16 , Songs, mapping settings, etc), **ALL KITs**, a single **MOTIF** or **ALL MEMory**.

To do a **DATA DUMP**:

1) Connect a MIDI cable from the **LEFT MIDI OUT** of the **drumKAT** to the MIDI IN on the receiving device. (the **RIGHT MIDI OUT** is *not* used for **DATA DUMPING**

2) Get the receiving equipment into a state ready to receive data.

3) Get to the **DATA DUMP** Screen on the **drumKAT** and select the type of data you want to save.

4) When all is ready, hit the left ear on the **drumKAT** (pads 7 or 8).

5) While the dump is occurring the blinking on the screen will stop. When the dump has completed the Screen will resume blinking.

To do a **DATA RECEIVE**:

1) Connect a MIDI cable from the **LEFT MIDI IN** of the
   drumKAT to the MIDI OUT on the storage device.
   (the **RIGHT MIDI IN** is _not_ used for **DATA RECEIVING**

2) Get to the **DATA RECEIVE** Screen on the **drumKAT** and select
   the type of data you want to receive. It is important that
   the data you request to receive is the same as the type of
   data that the storage device will send to you.

3) Get the sending equipment into a state ready to send data.

4) When all is ready, have the storage device send the data.

5) While the dump is occurring the blinking on the screen will stop.

6) Then one of three messages should result:

```
  data receive
recvtype=xxxxxxx

DATA RECEIVED OK
```

```
  data receive
recvtype=xxxxxxx
 RECEIVE  ERROR
 HEADER  ERROR
```

```
  data receive
recvtype=xxxxxxx
 RECEIVE ERROR
  DATA ERROR
```

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If the Screen says "DATA RECEIVED OK", then the reception was successful!

If the Screen says "HEADER ERROR" this means that either the information
received was not **drumKAT** information (the **HEADER** contains a **drumKAT** ID when it is dumped), or was a different type of information than what you were requesting (such as GLOBAL instead of a KIT). Check this and try again. If a **HEADER** error occurs the present information in your **drumKAT**
should not be affected.

If the Screen says "DATA ERROR" then some part of the transmitted data was formatted incorrectly. Check cables and transmitting device and try again. For more information see the **APPENDIX** for **SYSTEM EXCLUSIVE** documentation.

One of the powerful features of the drumKAT playing surface is that it can
be "TRAINED" for your own "dynamic range". If you play softer of
harder
than "average" the **drumKAT** playing surface can be adjusted to your
particular dynamic range.

To do this, press and release FOOTSWITCH 1 to get into the PRE-EDIT
screens. Hit Pad 7 twice to select "PAD ADJUST". The screen now says:

```
DO YOU WANT TO
    ADJUST PAD1?
PAD3=NO
            YES=PAD6
```

Hit Pad 6 to say yes! Now the screen says:

```
HIT PAD1 ONCE
      SOFT
TO SET BOTTOM OF
 DYNAMIC RANGE
```

So hit Pad 1 **SOFT!** Now the Screen says:

```
HIT PAD1 ONCE
     HARD!
TO SET TOP OF
 DYNAMIC RANGE
```

So hit Pad 1 **HARD!** You have just set the **DYNAMIC RANGE** on PAD 1!
A "table" has been constructed in memory that correlates the **drumKAT's**
measurements to *your* dynamics. This is *separate* from **MINIMUM
VELOCITY, MAXIMUM VELOCITY,** and **VELOCITY CURVES** .
However it does help the velocity parameters respond more naturally to
your particular playing style.

Later when you return to PLAY MODE any hits softer than your **SOFT** hit
will be treated simply as **SOFT** . Any hits harder than your **HARD**
hits will be simply treated as **HARD** . This puts the full working
dynamic range in a range that is adjusted for you.

If you are curious, a techie, or just a glutton for punishment you can see
the actual readings of your **LOW** and **HI DYNAMICs** (soft and hard hits) in
one of the GLOBAL Screens. Session 8 explains more about these settings
if you are interested.

At any time during the **PAD ADJUST** process you can exit with
FOOTSWITCH 1. You can choose to skip adjusting pads that respond the
way you want by simply hitting Pad 3 (as NO) in response to the YES/NO
question.

If you go all the way through the **PAD ADJUST** training the last screen
will
say:

```
PADS HAVE BEEN
ADJUSTED TO YOUR
PLAYING DYNAMICS
    TRY THEM!
```

The **drumKAT** has already returned to PLAY MODE for you when this screen
is displayed. After 4 seconds this Screen disappears and and your familiar
PLAY MODE screen appears to prove you are indeed in PLAY MODE.

To properly use the 9 **TRIGGER INPUTS** you must "**TRAIN**" the
drumKAT to recognize the *"envelope"* of the external trigger you
are using.   There are an incredible array of different kinds of external
triggers available for you to use.   There are acoustic trigger devices
(which are connected to the head or shell of an acoustic drum) (like the
KAT KDT-1 and **KST-1**), foot triggering devices, and trigger pads.   They
all have dramatically different characteristics.   The acoustic trigger
devices have a long **envelope** because of the "ringing" of the acoustic
drumhead.   The foot triggers and trigger pads can have very short spikes
as their response.

The **drumKAT** has been designed with this variety in mind allowing you to
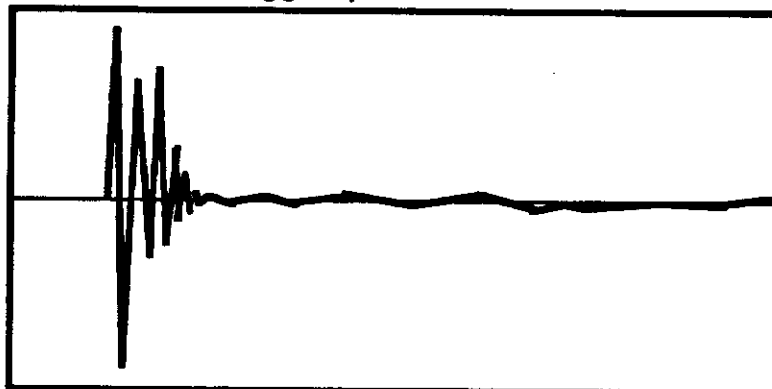get dynamics in your trigger playing without double triggering problems.

First, let's look at what these waveforms look like so that you can
understand why the settings used by the **drumKAT** are necessary.

The first waveform is that of a snare drum:
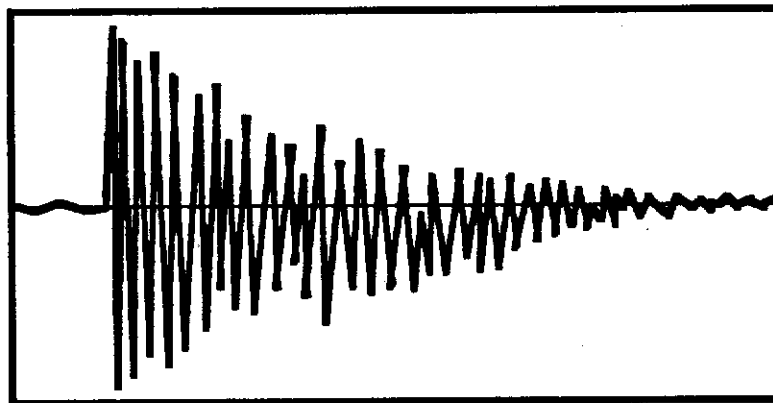
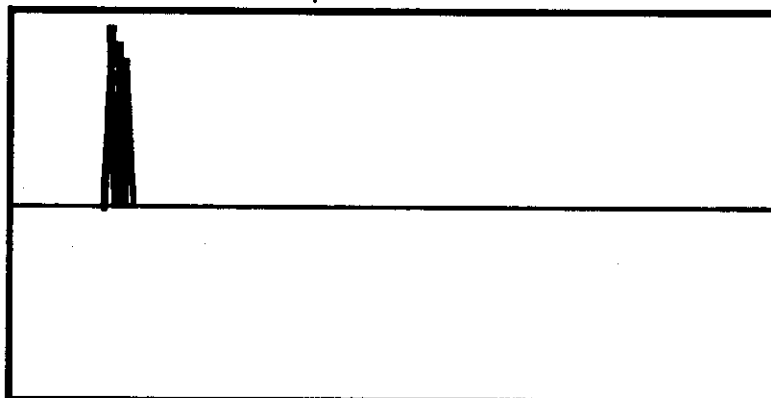<-- 200 milliseconds (0.2 sec) ------->

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Next, the waveform of a trigger pad:

<---->
20 milliseconds (0.02 sec)

Next, the waveform of an FSR pad:

<->
4 milliseconds (.004 sec)

The main difference between these waveforms is that the snare drum has a very *long* "decay time". Decay time is the time it takes for a signal to settle down to "quiet". Acoustic drums have a relatively long decay time - this is where the full *tone* of the drum is heard. A large tom-tom will have an even longer decay - up to 500 milliseconds (0.5 sec) or even longer.

If you wait 1 or 2 seconds between hits of an acoustic drum the signal from the drum will have settled down so that it is easy to differentiate the two hits as separate hits. This is how most trigger-to-MIDI devices before the **drumKAT** and **midiKITI** required you to play. However, if your hits are 60 milliseconds (0.06 sec) apart it is a tricky business to figure out what is going on.

Snare drum: 1st Hit   2nd Hit
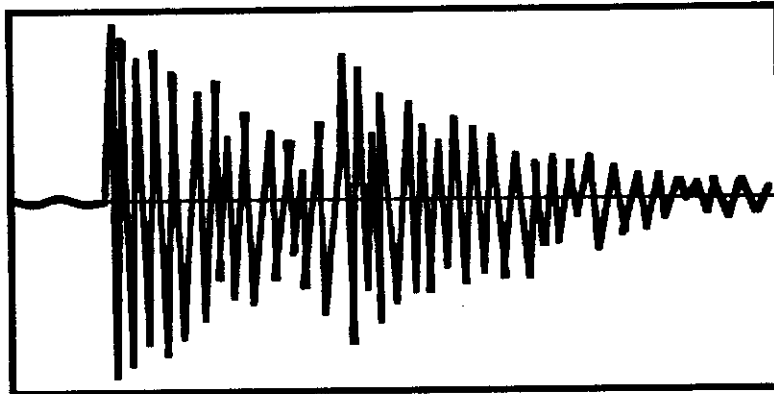
Trigger pad: 1st hit   2nd hit
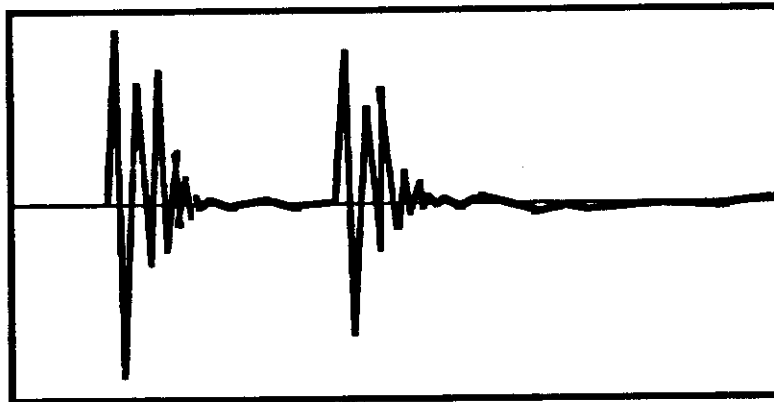
To make matters even worse different drums produce very different signals depending on how they are constructed, tuned and even mounted. Where the piezo head or shell trigger is mounted even makes a difference! To make sense of fast, dynamic playing on acoustic drums it is necessary to know what kind of signals are expected on the individual trigger inputs on the **drumKAT** and then use that information *wisely* to correctly sense dynamics and avoid double-triggering, but still allow fast playing. The **drumKAT's TRIGGER TRAINING** process allows it to get the information that is needed about your triggers/drums.

The **TRIGGER TRAINING** process asks you to first select an appropriate **GAIN** setting by using a bar-graph display of your dynamics. Then it asks for a **SOFT** hit and a **HARD** hit. The **drumKAT** uses these two hits to figure out a **MASK TIME**, a **THRESHOLD**, and a representation of the trigger's **envelope** (overall "shape" of the hit - especially crucial in acoustic triggering) to allow the **drumKAT** to respond to the trigger without double or false triggering. The **drumKAT** also uses the **SOFT** hit and **HARD** hit to adjust the trigger's response to your personal dynamics (as it also does for the Pads - Session 9).

To **TRAIN** the **drumKAT** for your trigger first press FOOTSWITCH 1 to enter the PRE-EDIT Screens. Now hit Pad 8 twice to select **TRIGGER ADJUST** . The screen now says:

```
set trg1: gainL6
hdroom10 thrsh04
hitPAD7 to train
```

You can select which trigger input you want to "**TRAIN**" or adjust by hitting pad 6 if the cursor is on the "trg" selection, or you can use the Sound Advance pad (pad 4) so that you can keep the cursor on some other value, or you can simply hit the trigger itself (and if the **drumKAT's** current settings for that trigger allow it to respond that trigger will be selected for adjustment).

During the **TRIGGER TRAINING** process your hits will not send any MIDI NOTE information out. This is to make sure that you don't alter your hits because of internal VELOCITY settings in the **drumKAT** or because of the way the sound responds on your drum machine. Your soft and hard hits should be based on how you *want* to play, not on the end result of what you are hearing. The end result can be adjusted once you have trained the trigger input properly for your dynamics.

The strength of every hit of your trigger will show up as a "**bar-graph**" reading on the top line of the display. This line will grow or shrink with your trigger's dynamics like a thermometer or a bar graph. You have 16 different **GAINs** to choose from. The goal here is to select a **GAIN** that gives the *widest spread* of response on the bar graph. The characteristics

of some triggers are such that a higher **GAIN** # produces no greater result, or even less of a result than one particular lower **GAIN #**. Don't let that bother you. Also you don't need to have your soft hits be 1 square and your hard hits be full scale. Just select the gain that gives the widest spread on the bar graph from soft to loud hits. The drumKAT software and dynamic table adjustment will adjust for that so that you still get a wide velocity response. Basically, you want to select a GAIN that is high enough to give you good sensitivity to soft hits, but not too much GAIN that causes medium hits to fill the whole bar-graph (overdrive the input).

The **TP** on this screen is the **THRESHOLD POINT** for your trigger. This is the setting (between 1 and 99 out of 255) for the **threshold** at which the peak of your trigger signal will be able to be seen as a hit. This setting is automatically read during the next soft-hard part of trigger training based on the "idle level" of your trigger. You normally don't need to adjust it unless you want to increase the low-end sensitivity of your trigger or if you need to try to reduce an interaction problem you are having - in that case you can try incrementing this value. However, trigger interaction problems are generally a sign that the physical location of your triggers needs to be rearranged or that you need to change your "trigger interaction settings" (explained later in this SESSION). The more you raise your **TP** the less sensitivity you will have. The more you lower your **TP**, the more likely you are to have false-triggering. (5 to 10 is a typical range)

Also on this screen is a setting for **"HEADROOM"**. Basically if you are getting double-triggering raise the **"hdroom"** and **TRAIN** again (changing the **hdroom** setting only affects *FUTURE* training sessions).
If you want to know more about this keep reading, if you are not in a technical mood then skip down to **"Back to the actual training"**.

This is a somewhat difficult one to explain. To explain this we will need to get technical. Along with your "Dynamic Range", the other major job of **TRIGGER TRAINING** is to store a representation of your trigger's **"ENVELOPE"**. This **"ENVELOPE"** is the overall shape of the decay of your trigger waveform. This stored **ENVELOPE** is used in PLAY mode to recognize the difference between a single hit and more than one hit on this trigger. Immediately after a hit of a trigger this **ENVELOPE** is used and for a new hit to be recognized the "hit" must rise *above* this **ENVELOPE**. Each hit of your trigger is slightly different than each other hit (kind of like "no two snowflakes are alike"). So when this **envelope** is stored away the **headroom** setting is used as a *"safety margin "* to make

the **envelope** less sensitive to double-triggering. The larger the **hdroom** used in a training the less likely an extra little wiggle in the trigger signal will cause a double-trigger. (If you make the **hdroom** too large, fast playing may not be tracked well or a Soft hit immediately following a Hard hit may not be accurately picked up.)
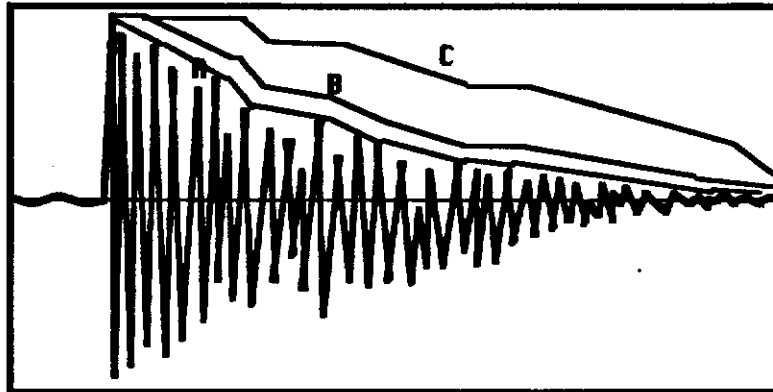
Above is shown a HARD hit in TRAIN and the resulting **ENVELOPE**s that would be stored for 3 different values of **HEADROOM**. **ENVELOPE** "A" is the result for a **HEADROOM** of "0". Note the **ENVELOPE** follows the waveform closely. **ENVELOPE** "B" would be the result if a **HEADROOM** of "10" were selected. This **ENVELOPE** still follows the waveform fairly closely, but more of a "safety-margin" is incorporated into the **ENVELOPE** when it is constructed. **ENVELOPE** "C" would be the result if a **HEADROOM** of "64" had been selected. This **ENVELOPE** incorporates a large safety-margin. If you intend to play on this trigger slowly then that is fine. However if you intend to play fast, the second hit may not actually be seen as a second hit!

Below is shown the two fast hits with the 3 different **ENVELOPES** superimposed upon them:

1st hit   2nd hit
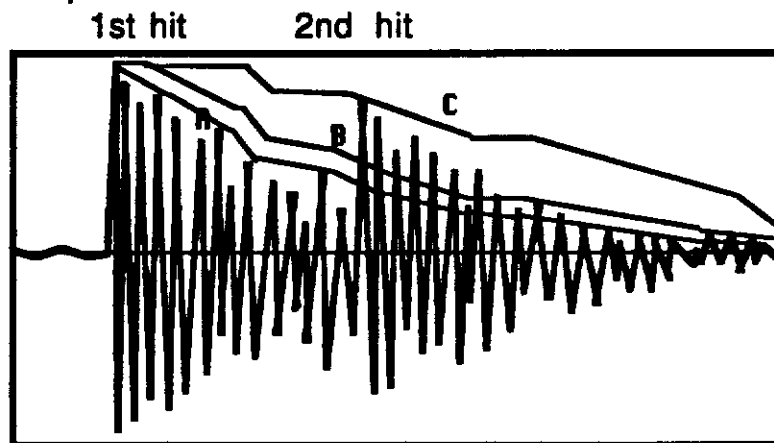
If **ENVELOPES** A or B were being used in the **drumKAT**, the 2nd hit would be correctly recognized (and at that point a *new* **ENVELOPE** would be

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started internally to track this *new* hit!) However, if **ENVELOPE C** were being used, the 2nd hit would not be big enough to get over the internal **ENVELOPE** that the software in the **drumKAT** is using because of the big safety-margin used when the **ENVELOPE** was constructed at **TRIGGER TRAINING** time.

Back to the actual training, once you have selected the best **GAIN** setting you can find, hit Pad 7 (as the screen suggests) to do the actual **TRAINING** and the following screen will appear:

```
┌─────────────────────────┐
│  HIT  TRG1  ONCE        │
│        SOFT!            │
│  TO  SET  BOTTOM  OF    │
│  DYNAMIC  RANGE         │
└─────────────────────────┘
```

So hit it **SOFT!** If it does not respond then you must hit a little harder until it does respond (maybe you should increase your **GAIN** or lower your **THRESHOLD**). When the **drumKAT** sees your trigger it will measure the peak of your soft hit and store it away as your "**LOW DYNAMIC**" and then say:

```
┌─────────────────────────┐
│  the  IDLE  LEVEL       │
│  of  your  trigger      │
│    is  now  being       │
│    measured.            │
└─────────────────────────┘
```

Don't hit your trigger during this message because it will affect the determination of your **TP** . Then, after 2 seconds, the Beeper locks on and the screen says:

```
┌─────────────────────────┐
│    HIT TRG1 ONCE        │
│  HARD(off center)       │
│   TO SET TOP OF         │
│   DYNAMIC RANGE         │
└─────────────────────────┘
```

So hit it **HARD**! The **drumKAT** measures your **Hi Dynamic**, stores an **Envelope** based on the actual waveform and your **HDROOM** setting, and stores a **Masktime**. The Beeper then shuts off and the message switches to:

```
┌─────────────────────────┐
│   PLAY TRIGGER1         │
│   if ok hit pad6.       │
│   TO RETRAIN:PAD7       │
│   to finetune:pad1      │
└─────────────────────────┘
```

Now you can play on your trigger and hear the response because it will now send out MIDI NOTE information. At this time you are given three choices: 1) If you like the way the trigger is responding you can hit pad 6 (this will put you back at the bar-graph screen with the next trigger selected). 2) If you don't like the results of your **TRAINING** you can hit PAD7 and you will be asked for the SOFT and HARD hits again (remember, that the Velocity settings in your current Kit will affect how your hits sound). 3) If you hit pad 1 you will advance to the next **TRIGGER ADJUST** screen where you may do some finetuning.

If you choose to hit pad 1, you will screen advance to the next of the remaining three screens in the **TRIGGER ADJUST** screens.

```
┌─────────────────────────┐
│  t1:masktime 35mS       │
│  gainL6     thrsh04     │
│   low dynamic= 63       │
│  high dynamic=246       │
└─────────────────────────┘
```

On this screen you can see and adjust the mask time (which is the time period after the trigger is recognized during which the trigger is ignored or not allowed to retrigger under any circumstances), the gain, threshold, and low and high dynamics. The low and high dynamics are the measurements that were taken of your SOFT and HARD hits during **Trigger Training**. Under normal circumstances you would probably not adjust any of these settings.

The next screen allows you to handle **trigger-interaction** problems. Since most triggers are piezo-based, interaction between them can be a real big problem. Two trigger pads on the same stand will quite often cross-trigger each other because of vibrational coupling through the stand. Also head triggers on acoustic drums that are very close to each other will sometimes cross-trigger each other because of either vibrational coupling through a stand or actual audio coupling because of the nearness of the two drums to each other. This screen can eliminate this problem with very little compromise on your ability to play simultaneously on those actual triggers. The screen is as follows:

```
trig interaction
   suppression
supp factor= 25%
supp time = 20mS
```

Trigger-interaction suppression works like this:

When a trigger is hit, some % of its peak is stored away as a "suppression factor" for a short period of time after the hit. This value is how big any other trigger must be to be seen as a hit. A % of the original hit is used because trigger interaction is usually greater for Harder hits than for Softer hits. The suppression time can vary from 20 to 90 mS. Believe it or not sometimes the interaction signal from the 2nd trigger can actually be 80mS after the original hit that caused the **interaction**. This is especially true if there are rubber isolation grommets on the triggers involved. Rubber for isolation does decrease the amount of interaction, but it also *slows down* the interaction signal!

The best procedure for dealing with interaction is:

1. Set the suppression factor at 100% and suppression time at 20 mS.

2. Now increase the suppression time until the interaction is gone.

3. Now decrease the suppression factor to the lowest setting at which no interaction occurs.

The last of the **TRIGGER-ADJUST** screens is:

```
select #of scans
to measure peak
of triggerinputs
  trg1  6SCANS
```

Different types of triggers take significantly *longer* than others to exhibit their peak (which tells the true strength of the hit). However, it is undesirable to wait longer than is absolutely necessary because any wasted time results in a *delay* until the note is sounded. Because of this the **drumKAT** allows you to select how many **scans** or "snapshots" of your trigger should be taken before it is assumed that the actual "peak" has been seen.

All 9 triggers have their own "**# of SCANS**". This setting allows you to make a trade-off between **MIDI delay** and accuracy of the reading of the peak of the trigger. It should be noted here that the actual problem of **MIDI delay** is mainly in the receiving sound sources not in the **drumKAT** itself. The "hottest" current drummachines take about **6.2 mS** to respond *AFTER* they have received all of the MIDI information.

A "SCAN" is one "look" at the size of the trigger level. Each look occurs during a processing loop in which all of the pads, triggers, and footswitches are checked (as well as MIDI IN etc.). This loop takes 1/2 of a millisecond. A low # of scans like 3 results in a very short **MIDI delay** (1.5 mS from hit to MIDI completely sent out) but a less accurate reading of the peak of the trigger waveform because not very much of the trigger waveform has been seen. A large # of scans, like 9 means you are very likely to have an accurate reading of dynamics but a longer **MIDI delay** (9 Scans is 4.5 mS from hit to MIDI completely sent out).

The goal here is to pick the smallest # of Scans that results in a consistent and accurate reading of your playing dynamics. The best setting depends very much on the specific trigger used. The best ones available reach their peak quickly (within 1 mS) and therefore need only 3 or 4 Scans to have the peak be seen. However, some triggers that are designed differently take about 2 or 3 mS to reach their peak (some particularly bad ones actually take around 7 or 8 mS to reach their peak!). On these slow responding ones a larger # of Scans must be used so that enough time has occurred for the peak to be reached and measured.
A setting of "5 or 6" is generally pretty safe in consistent dynamics and minimal **MIDI delay**.

When you are done training triggers press FOOTSWITCH 1 to return to PLAY MODE.

SOME SUGGESTIONS ON TRIGGER TRAINING:

1) Getting a workable trigger happening is generally a trade-off between **GAIN** settings. Therefore it is not unusual to try retraining a trigger a couple of times until you find a setting that is the best compromise of dynamics, sensitivity, and tracking.

2) Because most triggers have piezo-crystal elements instead of **FSR**, you should not expect them to respond as well as the playing surface of the **drumKAT**. Experimenting with what you do for the hard and soft hits can produce different results in the resulting dynamic range. Sometimes the best resulting dynamics can be gotten by giving a medium hit for both the soft and hard hit. Experimenting is the key.

See the **APPENDIX** for a **TRIGGERING TROUBLE-SHOOTING** guide.

In this SESSION you will learn about 1) **FOOTFUNCTION 2**, and **FOOTFUNCTION 4**.

FOOTFUNCTION 2

You may have actually learned some of **FOOTFUNCTION 2** already. When you do Kit Advances or Backsteps with Foot 2 and pads 3 or 6, or Song changes with Foot2 and pads 1 or 2 you were actually doing a FOOTFUNCTION. Now we will tell you what else you can do with FOOTSWITCH 2.
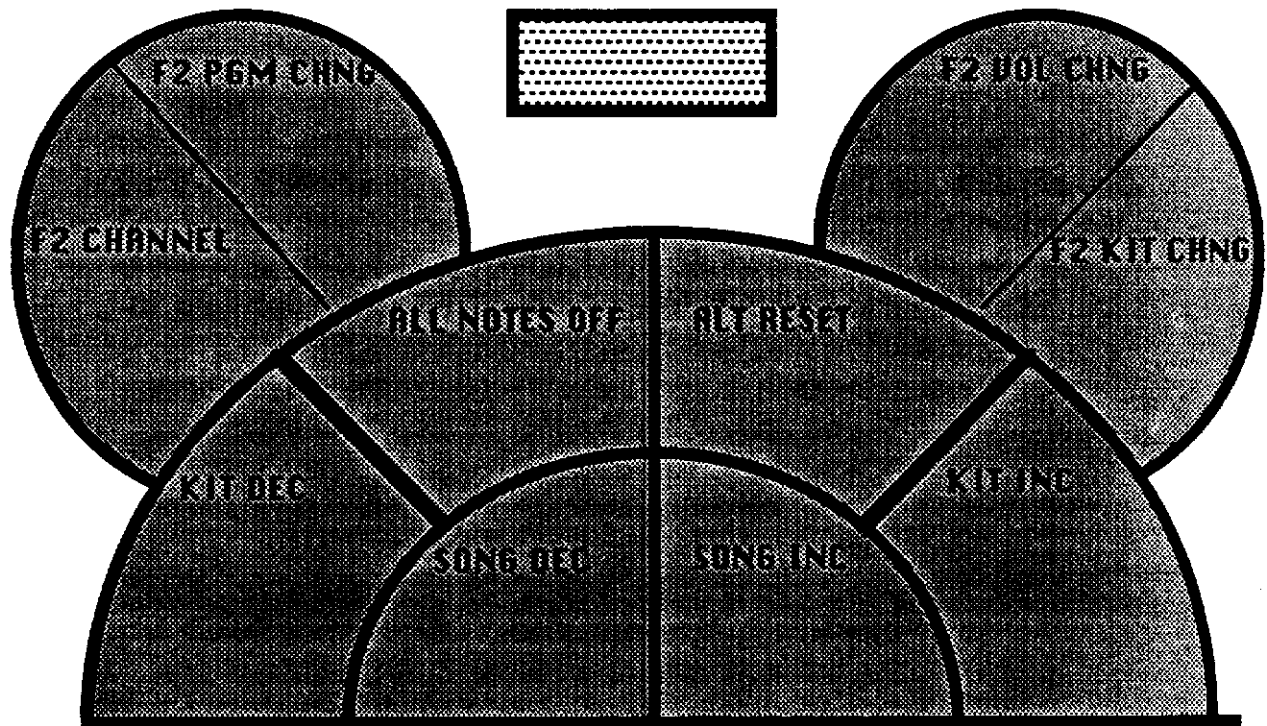
If you have forgotten KIT DEC, KIT INC, SONG DEC, and SONG INC go back and reread that section of SESSION 3.

If you press down on FOOTSWITCH 2 and *while it is still held down* hit pad 4 an **ALL NOTES OFF** burst will be sent out. This can also

be done with the Screens under pad 3 in "PRE-EDIT" mode. This is just another way to get at it.

If you press down on FOOTSWITCH 2 and *while it is still held down* hit pad 5 all of the **Alternating** pads and triggers will **be reset** to SOUND 1. If you are doing some kind of pattern with pads in Alternating mode you can be in serious trouble if you get out of sync. Hitting pad 5 while FOOTSWITCH 2 is down will always put you back to the beginning. This is one of the functions of HOME BASE. It is included here by itself to give you more flexibility.

You can use FOOTSWITCH 2 to send *live* **PROGRAM CHANGES, VOLUME CHANGES,** and **KIT CHANGES!** In this scheme pad **7** will select the **Channel**, pad **8** does the **PROGRAM CHANGE**, pad **9** does the **VOLUME CHANGE**, and pad **0** does the **KIT CHANGE**.

Setting which **Channel** to send to is done *live* with pad **7** when FOOTSWITCH 2 is down. On power-up the setting of "send channel" on KIT DEFAULTS SCREEN #7 is installed as the "live FOOTFUNCTION CHANNEL". To change that or select a new **CHANNEL** on the fly:

> **a)** Press down on FOOTSWITCH 2 and keep it down.
> **b)** Hit pad 7 to tell the drumKAT you are going to select a new "live FOOTFUNCTION CHANNEL".
> **c)** The next 2 pads you hit determine the Channel.
>   If you want Channel **13** hit pad **1** then pad **3**!
>   If you want Channel **10** hit pad **1** then pad **0**.
>   If you want Channel **07** hit pad **0** then pad **7**.
>   Channel **01** is pad **0** then pad **1**.
>   After the 2 pads are hit to determine the MIDI CHANNEL, you can choose **LEFT SIDE ONLY** by then hitting pad **9**, or **RIGHT SIDE ONLY** by hitting pad **0**. If you skip this, then both the LEFT *and* the RIGHT side will receive the ensuing PROGRAM or VOLUME CHANGES.
> **d)** Now release FOOTSWITCH 2.

To send a *live* **PROGRAM CHANGE**:

a) Press down on FOOTSWITCH 2 and keep it down.
b) Hit pad **8** to tell the **drumKAT** you are going to send a *live* **PROGRAM CHANGE**.
c) The next 3 pads you hit will determine the **PROGRAM CHANGE #**.
If you want **PROGRAM 125** hit pad **1** then pad **2** then pad **5**!
If you want **PROGRAM 91** hit pad **0** then pad **9** then pad **1**.
If you want **PROGRAM 3** hit pad **0** then pad **0** then pad **3**.
When the 3rd pad is hit the **PROGRAM CHANGE** is *sent out immediately*.
d) Now release FOOTSWITCH 2.


To send a *live* **VOLUME CHANGE**:

a) Press down on FOOTSWITCH 2 and keep it down.
b) Hit pad **9** to tell the **drumKAT** you are going to send a *live* **VOLUME CHANGE**.
c) The next 3 pads you hit will determine the **VOLUME CHANGE #**.
    If you want **VOLUME 125** hit pad **1** then pad **2** then pad **5**!
    If you want **VOLUME 91** hit pad **0** then pad **9** then pad **1**.
    If you want **VOLUME 3** hit pad **0** then pad **0** then pad **3**.
When the 3rd pad is hit the **VOLUME CHANGE** is *sent out immediately*.
d) Now release FOOTSWITCH 2.

To cause a *live* **KIT CHANGE**:

a) Press down on FOOTSWITCH 2 and keep it down.
b) Hit pad **0** to tell the **drumKAT** you are going to do a *live* **KIT CHANGE**.
c) The next 2 pads you hit will determine the **KIT#**. If you want **KIT 31** hit pad **3** then pad **1**!
    If you want **KIT 19** hit pad **1** then pad **9**.
    If you want **KIT 03** hit pad **0** then pad **3**.
When the 2nd pad is hit the new **KIT** is *selected immediately*.
d) Now release FOOTSWITCH 2.

You are only allowed to do one type of change at a time.
FOOTSWITCH 2 MUST BE RELEASED after a change is done, before a
new change is started.

FOOTFUNCTION 4
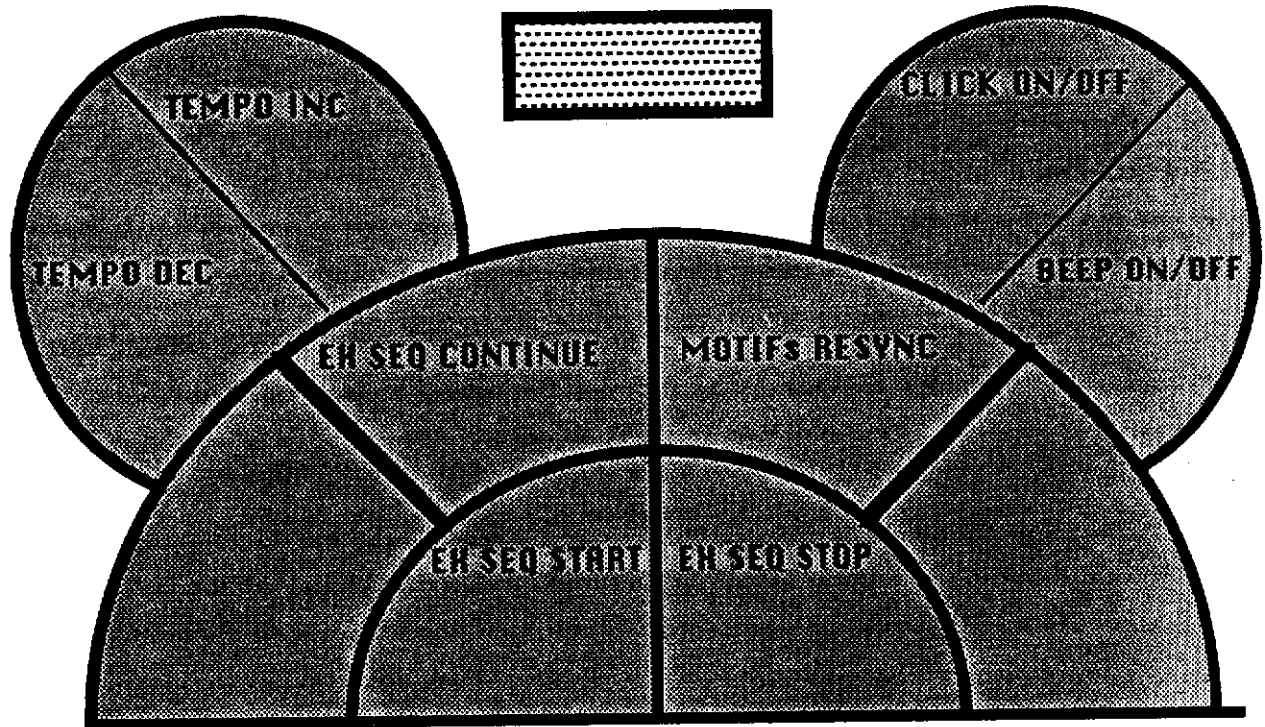
If you hit pad **1** *while* FOOTSWITCH 4 is pressed down a **MIDI**
SEQUENCE START command is sent out the **LEFT** pair of **MIDI**
jacks. This also starts the sending of a continuous **MIDI CLOCK** to
LEFT MIDI OUT. (No effect on internal MOTIFs).

If you hit pad **2** *while* FOOTSWITCH 4 is depressed, a **MIDI**
SEQUENCE STOP command will be sent to **LEFT MIDI** and the
external **MIDI CLOCK** will be **stopped**. (No effect on internal
MOTIFs).

If you hit pad **4** *while* FOOTSWITCH 4 is pressed down a **MIDI**
SEQUENCE CONTINUE command is sent out the **LEFT** pair of **MIDI**
jacks. This also starts the sending of a continuous **MIDI CLOCK** to
LEFT MIDI OUT. (No effect on internal MOTIFs).

If you hit pad **5** *while* FOOTSWITCH **4** is pressed down the internal MOTIFs will all **resync** to their beginning. The click track will also be resunc to this hit and a **MIDI SEQUENCE START** will be sent to **LEFT MIDI OUT** to also resync any external sequencing.

While FOOTSWITCH **4** is depressed, each hit of pad **7** will *decrement* the **TEMPO** and each hit of pad **8** will *increment* the **TEMPO** of the internal **TEMPO CLOCK**. If an internal **MOTIF** is playing or if external MIDI CLOCK is being sent to **LEFT MIDI OUT**, their tempos will instantly change since both are driven off of the same internal **TEMPO CLOCK**. This allows you to do an accelerando or decelerando on MOTIFs or external sequencers that are running. Or you can use this to set up a specific tempo before running a MOTIF or external sequence.

If FOOTSWITCH **4** is depressed, each hit of pad **9** will toggle **ON** and **OFF** the sending of the **TEMPO CLOCK** out the **CLICK OUTPUT** in beats per minute.

If FOOTSWITCH **4** is depressed, each hit of pad **0** will toggle **ON** and **OFF** the sending of the **TEMPO CLOCK** to the **INTERNAL BEEPER** in beats per minute.

APPENDIX A:

TROUBLESHOOTING HELP:

If you are having trouble playing into your synth or drum machine with the **drumKAT** check the following:

1) Make sure that the **drumKAT,** your synth, and your amp are all turned on.

2) Make sure that your synth makes sound when you play on its own keyboard, if it has one.

3) Make sure that you have a MIDI cable connected from a **drumKAT** MIDI OUT to your synth's MIDI IN. You might also try using a different MIDI cable.

4) Verify that your **drumKAT** is "seeing" your playing pads by doing the **KIT EDIT SHORTCUT** with FOOTSWITCH 1 and each of your pads. While you do this verify that the settings of the pads are appropriate for the MIDI device you want to control. Try putting the pads in **SIMPL** Mode, on MIDI Channel 01. Find out what MIDI Note numbers the receiving device needs to see and adjust the settings of your Pads accordingly. Set your Velocity range to 120-127, Curve 01, and Gate Time to 2.000 Seconds.

5) Verify that your synth is on the same MIDI CHANNEL as the **drumKAT** and is set up to receive incoming notes and control information. Also verify that there is nothing unusual about the sound you synth is making (like a slow building texture sound that a short HOLD TIME is not long enough for).

6) Check the power connections to all your **drumKAT** and the instruments and amplifiers involved.

7) If your **drumKAT** doesn't turn on at all check the fuse (Appendix B).

IF YOU EXPERIENCE A PROBLEM WITH YOUR drumKAT, TRY TO ISOLATE SPECIFICALLY WHERE THE PROBLEM IS. -- IS IT YOUR SYNTH OR AMP? HOW ABOUT YOUR FOOTSWITCHES OR MIDI CABLES OR POWER CABLES? *THE MORE YOU CAN RULE OUT OR DISCOVER BEFORE YOU CALL US, THE EASIER IT WILL BE FOR US TO HELP YOU SOLVE YOUR PROBLEM.*

APPENDIX B:

CHECKING YOUR FUSE:

FIRST REMOVE THE POWER CORD FROM THE BACK OF THE drumKAT!

In the back of your **drumKAT** next to the ON/OFF switch is a "fuse drawer" with a window that says 110 or 220 depending upon what power selection your **drumKAT** is set for. Looking at the fuse drawer from the back of the **drumKAT** there is a latch on the left hand side. Pull the latch to the right and pull the fuse drawer out. You will see a fuse protruding from the back of the bottom of the fuse drawer. Look a the fuse visually or check for continuity with an ohmmeter. If you think the fuse is bad, replace it. The specifications of the fuse are:

> 5 x 20 mm Slow Blow, 250 V, .125 (1/8) Amp

When putting the fuse back in the fuse holder note that only about 1/4" of the fuse gets held by the metal retaining clips, the rest of the fuse protrudes out about 1/2" out of the back of the bottom of the fusedrawer. Slide the fuse drawer back into the **drumKAT** receptacle until the latch on the fuse drawer catches.

CHANGING YOUR 110V / 220V SLECTION:

FIRST REMOVE THE POWER CORD FROM THE BACK OF THE drumKAT!

Remove the fuse drawer as described above in the CHECKING YOUR FUSE section. Remove the small plastic housing (that retains your fuse) from the fuse drawer. Turn this square plastic fuse holder around and reinsert it into the fusedrawer so that the correct voltage is visible from the window on the front face on the fuse drawer. Slide the fuse drawer back into the **drumKAT** receptacle until the latch on the fuse drawer catches.

APPENDIX C:

WARRANTY:

The drumKAT has a limited warranty. The drumKAT is warrantied against defects due to materials or workmanship for 90 days on labor and 1 year on parts.

WARRANTY RESTRICTIONS: Damage or defects sustained through unauthorized repair or tampering, or abusive treatment are not covered by this warranty. The warranty does not cover damages to the drumKAT as a result of improper line voltage.The shipping expenses and arrangements for repair are the responsibility of the purchaser.

APPENDIX D:

INSTRUCTIONS FOR INSERTING NEW SOFTWARE CHIPS FOR
SOFTWARE UPDATES:

TOOLS NEEDED: 1 Small flat and 1 medium flat screwdriver.

1) FIRST REMOVE THE POWER CORD FROM THE BACK OF THE drumKAT!

2) Find a smooth, clean, flat surface and place your **drumKAT** upside down on it with the jacks facing away from you.

3) Remove back cover of the **drumKAT** (10 screws).

4) When the **drumKAT** is opened you should see a large circuit board.

5) On the side of the circuit board closest to you is a chip in a special socket. This socket has machined, gold pins to insure that your software chip will continue to make good contact in the socket. Note that the chip in the socket has a white label on it. The label should read "drumKAT vX.X", where X.X is the version # of this software chip.

6) To remove the old chip, you will use your small flat screwdriver. You want to pry the chip out of its socket. The socket is soldered into the circuit board, so don't try to pry the socket out. You also want to take turns prying a little bit at a time on each side of the chip. If you pry a LOT on one side, you will bend the cute little legs on the other side as the chip pivots on them. Don't be scared - just pry a little on each side alternately until the chip is out. Take your time, don't be in a hurry. Make sure you insert the small screwdriver BETWEEN THE CHIP AND THE **SOCKET** before you start to pry each time (**INSTEAD OF BETWEEN THE SOCKET AND AND THE CIRCUIT BOARD**)

7) After you have the chip out, place the new chip in the sockets: Take a little care to align the legs of the chip into the pins of the socket. Then push down evenly on the chip. It should snuggly push down into the socket. Visually check to see that none of the legs got squished and are smashed under the chip.

8) Replace the back cover and put the 10 screws back in.

9) Turn your **drumKAT** back over and reinsert the power cord. Now turn your **drumKAT** back on. If the display is working then you are OK. If the display is not working then:

    a) Remove the power cord again.
    b) Turn the **drumKAT** back over and remove the 10 screws.
    c) Take the back cover off again.
    d) Try reinserting the chips (pry them out again to make sure the legs didn't get bent under the chip).
    e) Put the back cover back on, turn the **drumKAT** back over, reinsert the power cord and turn the power back on.
    f) If this still fails put your OLD software back in and give us a call.

10) After you have had the new software in and used it for several days, please send the old chip back to us. They are very reusable.

SYSTEM EXCLUSIVE DATADUMP DOCUMENTATION:

A **drumKAT** SYSTEM EXCLUSIVE DATA DUMP consists of two parts:

1) A 6 byte "header" that describes the dump and
2) The DATA! The # of bytes of the DATA is determined by the type of dump.

The 6 bytes of the header are defined below:

HEADER:

byte1:	(0F0H)	Start of System Exclusive Status Byte
byte2:	(00H)	
byte3:	(00H)	
byte4:	(15H)	[00H, 00H, 15H] is KAT's Company ID #.
byte5:	(68H)	Instrument ID # for the drumKAT.
byte6:	(00H - 05H)	DUMP TYPE:

00 = GLOBAL INFORMATION
01 = 1 KIT
02 = ALL MEMORY   (about 64 KBytes SYSEXC DATA)
03 = ALL KITS
04 = 1 MOTIF

The DATA is split into nibbles and sent in the following format: "X" is a variable DATA nibble.

DATA:

byte1:	0XH	Where X is the 1st nibble of DATA.
byte2:	1XH	Where X is the 2nd nibble of DATA.
byte3:	2XH	Where X is the 3rd nibble of DATA.
byte4:	3XH	
byte5:	4XH	
byte6:	5XH	
byte7:	6XH	
byte8:	7XH	
byte9:	0XH	Where X is the 9th nibble of DATA.
byte10:	1XH	Where X is the 10th nibble of DATA.

etc. etc.   etc. etc.

It takes two bytes of SYSTEM EXCLUSIVE transmission for every byte of raw DATA.

After all the DATA has been sent, the End Of System exclusive command (0F7H)
 is sent.

Function		Transmitted	Recognized	Remarks
Basic	Default	1 - 16	1 - 16	(L,R provides 32
Channel:	Changed	1 - 16	1 - 16	channels)
	Default	Mode 3	x	
Mode:	Messages	POLY,MONO	x	
	Altered			
Note		0 - 127	x	
Number:	True Voice	************	x	
Velocity:	Note ON	1 - 127	x	
After	Key's	x	x	
Touch:	Ch's	In Pressure Control	x	
Pitch Bender:		In Pressure Control	x	
Control				
Change:		0	x	Main Volume
Prog		0 - 127	0 - 127	Can be transmitted to
Change:	True #	************	0 - 127	6 Channels at once
System Exclusive:		o	o	1 kit, global, all memory all kits, 1 motif
System:	Song Pos	x	x	
	Song Sel	x	x	
Common:	Tune	x	x	
System:	Clock	o	x	and controlled by tap tempo
Real Time:	Commands	o	x	STOP, CONTINUE
Aux:	Local ON/OFF	x	x	
	All Notes OFF	o	x	
Mes-	Active Sense	x	x	
sages:	Reset	x	x	

Notes:

Note OFF by Internal HOLD time, or continued manual
holding on Note Pad

Mode 1: OMNI ON, POLY	MODE 2: OMNI ON, MONO	o:Yes
Mode 3: OMNI OFF,POLY	MODE 4: OMNI OFF,MONO	x:No

APPENDIX G:

CURVE DOCUMENTATION:

For those of you who are truly gluttons for punishment, we will now get MATHEMATICAL about **VELOCITY**. This will include tables and formulas explaining how the **drumKAT** determines the MIDI VELOCITY values that it sends out for the notes you play on the **drumKAT**.

The CURVES discused here are discussed in the context of velocity because that is generally how you will use them. However, these are the same curves that are used in NOTE SHIFT, GATE SHIFT, and PRESSURE so similar principles apply in those situations.

The **drumKAT** internally can measure 256 distinct levels of dynamics from the **drumKAT** PADs or Trigger Inputs. Since MIDI Velocity has only 128 different levels the **drumKAT** has more steps of "resolution" than it needs. The **drumKAT** uses this extra resolution in combination with the **PAD ADJUSTMENT** and **TRIGGER TRAINING** software to give you a personalized dynamic range. The **drumKAT** derives a LO DYNAMIC and a HI DYNAMIC that it makes a table from to adjust to your playing dynamics. This table reduces the number of individual steps of resolution to 64.

The **drumKAT** must then take these 64 levels and correlate them to MIDI VELOCITY numbers that can range from 0 to 127. The **drumKAT** uses the **MINIMUM VELOCITY, MAXIMUM VELOCITY,** and **VELOCITY CURVE** settings to do this correlation. The actual formula used is:

$$\text{MIDI VELOCITY} = \text{MINVEL} + ((\text{VCURV})/127) \times (\text{MAXVEL} - \text{MINVEL})$$

This result is then compared to the MAXIMUM VELOCITY setting to insure that even if you put in backwards values for MINIMUM and MAXIMUM that the final result will always be less than the MAXIMUM setting.

The VELOCITY CURVE has a "**% multiplier**" for each of the 64 dynamic levels to dictate how to divide up the range between the MINIMUM and MAXIMUM VELOCITY settings. The 14 factory VELOCITY CURVEs in the KAT

are shown in table form below where 1 is your softest hit and 64 is your hardest hit.

(The truth of the matter is that these values are really 0-255 inside the drumKAT but we show them to you here and in the GLOBAL CURVE Definition Screen as 0-127 because MIDI has everyone expecting to see numbers ranging from 0-127!)

CURVE	DESCRIPTION
1	Linear. Very good for drumKAT pads. (old #14)
2	Starts high. Good for rock drumming. (New)
3	4 separate plateaus (old #10)
4	3 separate plateaus (old #9)
5	Stays low long with accent at top. (old #4)
6	Good for smooth low buzz rolls. (old #3)]
7	Linear with zeroes at the bottom. (old #8)
8	For smooth response on piezo trigger pads. (New)
9	For piezo pads. Faster rise than 8. (New)
10	Use with 11 to do a Multiple Vshift (New)
11	Use with 10. Only plays at the top. (New)
12	Reverse curve. Drops out only at the very top. (old #11)
13	Reverse curve. Drops out before top. (old #12)
14	Reverse curve. Drops out in mid-range. (old #13)

VCURVE 1:

Steps 1- 8	00	02	04	06	08	10	12	14
Steps 9-16	16	18	20	22	24	26	28	30
Steps 17-24	32	34	36	38	40	42	44	46
Steps 25-32	48	50	52	54	56	58	60	62
Steps 33-40	64	66	68	70	72	74	76	78
Steps 41-48	80	82	84	86	88	90	92	94
Steps 49-56	96	98	100	102	104	106	108	110
Steps 57-64	112	114	116	118	120	122	124	126

VCURVE 2:

Steps 1- 8	20	20	20	20	20	20	21	21
Steps 9-16	22	22	23	23	24	25	26	27
Steps 17-24	28	29	30	32	34	36	38	40
Steps 25-32	42	44	46	49	52	55	58	62
Steps 33-40	66	70	75	80	84	88	91	94
Steps 41-48	97	100	102	104	106	108	110	112
Steps 49-56	114	116	118	120	121	122	123	124
Steps 57-64	125	125	126	126	127	127	127	127

VCURVE 3:

Steps 1- 8	05	05	05	05	05	05	05	05
Steps 9-16	05	05	05	05	40	40	40	40
Steps 17-24	40	40	40	40	40	40	40	40
Steps 25-32	40	40	40	40	40	40	40	40
Steps 33-40	40	40	40	40	100	100	100	100
Steps 41-48	100	100	100	100	100	100	100	100
Steps 49-56	100	100	100	100	100	100	100	100
Steps 57-64	100	100	127	127	127	127	127	127

VCURVE 4:

Steps 1- 8	05	05	05	05	05	05	05	05
Steps 9-16	05	05	05	05	05	05	05	05
Steps 17-24	40	40	40	40	40	40	40	40
Steps 25-32	40	40	40	40	40	40	40	40
Steps 33-40	40	40	40	40	40	40	40	40
Steps 41-48	40	40	40	40	40	40	40	40
Steps 49-56	127	127	127	127	127	127	127	127
Steps 57-64	127	127	127	127	127	127	127	127

VCURVE 5:

Steps 1- 8	16	17	18	19	20	21	22	23
Steps 9-16	24	25	26	27	28	29	30	31
Steps 17-24	31	32	32	33	33	34	34	35
Steps 25-32	35	35	36	36	37	37	38	38
Steps 33-40	39	39	40	40	41	41	42	42
Steps 41-48	43	43	44	44	45	45	46	46
Steps 49-56	47	47	48	48	49	49	50	50
Steps 57-64	51	51	51	52	52	127	127	127

VCURVE 6:

Steps 1- 8	01	01	01	01	01	01	01	01
Steps 9-16	01	01	01	01	01	01	01	01
Steps 17-24	02	03	04	05	06	07	08	09
Steps 25-32	11	13	15	17	19	21	23	25
Steps 33-40	27	29	31	33	35	37	39	41
Steps 41-48	44	47	50	53	56	59	62	65
Steps 49-56	68	72	75	79	82	86	89	93
Steps 57-64	97	101	105	109	114	119	124	127

VCURVE 7:

Steps 1- 8	00	00	00	00	00	00	00	00
Steps 9-16	01	01	02	03	04	06	08	10
Steps 17-24	12	14	16	18	20	22	24	26
Steps 25-32	28	30	32	34	36	38	40	42
Steps 33-40	46	50	54	58	62	66	70	74
Steps 41-48	78	82	86	90	94	98	102	106
Steps 49-56	110	114	118	122	126	127	127	127
Steps 57-64	127	127	127	127	127	127	127	127

VCURVE 8:

Steps 1- 8	00	04	09	14	19	25	29	33
Steps 9-16	37	41	45	49	52	55	59	63
Steps 17-24	66	69	71	74	76	78	80	82
Steps 25-32	84	86	87	89	91	93	94	95
Steps 33-40	97	98	100	102	103	105	106	108
Steps 41-48	109	111	113	114	115	116	117	117
Steps 49-56	118	119	120	120	121	121	122	123
Steps 57-64	124	125	125	126	126	126	127	127

VCURVE 9:

Steps 1- 8	00	14	25	35	46	53	59	64
Steps 9-16	69	73	77	82	86	89	93	96
Steps 17-24	99	101	103	105	107	109	111	113
Steps 25-32	114	115	116	117	118	119	120	121
Steps 33-40	121	122	122	123	123	124	124	125
Steps 41-48	125	125	125	126	126	126	126	126
Steps 49-56	126	126	127	127	127	127	127	127
Steps 57-64	127	127	127	127	127	127	127	127

VCURVE 10:

Steps 1- 8	01	03	05	08	10	13	15	18
Steps 9-16	20	23	25	28	30	33	35	38
Steps 17-24	40	43	45	48	50	53	55	58
Steps 25-32	60	63	65	68	70	72	76	79
Steps 33-40	83	92	97	102	107	112	117	122
Steps 41-48	127	127	127	127	127	127	127	127
Steps 49-56	64	32	08	00	00	00	00	00
Steps 57-64	00	00	00	00	00	00	00	00

VCURVE 11:

Steps 1- 8	00	00	00	00	00	00	00	00
Steps 9-16	00	00	00	00	00	00	00	00
Steps 17-24	00	00	00	00	00	00	00	00
Steps 25-32	00	00	00	00	00	00	00	00
Steps 33-40	00	00	00	00	00	00	00	00
Steps 41-48	00	00	00	00	00	00	00	00
Steps 49-56	32	63	85	105	120	123	124	126
Steps 57-64	127	127	127	127	127	127	127	127

VCURVE 12:

Steps 1- 8	127	127	127	127	127	127	127	127
Steps 9-16	127	127	127	127	127	127	127	127
Steps 17-24	126	125	124	123	122	120	119	117
Steps 25-32	115	113	111	109	107	105	103	101
Steps 33-40	98	95	92	89	86	83	80	78
Steps 41-48	74	70	66	62	58	54	50	46
Steps 49-56	42	38	34	30	26	21	16	11
Steps 57-64	06	01	00	00	00	00	00	00

VCURVE 13:

Steps 1- 8	127	127	127	127	127	127	127	127
Steps 9-16	127	127	127	127	127	127	127	127
Steps 17-24	125	122	120	117	115	112	110	107
Steps 25-32	104	100	96	92	86	82	78	74
Steps 33-40	68	62	56	50	44	38	32	26
Steps 41-48	18	10	02	00	00	00	00	00
Steps 49-56	00	00	00	00	00	00	00	00
Steps 57-64	00	00	00	00	00	00	00	00

VCURVE 14:

Steps 1- 8	127	127	127	127	127	127	127	127
Steps 9-16	127	127	127	127	127	127	127	127
Steps 17-24	125	122	119	116	112	108	104	100
Steps 25-32	95	90	85	80	74	68	62	56
Steps 33-40	48	40	32	24	16	08	04	00
Steps 41-48	00	00	00	00	00	00	00	00
Steps 49-56	00	00	00	00	00	00	00	00
Steps 57-64	00	00	00	00	00	00	00	00

HINTS: Curves **11, 12,** and **13** are reverse curves. In NOTE SHIFT they will cause the pitch to go *down* as you hit harder.
In GATE SHIFT they will cause the Gate Time to get shorter as you hit harder. If used on a sound in MULTIPLE mode against another sound that is using a normal curve they will result in another kind of cross-fade.

Curves **3** and **4** have 4 and 3 plateaus respectively, within which the velocity will remain constant. For drum machines with a jumpy velocity response they may make it feel more consistent.

Curves **8** and **9** are specifically designed to be used with piezo trigger pads!

Curve Step

◇ Curve 1   □ Curve 2

Curve Step

◇ Curve 3   □ Curve 4

Curve Step

◇ Curve 5   ▫ Curve 6   ◆ Curve 7

Curve Step

◇ Curve 8   ▫ Curve 9

Curve Step

◆ Curve 10   ◻ Curve 11

Curve Step
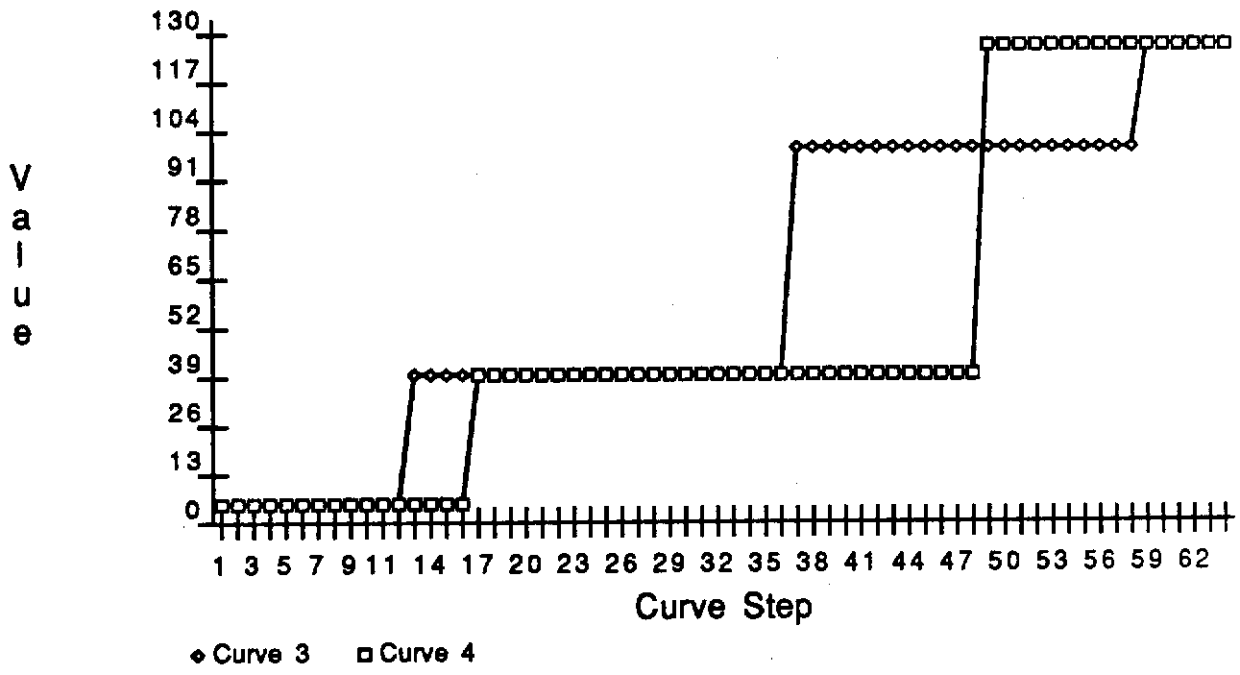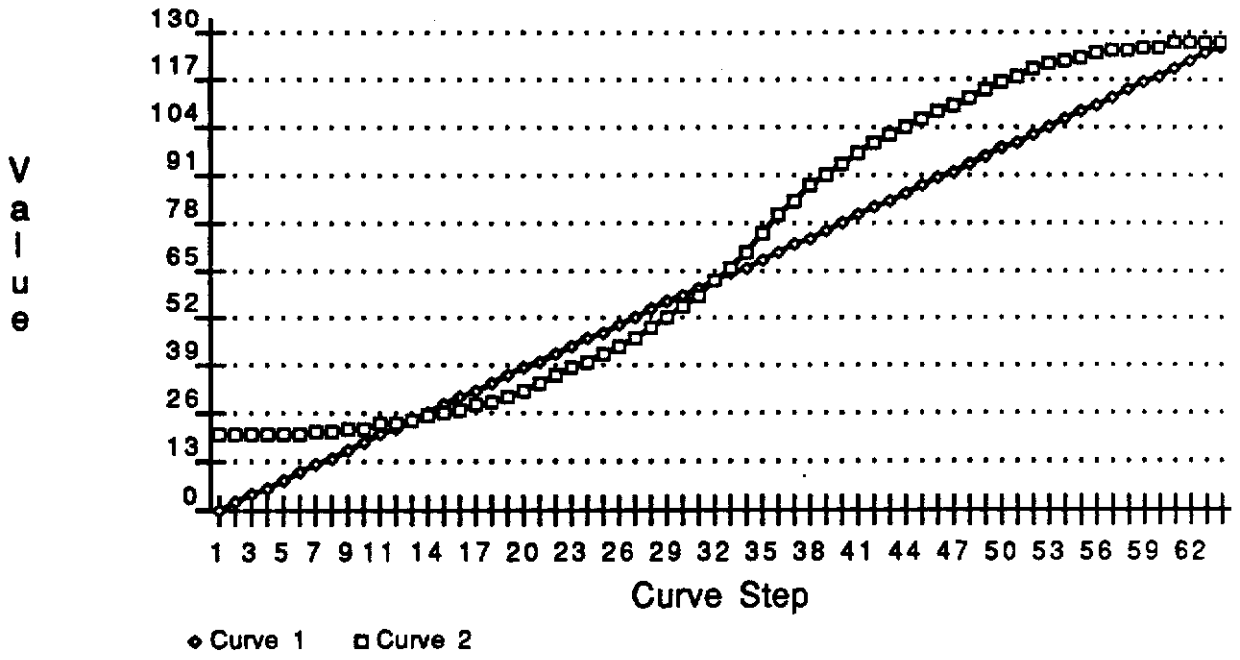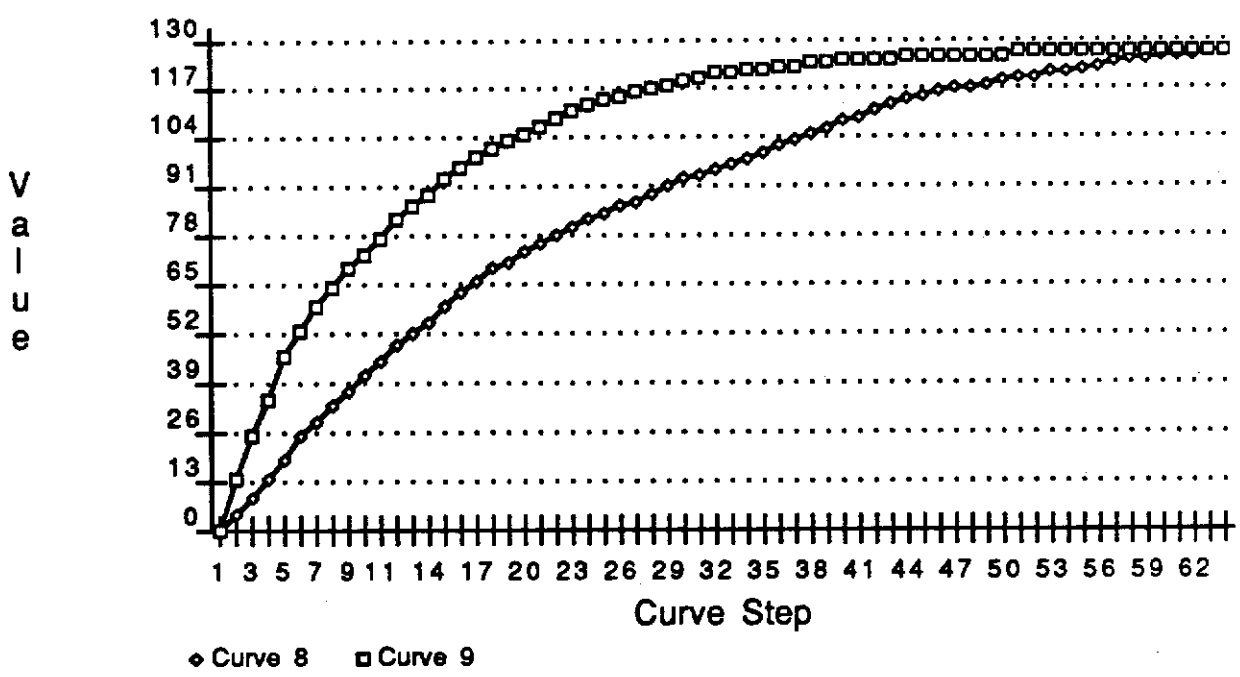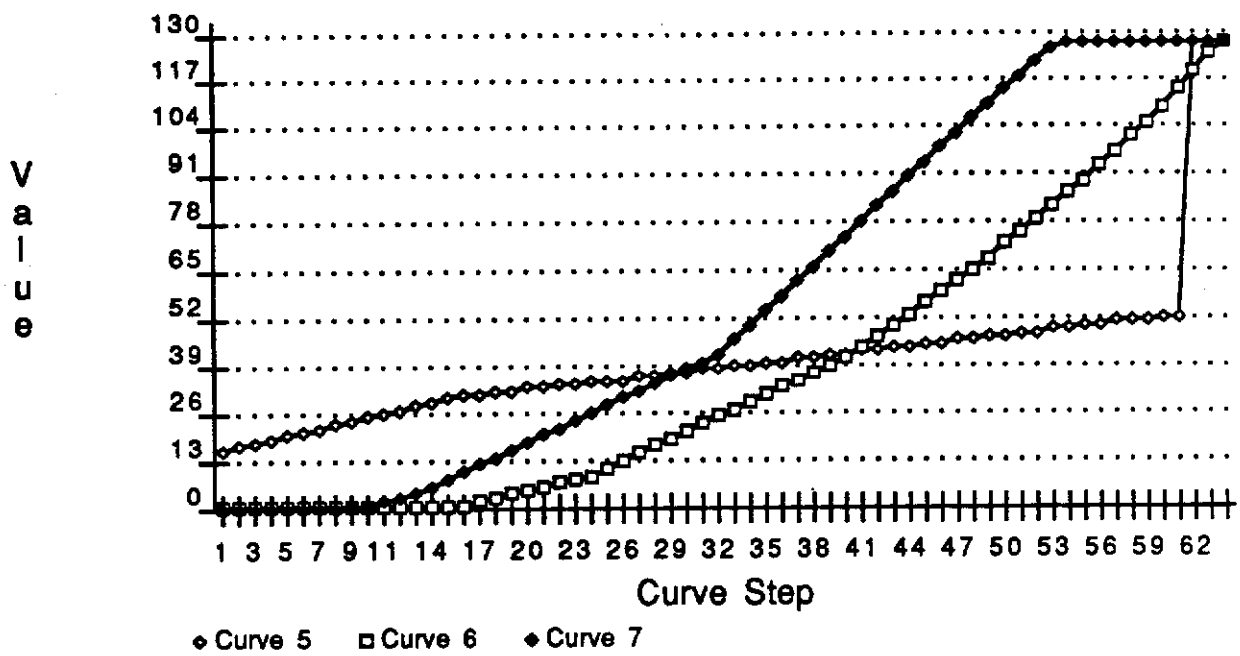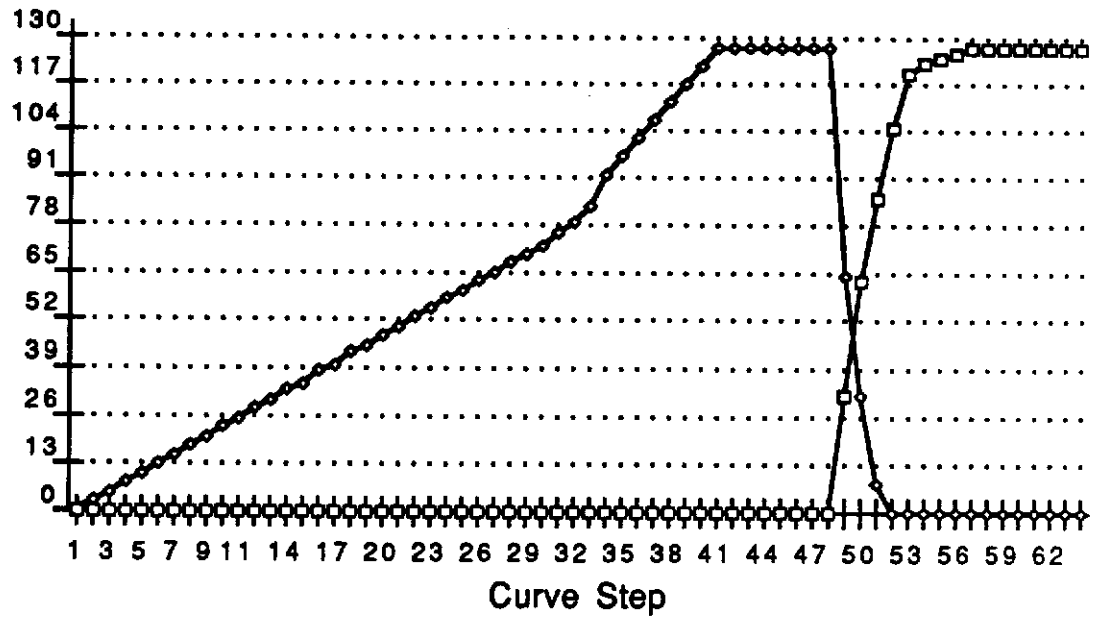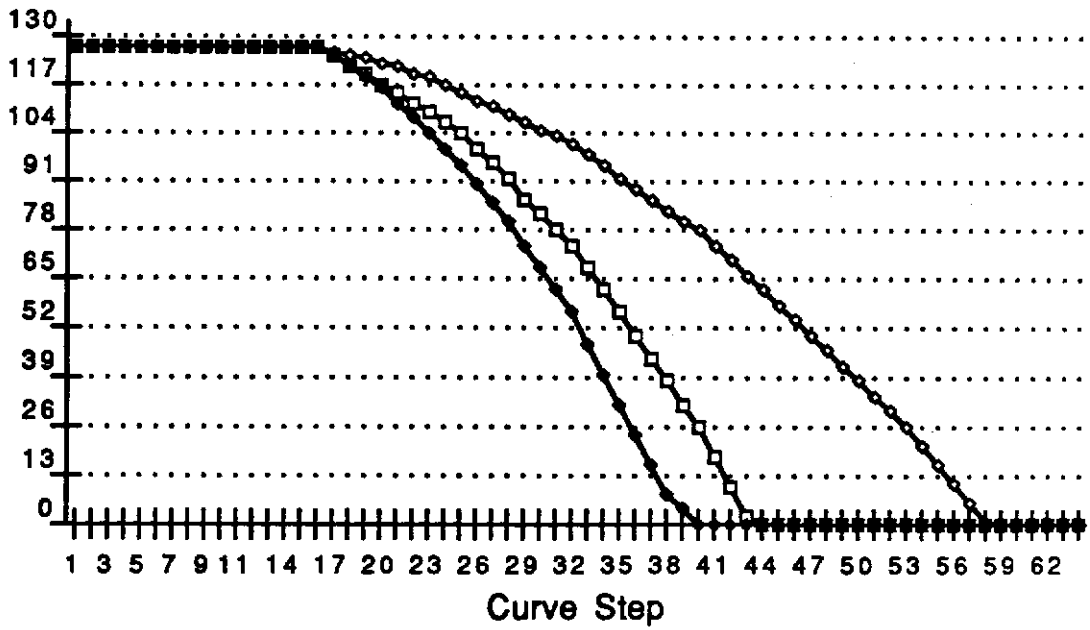
◆ Curve 12   ◻ Curve 13   ◆ Curve 14

APPENDIX H:

TRIGGERING TROUBLE SHOOTING GUIDE:

SYMPTOM	POSSIBLE CAUSE	REMEDY
Multiple triggers with just one hit.	drumKAT not Trained properly.	See SESSION 10.
	Wire of trigger is touching rim or shell of drum.	Shape wire so that no portion touches rim or shell.
	Trigger head is not seated well on drum head.	Remove trigger head, replace double stick foam tape, clean head with alcohol and then apply trigger to drum head.
False triggers when not hit.	Threshold Point is set too low.	Raise Threshold. (SESSION 10)
Drum triggering not sensitive.	Threshold Point is too high.	Lower Threshold. (SESSION 10)
	Not enough Gain on trigger.	Raise Gain. (SESSION 10)
	Bad trigger element.	Try another trigger.
Dynamice range not very wide.	Not enough difference between Soft and Hard hits in Training.	Retrain (SESSION 10) with larger difference between Soft and Hard hits. (Can be set manually by changing LOW and HI DYNAMICS .
	MIDI Velocity range not set right in current KIT or unusual Velocity Curve selected.	See SESSION 2 and APPENDIX G.
Adjacent drum triggers when you play a nearby drum.	Trigger Interaction time too short.	Lengthen time. (SESSION 10)
	Trigger Interaction % too low.	Raise % setting. (SESSION 10)

(courtesy of TRIGGER PERFECT.)

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