

# **DRUMULATOR OWNERS MANUAL**

## **How to Use this Manual**

You can use this manual to line bird cages, as kindling when starting a fire in the fireplace, as the raw material for creating paper gliders, or most importantly, as a guide to help you get the most out of the Drumulator.

Sections 1, 2, and 3 will acquaint you with the most common Drumulator functions. The further you go into each section, the more advanced the information. So, don't try to absorb a whole section at a time; experiment with the buttons and controls as you go along.

Section 4 describes the cassette interface, while Section 5 describes the various control jacks on the back. Section 6 deals with how to best use the Drumulator in studio environments.

Section 7 is a short-form summary of all the various functions presented in the first 6 sections. Once you become familiar with the Drumulator, this may be the only section, which you will ever need to refer to.

The Appendix contains background information, which you might find interesting. Or you might not. In any event, it's optional reading.

How else can you use this manual?

There are lots of ways, but for the moment, let's stick to its intended purpose. Flip the page, set up the Drumulator, and prepare to make some absolutely fantastic drum sounds.

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## **Drumulator Overview**

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The Drumulator is a rhythm/drum machine that features twelve digitally recorded drum sounds stored on computer chips, and extensive solid-state recording capabilities. You may record up to 36 individual rhythm patterns (called *segments*), and then combine these segments in just about any order imaginable to create up to 8 *songs*.

When composing/recording a segment (which can be up to 99 measures long!), a metronome click indicates the tempo, and a light shows the beginning of the segment. To record, say, the bass drum part of a rhythm, you listen to the metronome and play the bass drum wherever you want it to occur in the segment. The Drumulator then remembers where you wanted the bass drum, and can even correct for timing inaccuracies. You may record up to four drum sounds at any one time; you may then stop recording, change over to four new drum sounds, resume recording, and continue “overdubbing” these new drums for up to 12 drum parts. You can edit the part as you go along (erase some sounds, add others, erase only certain beats of certain sounds, and so on), alter the dynamics of each drum, and vary the overall mix of the drums.

You may play segments individually or combine them into songs. To create a song, you tell the machine which segments you want to use, the order you want them in, and any repeats, which might occur in the song. If you want to edit the song, no problem: you can insert new segments, delete old ones, add repeats, change tempos in the middle of a song, or even jump automatically to a different song after the first one has finished playing.

The Drumulator lets you create virtually any time signature you want, includes built-in battery backup which stores the segments and songs for up to five years (or, transfer this data over to cassette for permanent storage), provides long and short “beep” messages to confirm your instructions and advise you of the Drumulator’s status, and is compatible with any device that can drive other drum units — and even some devices which can’t drive other drum units.

There’s more, too . . . and as you might expect, this all takes some time to learn. So, settle in with this manual, and explore the Drumulator’s many possibilities.

## **SECTION 1: GETTING READY**

- 1A Hooking up the Drumulator.
- 1B Instant Gratification!
- 1C Assigning Drum Sounds to Play Buttons
- 1D Setting Drum/Percussion Levels
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## 1A Hooking up the Drumulator

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**Important:** The Drumulator was set for the AC voltage indicated on the sticker attached to the Drumulator's AC plug. If this voltage does not agree with the AC voltage present in your part of the world, **before turning on the Drumulator** make sure the Drumulator is unplugged; then, remove the bottom plate, locate the voltage selector switch (near the ON-OFF switch), and set it to the correct AC voltage.

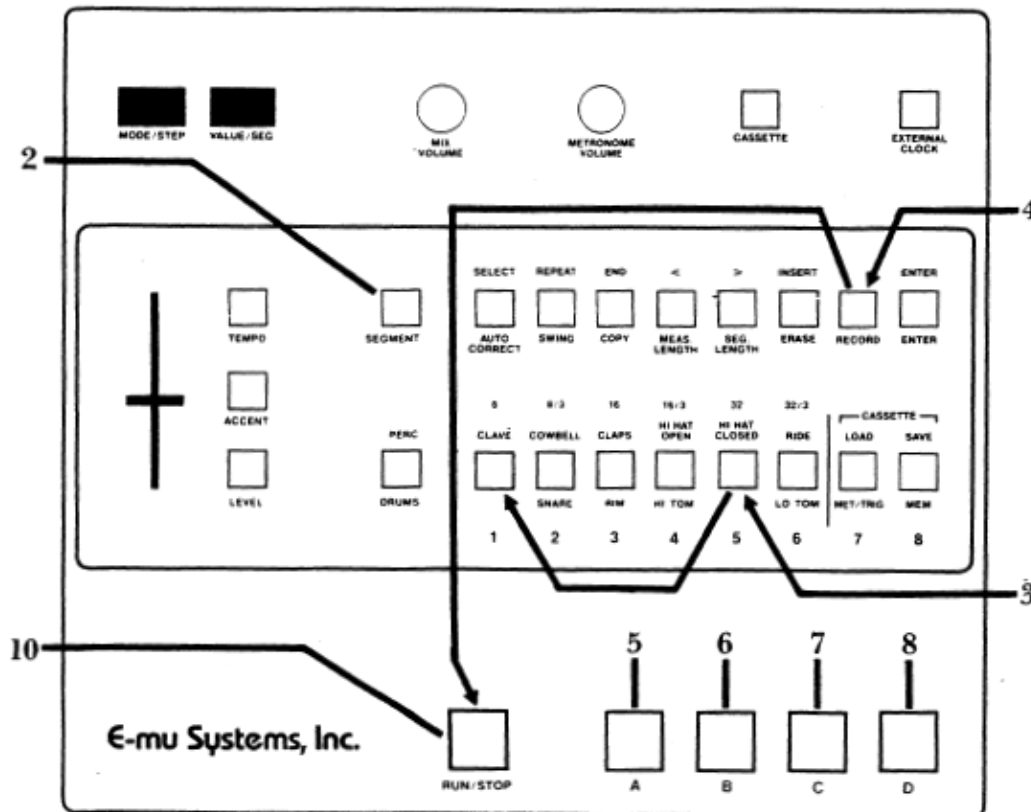
1. To prevent obstruction of the ventilation holes in the Drumulator's bottom plate, set up the Drumulator on a *hard* surface.
2. Patch a standard, guitar-type patch cord between the **MIX OUT** jack on the rear panel, and a high quality amp or mixing console. The better the sound system, the more life-like the sound of the Drumulator.
3. For private practice, plug high sensitivity earphones into the **MIX OUT** jack. An adapter (such as Radio Shack #274-367) will be required if your phones use 1/2" diameter instead of 1/4" plugs. You will hear the sound only in one ear (however, if you pull the plug outwards just a tiny bit from its fully seated position, in some cases you will hear the drums in both ears).
4. Make sure the ON-OFF switch is in the OFF position. Plug the line cord into a three-wire AC outlet. If only a two-wire outlet is available, you must use a 3-wire to 2-wire adapter (available at any hardware store). This adapter will have a wire coming out of it, which should hook underneath the screw holding the AC receptacle faceplate in place (this assumes the screw is metal and contacts the junction box ground).
5. Turn the **MIX VOLUME** and **METRONOME VOLUME** controls all the way to the left.
6. Turn the ON-OFF switch to ON; the Drumulator will run two self-tests. First, all LED's will light up briefly to show they're working properly. Second, there will be a memory integrity test. If there is any problem (bad back-up battery, parts failure, or whatever), the display will read **bAd**.  
  
Should the display read bAd, turn off the Drumulator, wait 10 seconds, and then turn it back on again. If the display continues to read bAd, clear the memory as described in Section 2M. If the **bAd** indication persists, contact your dealer.
7. Press switches A through D while turning up the **MIX VOLUME** control. You should start hearing drum sounds, and very realistic ones at that. Feel perfectly free to get carried away for a while playing those four sounds, but you should know there are eight other sounds available, so proceed whenever you're ready.
8. Turn up the **METRONOME VOLUME** control approximately half way (this is a preliminary setting; adjust to suit later on). The Drumulator sends beeps through the metronome channel to signal you about such things as how it feels, and whether you've entered instructions properly or not. Note that the **MIX VOLUME** control serves as a master volume control for both the Metronome volume and the various drum sounds.

## Instant Gratification! 1B

Yes, the Drumulator is an extremely versatile device. But that versatility means that in order to learn about *all* the options, you'll have to spend one or two hours with the Drumulator and this manual.

If you're patient enough to actually do that right now, we salute your will power. Chances are, though, you can hardly wait to start making some sounds. So, we'll short circuit the learning process a bit with this little exercise. Follow these steps **EXACTLY** as given:

1. Hook up the Drumulator as described before.
2. Push the **SONG/SEGMENT** button until the **SEGMENT** light glows.
3. Locate the buttons numbered 1 - 8. Press 5 and then press 1. The right hand display shows 51.
4. Hold down **RECORD** and press **RUN/ STOP**; the left-hand display shows rc, the **RUN/ STOP** light glows, and you should hear the metronome (if not, check the **METRONOME VOLUME** control).
5. Press the **A** button to play the bass drum. After two measures, whatever you played will be repeated. Continue adding bass drum parts if desired.
6. Press the **B** button to play the snare drum. After two measures, whatever you played will be repeated. Continue adding snare drum parts if desired.
7. Press the **C** button to play the cowbell. After two measures, whatever you played will be repeated. Continue adding cowbell parts if desired.
8. Press the **D** button to play the ride cymbal. After two measures, whatever you played will be repeated. Continue adding ride cymbal parts if desired.
9. For now, you can only play 8th notes; later on, we'll cover how to play notes as fast as 32nd note triplets.
10. When you've finished recording, press **RUN/STOP** (the **RUN/STOP** light goes out). To play back what you've recorded, press **RUN/STOP** again (**RUN/STOP** light glows).
11. **Congratulations!** You have now experienced about 1% of the Drumulator's capabilities. To find out about the other 99% keep reading.





## 1C Assigning Drum Sounds to Play Buttons

When you turn on the Drumulator, Drum Play buttons **A - D** play four different drum sounds (**A=BASS, B=SNARE, C=COWBELL, D=RIDE**). The following procedure lets you assign any of the 12 drum sounds to any Drum Play button:

1. Press the **PERC/DRUMS** button a few times. When the PERC light is on, you may assign any of the upper row percussion sounds to the Drum Play buttons. When the DRUMS light is on, you may assign any of the lower row drum sounds.
2. To assign a lower row drum sound to a Drum Play button, use the **PERC/DRUMS** switch to turn on the DRUMS light.
3. Hold down any Drum Play button, and continue holding it down while you tap any Drum/Percussion Sound Select button. In the picture, the **HI TOM** is being assigned to button A.
4. To assign an upper row percussion sound to a Drum Play button, use the PERC/DRUMS switch to turn on the **PERC** light.
5. Hold down any Drum Play button, and continue holding it down while you tap any Drum/Percussion Sound Select button. In this example, the **HI HAT CLOSED** is being assigned to button C. Hold down the Drum Play button to be assigned and tap **ACCENT**. While

continuing to hold down the Drum Play button, press the Drum Select button corresponding to the drum/percussion sound you want accented. Try assigning the non-accented and accented versions of a drum sound to adjacent buttons, and play both in order to hear the difference between the two sounds.

6. You may also assign an accented (louder) version of any drum sound to any Drum Play button.

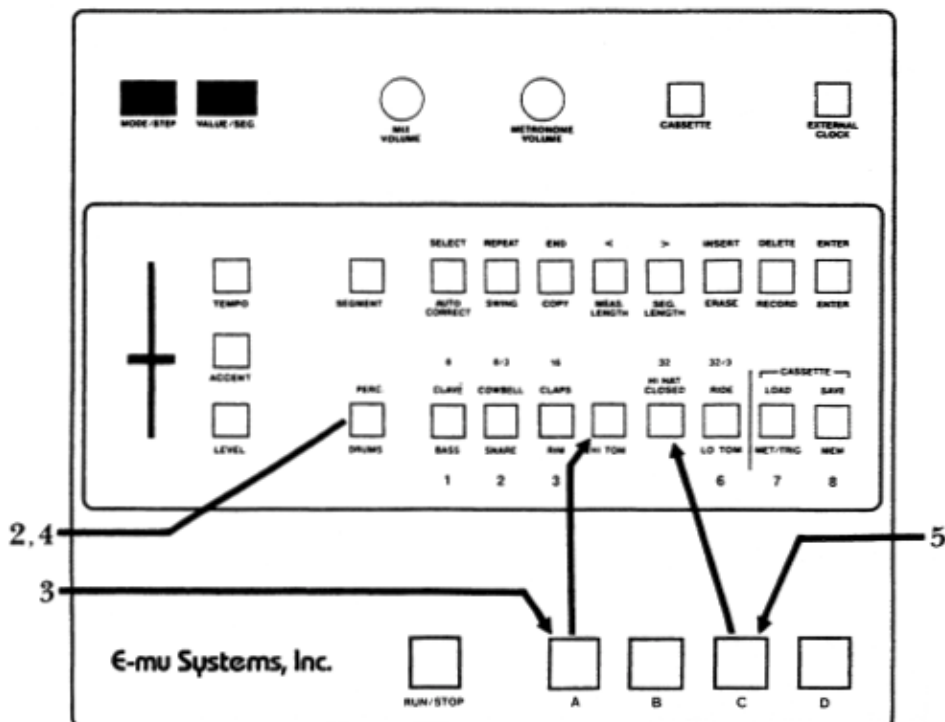
### Notes:

To rapidly audition the various drum sounds, hold down any Drum Play button while tapping the six Drum/Percussion Sound Select buttons. If the PERC light is on, you will hear the upper row of percussion sounds. If the DRUMS light is on, you will hear the lower row of drum sounds. You can use the PERC/DRUM switch to change from drum sounds to percussion sounds while a Drum Play button is being held down.

You may assign one drum to more than one button: if you want four snares, you got 'em.

### Help:

If the right-most display digit shows a flashing bar (called a *cursor*), you have pressed a Drum/Percussion Sound Select button without first holding down a Drum Play button — and the Drumulator now thinks that you have started to choose a segment (Section 1F describes choosing segments in detail). To extricate yourself, press the ENTER button; the cursor will go away, and you may then continue assigning drum sounds to play buttons.

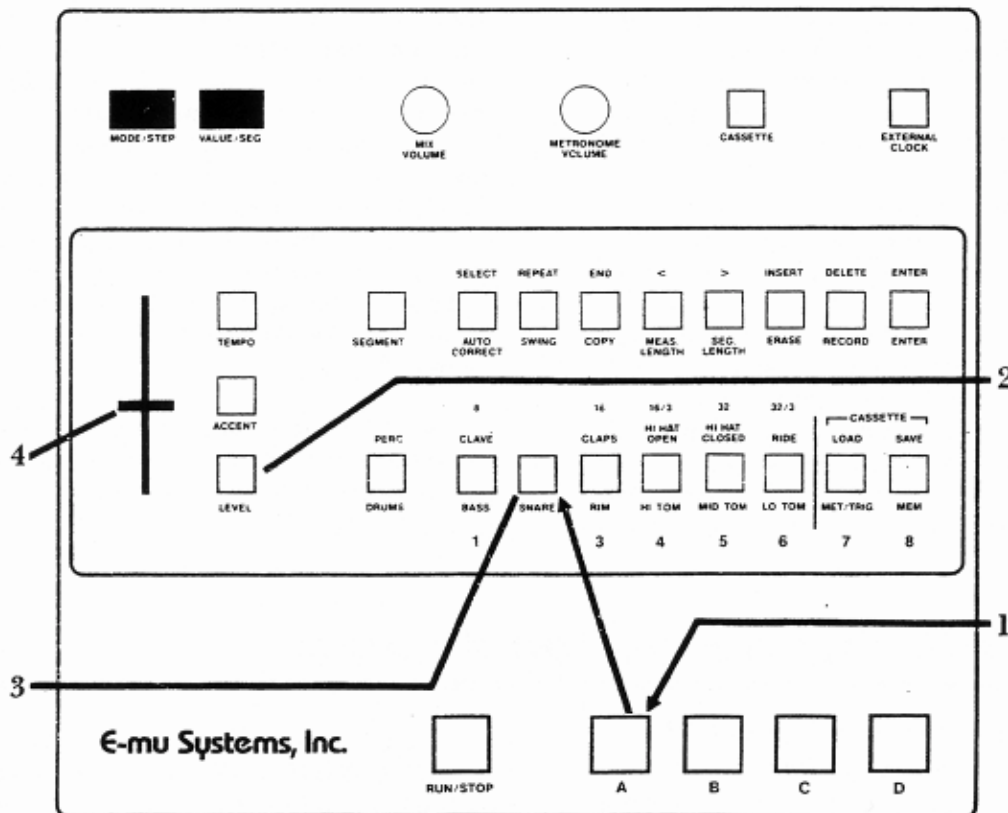


## Setting Segment Drum/Percussion Levels 1D

Each drum sound may have any one of 15 different volume levels, from 0 (full off) to 15 (full blast). When you turn on the Drumulator, the drums assume whatever levels were programmed for Song 1. You may change drum levels with the following procedure; but first, push the **SONG/SEGMENT** button so that the **SEGMENT** light glows. Otherwise, you will end up altering the mix of a song instead of a segment (Section 3G

describes altering drum levels while in *song* mode).

Note that segment levels are “remembered” by the Drumulator only while you are in *segment* mode. If you switch over to *song* mode, as described in Section 3, the Drumulator acquires the mix of the selected song. If you then switch back to *segment* mode, the Drumulator will retain the song mix.



1. Assign a drum/percussion sound to a Drum Play button. For now, assign the snare drum sound to Drum Play button **A** by pressing and holding Drum Play button **A** and tapping the SNARE Sound Select button.
2. Press **LEVEL**. The left-hand display shows **LE**.
3. Press the SNARE Sound Select button. (Remember - the DRUMS light must be lit, because if the PERC light is lit, you will be altering the COWBELL level instead of the SNARE.) The display shows **LE** and a number between 0 and 15, which is the existing snare drum volume level.
4. The slider varies the drum level from 0 to 15.

However, the slider is not active *until it moves past the position, which corresponds, to its present value*. For example, if the current programmed level is 12 and the slider is all the way down (corresponding to a value of 0), you would need to move the slider *up* until it moved past 12. If the slider was all the way up (corresponding to a value of 15), you would need to move the slider *down* until it moved past 12. After passing the current value, moving the slider will instantly vary the numbers in the display.

To hear the different possible snare drum volume levels, tap Drum Play button A as you move the slider (note the changing display numbers). When you reach the desired level, press **ENTER**.

## Notes:

◆ You may set levels while the Drumulator is running (although not while it is in *record* mode). This is useful when you have completed a song or segment and want to set the final mix while listening to all of the parts.

◆ There's a shortcut if you want to alter the levels of several drums. First, you don't have to assign a drum/percussion sound to a Drum Play button in order to change the level (we just did that so you could hear the level changes as you moved the slider). As you become familiar with the Drumulator, you will often be able to set levels 'by the numbers' since you will know what level to expect for various settings. Second, you don't have to press **ENTER** after setting each drum level; you can move right along to the next drum, pressing **ENTER** only when you've finished all your level setting. For example, to set multiple drum/percussion levels:

1. Press **LEVEL**.
2. Press the appropriate Drum/Percussion Sound Select button (remember to set the **PERC /DRUMS** for the desired row of drum or percussion sounds).
3. Move the slider. When you reach the desired value, press the Drum/Percussion Sound Select button corresponding to the *next* sound you want to adjust. This enters the volume level for the drum sound you selected initially, and simultaneously prepares you to enter the next drum sound level. (You may use the **PERC./DRUMS** switch at any point to change from upper row percussion sounds to lower row drum sounds.)

4. After setting the level of the last Drum/Percussion Sound Select button you want to adjust, press **ENTER**.

◆ You may set all levels to 0 (all drums muted) by pressing **LEVEL** to enter *level* mode, and then pressing and holding **LEVEL** while pressing **ENTER**. A beep confirms that all drum levels are now at 0. This feature is useful if you're not pleased with a mix and want to start over from scratch.

◆ Be careful when you set all levels to 0. Suppose you are working on a song (as described in Section 3), and start a song mix from scratch by initially setting all levels to 0. If you set your song mix and then change over to *segment* mode, any instrument which you didn't bring up from the initial 0 level (say, because you didn't use that particular sound in a song) will remain at 0. Thus, if you try to use that sound in the segment, it will appear that the sound isn't working. You don't have to be too concerned about this right now, but if at some point it seems that the Drumulator is broken and not producing certain drum sounds, check the drum levels to make sure you didn't inadvertently set them to 0.

◆ After you've finished setting a level or levels, always remember to press **ENTER**. **LE** should only appear in the left hand display when you are actually setting levels.

## 1E Setting Drum/Percussion Accents

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Accenting lets you add dynamics to a drum part, thereby allowing for greater expressiveness. You may assign a single drum or percussion sound to *two* Drum Play buttons, with one Play button set for one level, and the other set for an accented (louder) level.

Like volume levels, accents go from **0** (no accent) to **15** (maximum accent). This represents a level change, which adds to the existing volume level. The existing volume level and accent cannot total more than 15; for example, a snare sound with a level of 10 can have an accent of 1, 2, 3, 4, or 5, but any greater accent would exceed 15, which is the maximum allowable volume. Selecting an accent of, say, 15 in this instance won't hurt anything, but the accent will be no louder than if you had chosen an accent of 5.

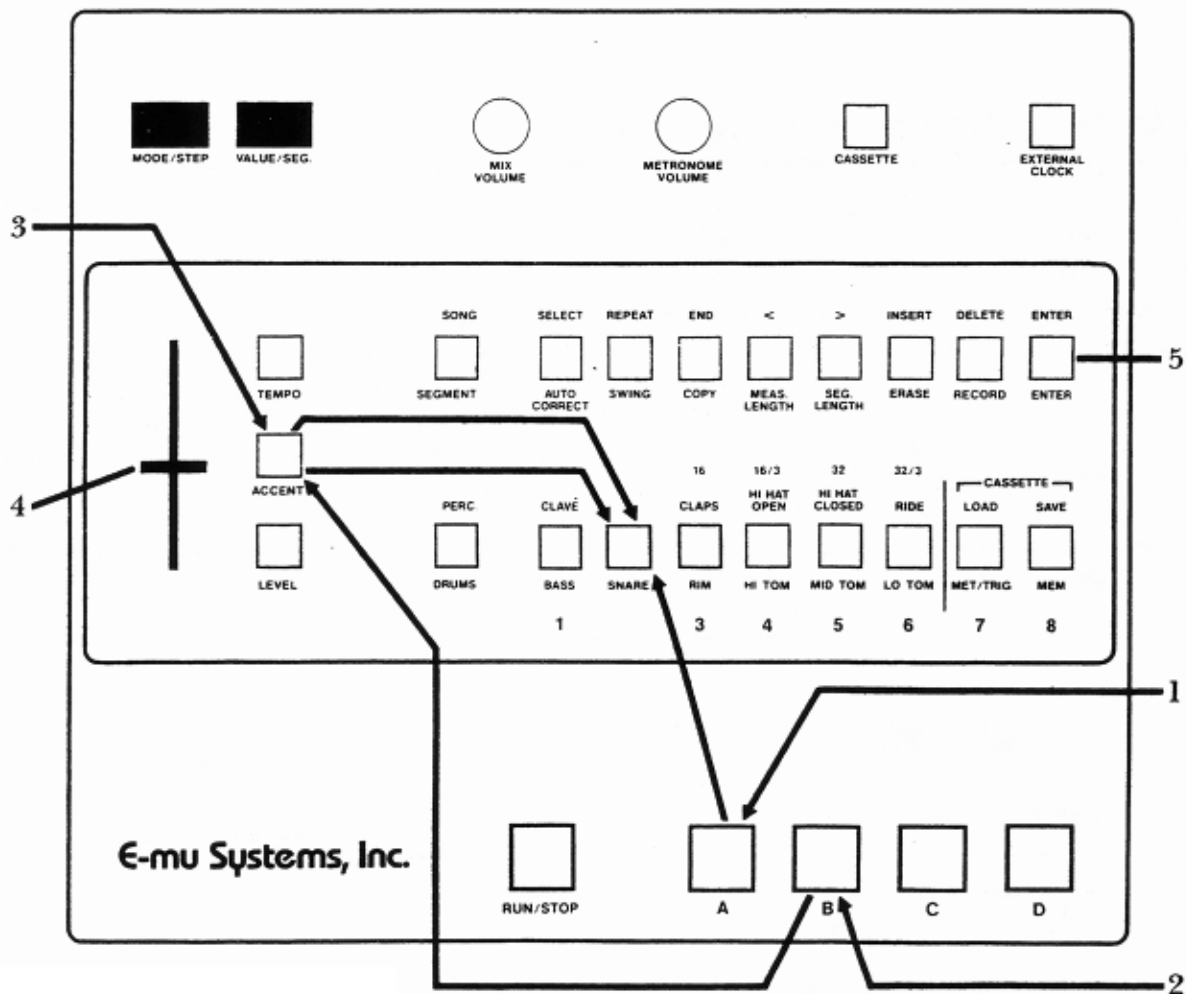
Here's how to set an accent; if necessary, push the **SONG/SEGMENT** button to make sure that the **SEGMENT** light glows. (Note: the accompanying drawing shows how to set the accent for the snare drum).

1. Assign the non-accented drum/percussion sound to Drum Play button A by holding down Drum Play button A and tapping the desired Drum Sound button.
2. Assign the accented drum/percussion sound to Drum Play button B by holding down Drum Play button B and tapping **ACCENT**. While continuing to hold down the Drum Play button, tap the Drum Sound button corresponding to the sound you want accented.

3. To set the accent, press **ACCENT** (left display shows **AC**), then the Drum Sound button whose accent you want to set. The right-hand display shows the current accent for the chosen drum sound.
4. Move the slider while alternately tapping the non-accented and accented Drum Play buttons to hear the effect of different accents. As with level setting (Section 1D), the slider is not active until it moves past the position, which corresponds, to its present value. For example, if the current programmed accent is 3 and the slider is all the way down (corresponding to a value of 0), you would need to move the slider *up* until it moved past 3. If the slider is set above 3, you would need to move the slider *down* until it moved below 3. After passing the current value, moving the slider will instantly vary the number in the display. An accent of 0 produces no level difference between the two play buttons; as you increase the accent, the accented drum will become louder, providing that the sum of the level and accent values does not exceed 15.
5. After selecting the desired accent, press **ENTER**.

**Notes:**

- ◆ If you press the **ACCENT** button and a Drum Sound Select button, and the readout shows an accent setting that is already correct, either press **ENTER** or press the next Sound Select button whose accent you want to vary.
- ◆ The accent “floats” with any level changes. For example, if the snare drum level is 10 and the accent is 3, the overall volume level of the accented drum is 13. If you later change the snare drum level to 8, the accent will still be 3, and the overall level of the accented drum will now be 11.
- ◆ After you’ve finished setting the accent, remember to press **ENTER**. **AC** should only appear in the left hand display when you are actually setting accents.
- ◆ In most cases, you’ll want to assign the normal drum / percussion sound to one Drum Play button and the accented sound to another Drum Play button. This way, both sounds are available for playing.
- ◆ When you turn on the Drumulator the drums assume whatever accent levels were programmed for Song 1. However if you clear all memory (see Section 2M), all drums assume the levels given in the appendix



◆ When accenting drums, you will usually want to use modest accent levels (1 to 3). Greater accents are more useful with percussion sounds. For example, programming the cowbell to appear every single beat with a consistent volume level can sound very artificial, since most percussionists like to accent certain beats. In a case like this, set a low cowbell level (say, 3), an accent of 4 or 5, and use the accent to emphasize certain beats (such as beats 2 and 4 in 4/4 music).

◆ If a drum sound level is 0, the accented version will also be silent, regardless of the accent setting.

◆ You can set accents while the Drumulator is running (but not while it is in *record* mode).

**Help:**

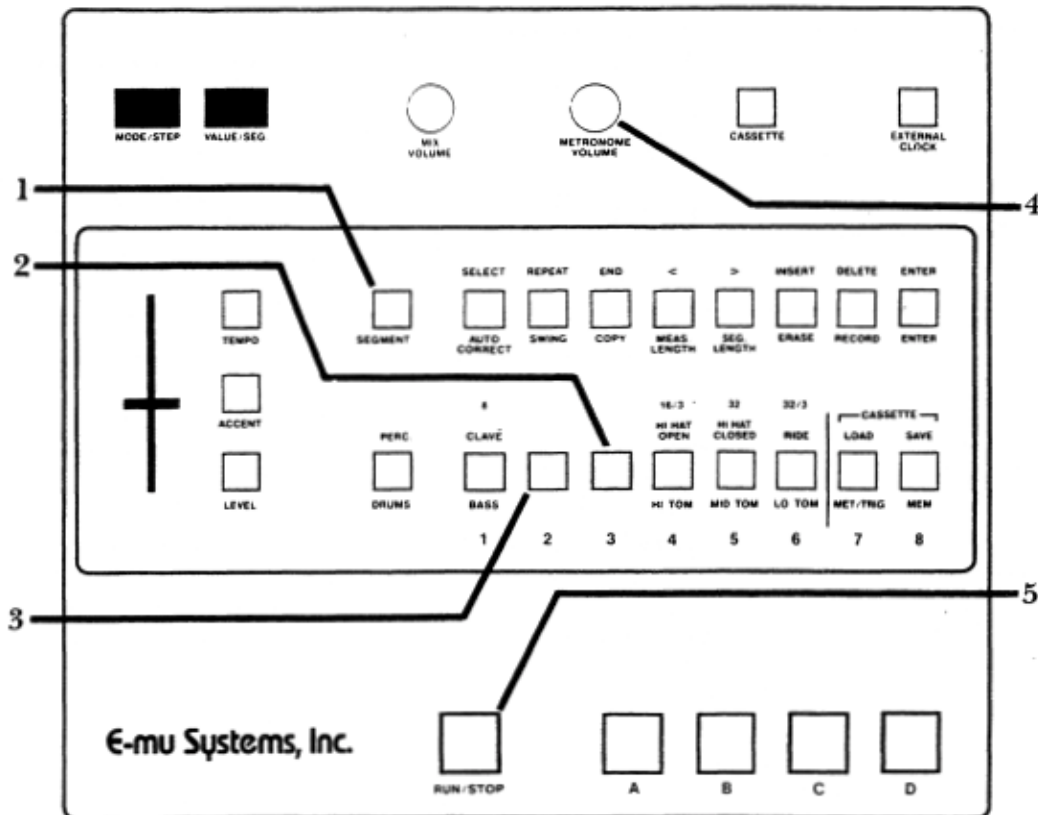
◆ If adding an accent doesn't appear to affect the sound, check the level of the sound you're attempting to accent. Remember that the level number and accent number must be less than or equal to 15; if the drum sound is programmed for a high volume level, adding accent may not make a very dramatic difference.

## 1F Playing Back Segments

You can record and play back 36 rhythm patterns, called *segments*. These are organized as 6 banks of 6 segments. Several segments were loaded into the Drumulator at the factory; here is how to play them.

1. Press the SONG/SEGMENT button a few times. The SEGMENT light shows you are in *segment* mode, and can play back or record segments. The SONG light shows you are in *song* mode. For now, choose the *segment* mode.
2. When in *segment* mode, if you are not holding

down a Drum Play button in order to assign a drum sound, the six Drum Sound Select buttons turn into bank: segment select buttons. (The setting of the **PERC/DRUMS** switch does not matter in this mode, or for that matter, any mode other than assigning drum sounds to Drum Play buttons.) Press one of these buttons to select the bank (in the example, we've selecting bank 3). The 2nd display from the right will show this bank number, while the right-most display will show a flashing cursor (this indicates that the Drumulator now expects the segment number).



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3. Press one of the six bank/segment select buttons to select the segment; this number replaces the blinking cursor. In this example, we're selecting segment 2.
4. Make sure **METRONOME LEVEL** is up so that you can hear any beep messages from the Drumulator in subsequent steps.
5. Press **RUN/STOP**. Several things will happen: the segment will play continuously, the RUN/STOP light will glow (except for a blink at the beginning of the segment), and you will hear a metronome clicking along with the segment (adjust **METRONOME LEVEL** to suit). If instead of hearing a rhythm pattern you hear a beep, the segment you've selected has never been put in *record* mode (which means it cannot contain any drum sounds). Key in a different bank, and segment number. To stop a segment, press RUN/STOP a second time.
6. Repeat steps 2 and 3 to select another bank/segment. If the Drumulator is running, the new segment will begin playing as soon as the current segment ends. If the current segment ends and the Drumulator stops (light goes off), the new segment you've selected is empty.

### Help:

◆ If you press the **RUN/STOP** switch to start a segment but hear a long beep instead, nothing is recorded in that segment.

◆ Remember as you go through any of these examples that the **ENTER** button, in addition to its normal enter function, is a fail-safe/reset button as long as the display shows a flashing cursor. For example, if you enter the wrong bank number accidentally, before doing anything else press **ENTER**. This restores the Drumulator to where it was before you hit the wrong key.

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## Setting Tempo 1G

The tempo may be varied from 40 to 240 Beats Per Minute. As with mix information, tempo settings are "remembered" by the Drumulator only while you are in *segment* mode. If you switch over to *song* mode, as described in Section 3, the Drumulator acquires the tempo of the selected song. If you then switch back to *segment* mode, the Drumulator will retain the song tempo.

1. To change tempo (the Drumulator may be stopped or running), press **TEMPO**. The left most display shows half a **T** (short for TEMPO);
2. When you find the right tempo press **ENTER**. This tempo change affects all segments when you are in segment mode.

the other three digits show the tempo in beats per minute (BPM). Vary the slider to select the new tempo (remember — as with level and accent level setting, the slider is not active until it moves past the position which corresponds to its present value). After passing the current value, moving the slider will instantly vary the numbers in the display.

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## Programming the Metronome 1H

When playing back or recording segments, you can program the metronome for a variety of different beats. The metronome produces an accented click on the first beat of each measure and a softer click on the other beats.

1. The Drumulator must be stopped (**RUN/ STOP** light is off), and the **SEGMENT** light must be on.
2. Press **MET/TRIG**. The left display shows **ME** (well, actually the M looks more like an upside
3. While in *metronome* mode, the six Drum Sound Select buttons become Metronome Beat Select buttons. (The **PERC/DRUMS** switch setting does not matter in this mode.)

down U, but those are the breaks) to show you're in Metronome Program mode, and the right display will probably show the number 4. The four indicates that the metronome is programmed to give a click every 1/4 (quarter) note. The Drumulator assumes this setting when you first turn it on.

The following summarizes your options:

Button Legend	Metronome Clicks Every	Right Display Reads
MET/TRIG	Quarter note	4
8	8th note	8
8/3	8th note triplet	.8.
16	16th note	16
16/3	16th note triplet	.16.
32	32nd note	32
32/3	32nd note triplet	.32.

After selecting the desired click rate, press **ENTER**.

4. To return to quarter note clicks, press **MET/TRIG** to enter *metronome* mode, press **MET/TRIG** again, then press **ENTER**.

**Notes:**

◆ In addition to the click, which occurs on each beat, there is a louder (accented) click on the first beat of each measure. Also, the **RUN/STOP** light blinks off at the beginning of each segment.

◆ The higher metronome speeds are very useful if you want to record a fast, complex drum part. You may slow the tempo way down, yet still have clicks occurring regularly enough so that you know where you are in the segment. (If the tempo is very slow and you select quarter note clicks, the clicks occur too far apart to be helpful).

**Help:**

◆ If you press the **MET/TRIG** button to program the metronome when the **SONG**, rather than **SEGMENT**, light is lit, the left display will show numbers and the right display will flash **ME**. This mode lets you program output trigger pulses in the *song* mode, as described in Section 3. To extricate yourself, press **ENTER**, then remember to select **SEGMENT** mode before programming the metronome.

## **SECTION 2: RECORDING SEGMENTS**

**2A Recording A Segment: Overview**

**2B Erasing a Segment**

**2C “Dimensioning” a Segment  
Setting the time signature and/or measure length**

**2D Understanding Auto Correct**

**2E Setting Auto Correct**

**2F Recording a Segment**

**2G Erasing A Specific Drum Sound**

**2H Erasing a Specific Note of a Drum Track**

**2I Copying Segments**

**2J Appending a Segment.**

**2K Adding Swing**

**2L Checking Memory Space**

**2M Clearing All Data**



## 2A Recording A Segment: Overview

Recording a segment:

- Programming the metronome if necessary.
- Erasing previously recorded sounds (if necessary).
- Defining the segment's rime signature and the number of measures in the segment ("dimensioning" the segment).
- Setting Auto Correct (to correct for any timing errors).
- Assigning the drum sounds you want to record to the four Drum Play buttons (this includes setting levels and/or accents).

- Entering *record* mode and playing drum sounds. The Drumulator memory *remembers* what you play
- Editing the segment in case you want to make changes.

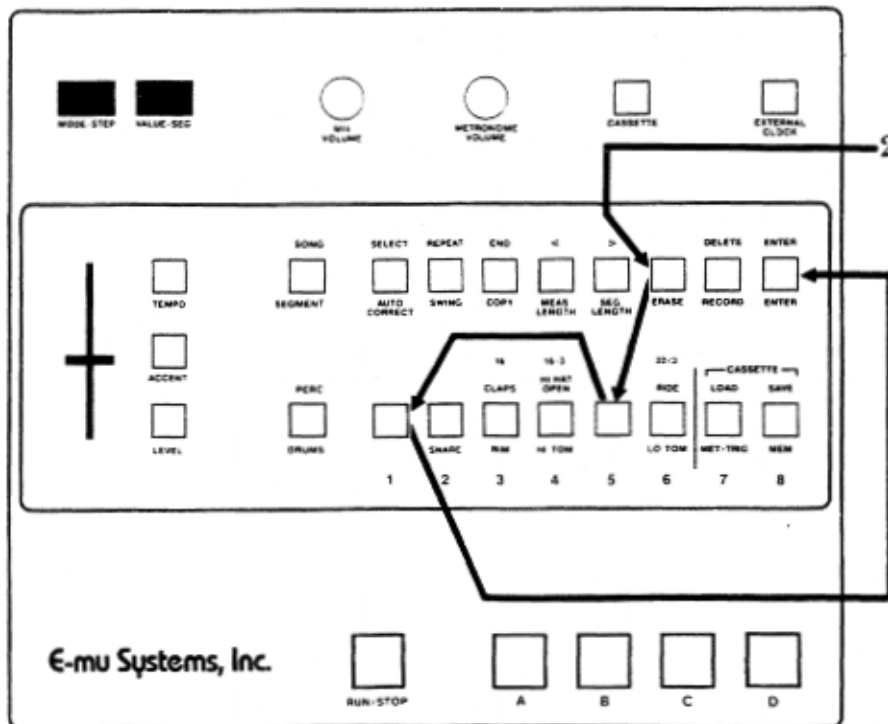
After completing these steps you may then assign different drum sounds to the Drum Play buttons, go hack into record mode, change the Auto Correct resolution or re-program the metronome if necessary, and record more drums. Or, simply play back the segment and groove to the sounds you've just created.

## 2B Erasing a Segment

Erasing a segment clears out all existing drum sounds, and automatically redimensions the segment to two measures of 4/4. Before erasing a segment, always check whether that segment already contains drum sounds — you may want to keep them.

Here's how to erase:

1. Key in a bank/segment number (Section 1F), and press **RUN/STOP** to play the segment. If you hear a beep remember, the **METRONOME VOLUME** control must be up for you to hear any beeps), the segment contains no drum sounds. If you hear an existing drum pattern and you want to keep it, key in a segment which is empty, or one which you are willing to erase.



2. To erase a segment stop the Drumulator and hold down ERASE. The left-hand display shows Er, the right-hand display shows a blinking cursor. While holding down ERASE, press the desired bank number (the right-most display now shows a blinking cursor), then press the segment number. (Note: If you change your mind about erasing, or key in the wrong segment by mistake, release ERASE and start over.) While still holding down ERASE, press ENTER. A beep confirms that the segment has been erased. The picture shows how to erase bank/segment 51.
3. After erasing, the display will return to whatever segment you had keyed in before starting the erase process. For example, if you had first selected bank/segment 11 but then decided to erase bank/segment 51, after

erasing 51 you would return to 11. If you want to continue working with segment 51, make sure you key it back in again so that 51 appears in the display.

**Notes:**

- ◆ Sometimes you might not get a beep when you key in a segment, even though it *appears* empty since it contains no drum sounds. However, if the segment was put into *record* mode — regardless of whether you actually recorded drum sounds into the segment - it is no longer considered empty.
- ◆ Also note that if you want a segment that contains silence, simply erasing the segment is not sufficient; you must go into *record* mode to “fill” the segment with silence. Section 2F gives more information on recording.

## “Dimensioning” a Segment 2C (Setting the time signature and/or measure length)

“Dimensioning” a segment defines the segment’s time signature (from 1 to 99 beats per measure), and the number of measures per segment (up to 99). If desired, each segment may be dimensioned differently. If you are not familiar with time signature notation, see Appendix B.

After you erase a segment, it assumes two measures per segment and a 4/4 time signature. If this dimensioning suits your musical needs, skip ahead to Section 2D.

Otherwise, make sure you are in *segment* mode, then proceed with the following steps to re-dimension a segment.

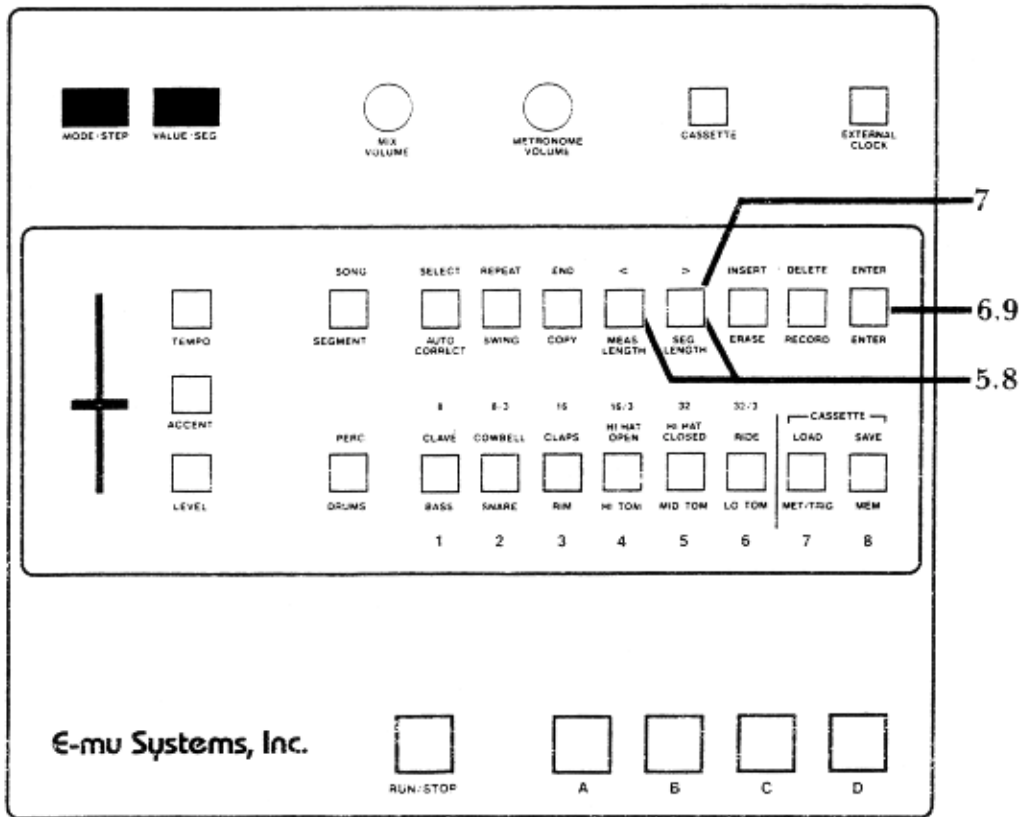
1. Set the time signature denominator (i.e. the rhythmic value of each beat in the measure) by pressing **MEAS. LENGTH**. The left-hand display will show **ML** (again, the M is more like an upside down U, but you’re probably used to that by now), and the right-hand display will probably show 4, indicating that the denominator is 4 (measures are made up of quarter notes).
2. Please Note: After you press **MEAS. LENGTH** (or **SEC. LENGTH**), the function of the **MEAS. LENGTH** and **SEC. LENGTH** buttons change from the *segment* mode

designations *below* the button to the *song* mode designations *above* the button ( > means increase and < means decrease). Yes, we know this is inconsistent with the lower-row-for-segment-mode and upper-row-for-song-mode tradition, but we figured that you’re all adult enough to deal with this one exception.

3. To *increase* the denominator value, press > (**SEC. LENGTH**). Pressing this button steps the right-hand display through the following denominators.

Denominator value	Right display shows
<b>Quarter note</b>	<b>4</b>
<b>Quarter note triplet</b>	<b>. 4.</b>
<b>Eighth note</b>	<b>8</b>
<b>Eighth note triplet</b>	<b>. 8.</b>
<b>Sixteenth note</b>	<b>16</b>
<b>Sixteenth note triplet</b>	<b>.16.</b>

Either tap this button repeatedly to go through a step at a time, or hold it down for a “fast forward” effect. To *decrease* the denominator value press < (**MEAS. LENGTH**). This steps the display in the reverse order of the above table. Tap this button to go backwards a step at a time, or hold it down for a “fast backward” effect.



4. When the display shows the desired denominator press **ENTER**. When the left-hand display changes to **ML** you may now specify the time signature numerator (i.e. the number of notes in a measure). The right-hand display will probably show 04, which indicates that the numerator is 1 (four beats per measure).
5. To *increase* the numerator value up to 99 press **> (SEG. LENGTH)**. Tap this button to move forward a digit at a time, or hold it down for a "fast forward" effect. To *decrease* the numerator value (down to 1), tap or hold **< (MEAS. LENGTH)**.
6. When the display shows the desired numerator, press **ENTER**. The readout returns to the segment number you are dimensioning.
7. To set the number of measures in the segment (*segment length*), press **SEC. LENGTH**. The left-hand display shows **SL**, and the right-hand display will probably show **02** (indicating two measures per segment).
8. To *increase* the number of measures in a segment (up to 99), press **> (SEG. LENGTH)**. You may repeatedly tap this button to go forward digit at a time, or hold it down for a "fast

forward' effect. To *decrease* the number of measures in a segment, (down to 1), tap or hold **< (MEAS. LENGTH)**.

9. When the display shows the desired segment length, press **ENTER**. The readout returns to segment number you are dimensioning.

**Help:**

◆ If you hear a long beep when you press either the **<** or **>** button, then the segment is not empty. (Remember, a segment is not considered empty if it has ever been put in *record* mode, even if it contains no drum sounds.) Press **ENTER** until the display again shows the number of the segment you want to dimension. Erase the segment as described in Section 2B, then continue dimensioning.

◆ If while in *real time dimensioning* mode you try to create a segment length longer than the Drumulator can accommodate, the Drumulator will stop, the display will read **SEGF** (for SEGment Full), and the segment will be erased so that you can try again. If you have used up almost all of the available memory space, the display will say **FULL** (see Section 2L).

**Notes:**

◆ There is an alternate way to set segment length called *real time dimensioning* mode. This is useful when you want a segment's length to be other than some number of whole measures (i.e. if you wanted 2-1/2 measures of 4/4 or 6-1/3 measures of 3/4). Press SEC. LENGTH then press RUN/STOP; the metronome will click and the right-hand display will count off the measures as they go by. After the appropriate number of measures and beats have gone by, press RUN/STOP a second time. The segment is now set to that length. If you do not press RUN/STOP precisely on the beat, it will be auto corrected by the Drumulator (Section 2D gives more information on auto correction).

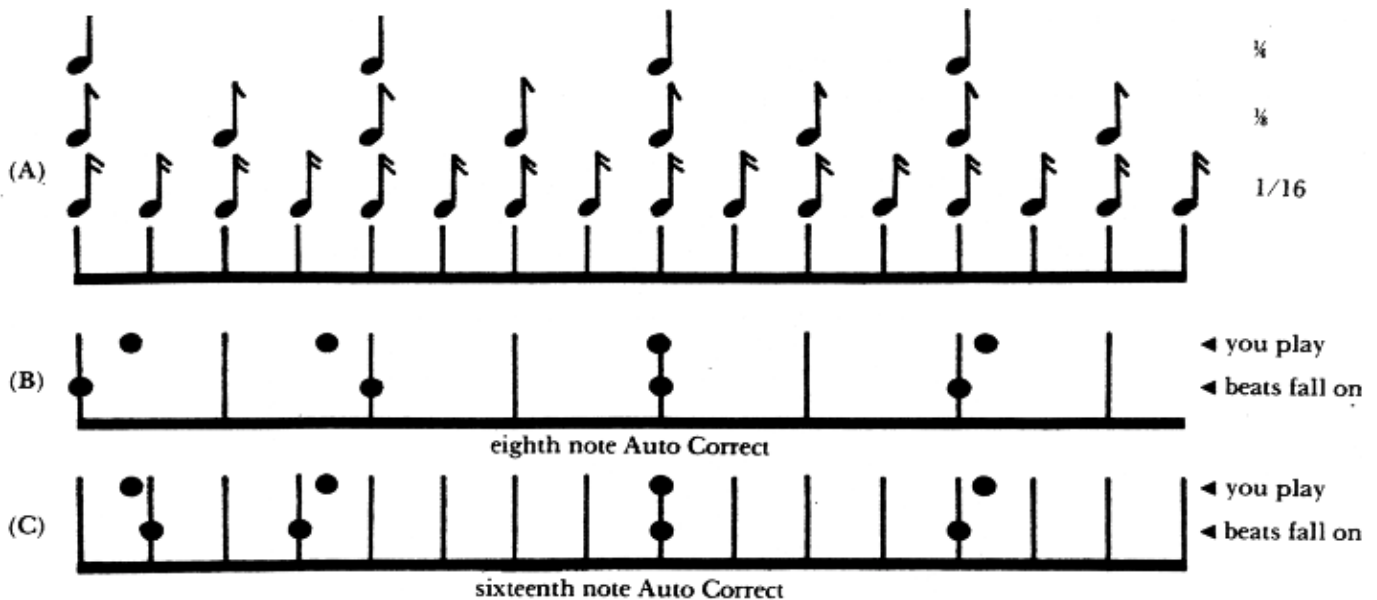
◆ If you are in *real time dimensioning* mode and miss the desired end point of the segment, hit **ENTER** while still in that mode, and you can immediately try again to set the segment length.

◆ It might seem musically strange to specify triplets for the denominator of the time signature. However, if you specify quarter notes for the denominator of one segment and quarter note triplets for another, chaining them together in a song will result in the quarter note triplet based segment running 33% faster than the quarter note based segment.

## Understanding Auto Correct 2D

Auto correct lets you create patterns with perfect timing by placing whatever drum sound you play on your choice of the nearest eighth note, eighth note triplet, sixteenth note, sixteenth note triplet, thirty-second note, or thirty-second note triplet. (For more information on rhythmic notation, see Appendix A.)

To understand how this works, consider figure A, which shows one measure of 4/4 music (there are four quarter notes, eight eighth notes, and sixteen sixteenth notes in a measure of 4/4).



Suppose you want to record a bass drum on every quarter note, but your sense of timing is a little shaky. The upper row of dots in figure B shows where you might have played the four bass drum beats. The first one is a little behind the beat, the second a little in front of the beat, the third right on the beat, and the fourth slightly behind the beat. The lower row of dots in figure B shows how setting Auto Correct to eighth note resolution puts each drum sound on the nearest eighth note, thereby correcting a not-so-tight bass drum part for perfect timing.

Now consider figure C, which shows Auto Correct set to sixteenth note resolution. In this case, the beats you played have been assigned to the nearest sixteenth note - which is fine on beats 3 and 4, but not on 1 and 2.

This illustrates an important point:

Use the least amount of resolution needed. If you are recording a simple snare back beat, there's no point in using an Auto Correct setting with any more resolution than eighth notes. To record something more complex, set a finer resolution (such as sixteenth or even thirty-second notes).

You may change Auto Correct at any point by stopping the Drumulator. Changing Auto Correct takes the pressure off of recording long drum parts - use low resolution to record most of a part, and then switch over to finer resolution to record more complex rhythms. Note that recording triplets is easy; since there are three triplet Auto Correct options, and that alternating between triplet and non-triplet Auto Correct modes lets you record complex polyrhythms.

Another option is *high resolution* mode, where the Drumulator places beats exactly where you play them rather than "rounding them off" to the nearest specified note. This allows syncopation, beats which slightly lead or lag the rhythm, and so on.

It may take some time to get used to Auto Correct, but once you have it mastered, you'll find it a powerful feature which lets you create drum patterns with perfect timing.

## 2E Setting Auto Correct

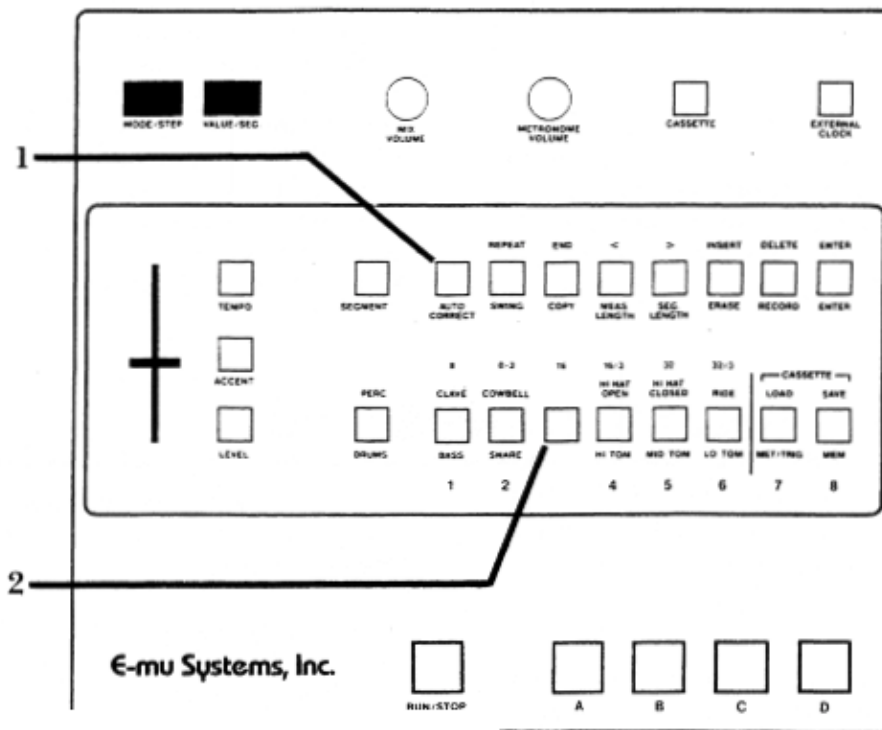
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To set Auto Correct, the Drumulator must be *stopped* and in *segment* mode.

1. Press **AUTO CORRECT**. The left-hand display shows **Au** (for Auto), while the right-hand display will probably show 8. The Drumulator assumes eighth note Auto Correct when you first turn it on.
2. When in *Auto Correct* mode, the Drum Sound Select buttons become Auto Correct Select buttons (time setting of the **PERC/DRUMS** switch doesn't matter). Here are your choices:

Button Legend	Auto Correct Resolution	Right Display Reads
8	Eighth notes	8
8/3	Eighth note triplets	.8.
16	Sixteenth notes	16
16/3	Sixteenth note triplets	.16.
32	Thirty-second notes	32
32/3	Thirty-second note triplets	.32.

## Drumulator



Press the desired Auto Correct button, then press **ENTER**. The picture shows how to select sixteenth note Auto Correct resolution.

3. To select *high resolution* mode, press **AUTO CORRECT** twice and then press **ENTER**. The first time you press this button the left display

shows **Au**; the second time, the right display shows **Hr** (for “high resolution”).

4. Remember that although you may change the Auto Correct resolution any time that the Drumulator is stopped, this change does not affect any parts recorded prior to the change.

## Recording a Segment 2F

Now that you’ve selected a segment and dimensioned it, you’re ready to record drum patterns into the segment.

1. Assign drums sounds to the Drum Play buttons. You may assign a sound along with its accented version to two buttons (Section 1E), or single sounds to single buttons (Section 1C).
2. Specify the drum levels (Section 1).
3. If necessary, program the metronome (Section 1) and set the Auto Correct resolution (Sections 2D and 2E).
4. While holding down **RECORD**, push **RUN/STOP** so that the **RUN/STOP** light glows. The left-hand display shows **rc** and the metronome will start. The **RUN/STOP** LED will

blink off at the beginning of each segment, and there will also be an accented metronome beat at the beginning of each measure.

5. Play the various drums where you want them to occur in the segment. The segment will repeat over and over, so you may “overdub” as many drum beats as you like. For example, record a basic bass drum part first, then snare drum sounds, then some bass drum accents, then some more snare drum sounds, cowbell, etc. Any drum sounds you record during one cycle of the segment will play back on the next cycle of the segment.
6. When you’ve finished recording the four drum sounds, either press **RUN/STOP** again to stop the segment (the **RUN/STOP** light will go out); or, remain in *record* mode, and go into assign mode to assign new sounds to the Drum Play buttons *with-*

*out* having to stop the segment. To enter *assign* mode, press the RECORD button while in *record* mode. The left-hand display will read **AS** (for assign). You are now temporarily out of *record* mode and can reassign sounds to the Drum Play buttons. To continue recording, press **RECORD** again.

- Repeat steps 1 through 6 until you have recorded the complete drum part. Note that while you can change tempo in *record* mode, you cannot set levels or accents (even while in *assign mode*).

**Notes:**

- ◆ When possible assign drum sounds to Drum Play buttons in a manner that makes a part easier to play. For example; By assigning one drum sound to all four buttons ‘drumming’ your fingers sequentially will rapidly trigger the drum sound.
- ◆ Sounds recorded during one cycle of a segment are not permanent until the next cycle starts This is good to know if you make a mistake right at the beginning of recording a drum part; simply press **RUN/STOP** to stop the segment, and start over However if you’re adding a few notes at the beginning of a song segment be sure to wait for the end of the segment to come around before hitting **STOP**. Or the new notes will not be stored

## 2G Erasing A Specific Drum Sound

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When you are in *segment* mode and editing a segment, you may erase a drum or percussion sound wherever it appears in the segment.

- To erase a particular drum sound wherever it appears in the segment, first assign the drum sound to be erased to a Drum Play button (unless it is already assigned).
- While the Drumulator is *stopped*, hold down **ERASE** (the right-hand display shows a blinking cursor). While holding down **ERASE**, tap the Drum Play button corresponding to the sound you want to erase. The cursor will be replaced by two letters confirming the drum sound about to be erased:

If you change your mind about erasing, or picked the wrong drum sound by mistake, release **ERASE** and start over.

- While continuing to hold down **ERASE**, press **ENTER**. A short beep will confirm that the drum has been erased.

**Notes:**

- ◆ When you erase a sound in this mode, you erase both the accented and non-accented version of the sound, regardless of which version is assigned to the Drum Play button.

Right-hand Readout	Drum sound to be erased
<b>bA</b>	<b>BASS</b>
<b>Sn</b>	<b>SNARE</b>
<b>ri</b>	<b>RIM</b>
<b>Hi</b>	<b>HI TOM</b>
<b>Md</b>	<b>MID TOM</b>
<b>Lo</b>	<b>LO TOM</b>
<b>CL</b>	<b>CLAVE</b>
<b>Cb</b>	<b>COWBELL</b>
<b>CP</b>	<b>CLAPS</b>
<b>Ho</b>	<b>HI HAT OPEN</b>
<b>Hc</b>	<b>HI HAT CLOSED</b>
<b>rd</b>	<b>RIDE</b>

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## Erasing a Specific Note of a Drum Track 2H

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You may also erase specific notes in a drum (or percussion) track while the Drumulator is *running* and in *record* mode. As in Section 2G, you must be in *segment* mode to erase sounds.

1. Start off with the Drumulator *stopped*. To erase a portion of a drum track, first assign the drum sound to be erased to a Drum Play button. If you want to erase the accented version of the drum sound, then you must assign the accented drum sound to a Drum Play button (Section 1E, step 2). Note that this differs from the way drum sounds are erased in Section 2G.
2. Set Auto Correct to *high resolution* mode (Section 2E).
3. Put the Drumulator into *record* mode by holding down **RECORD** and pressing RUN/STOP so that the RUN/STOP light glows. The left-hand readout should read **rc** to indicate record, and you will hear the metronome.
4. Press ERASE (the left-hand display now reads **Er** instead of rc). While holding down **ERASE**, press the Drum Play button corresponding to the sound you want to erase. Press this Drum Play button down just *before* the note or series of notes you want to

erase, and release it just *after* the note(s) you want to erase ends. To erase one note out of a rapid series of notes, tap the Drum Play button simultaneously with the note to be erased.

When erasing, you will hear the drum sound in its normal place as it is being erased, however, the next time the segment cycles the drum sound(s) you erased will be gone.

### Help:

- ◆ There will probably be times when you are *absolutely* sure that the erase function is not working properly. One cause of trouble is trying to erase an accented sound without assigning an accented sound to a drum play button. Another problem occurs if you try to erase a non-accented drum sound with a Drum Play button which triggers the accented version of that sound.
- ◆ You may use Auto Correct settings other than high resolution for special effects. For example, suppose you recorded a series of four sixteenth note snare drum sounds with an Auto Correct of 16. If you erase using an Auto Correct setting of 8, you could erase only every eighth note; so two of the sixteenth notes would remain. Returning the Auto Correct to 16 would let you erase all four sixteenth notes. Note that this technique may be used to advantage if you want to “thin out” an overly complex drum part.

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## Copying Segments 2I

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You may copy a segment to one or more other segments. For example, suppose you set up a great hi-hat and bass drum pattern in segment 54. Now suppose you want segment 55 to contain a snare part recorded over the basic bass drum/hi-hat pattern, and segment 56 to contain a tom part recorded over the same basic bass drum/hi-hat part. Rather than having to re-create the hi-hat and bass drum pattern for segments 55 and 56, you may simply copy segment 54 to segments 55 and 56 (or any segment to any other segment, of course) by following these steps:

1. You must be in *segment* mode and the Drumulator must be *stopped*.

2. Key in the segment you want to copy. (In this example, segment 54.)
3. Press **COPY**. The left-hand display shows **Co** and the right-hand display shows a flashing cursor.
4. Key in the number of the segment you want to copy to (in this example, 55), and then press **ENTER** to complete the copying procedure. A beep will confirm a successful copy, and the right-hand readout will return to the number of the segment being copied.



5. To now copy segment 54 into segment 56, press **COPY, key in 56**, and press **ENTER**. Again, a beep will confirm that the copy was

successful, and the right-hand readout will return to the number of the segment being copied.

## 2J Appending a Segment

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You may also copy a segment to itself. For example, suppose you create a great segment, but realize that you want it to last four times as long as you had originally intended. No problem — simply *append* the segment four times. The *append* function takes the segment and multiplies its length by anywhere from 1 to 8. Here's how to program the append function:

1. You must be in *segment* mode and the Drumulator must be *stopped*.
2. Key in the segment you want to append.
3. Press **COPY**. The left-hand display shows **Co** and the right-hand display shows a flashing cursor.
4. Key in the number of the segment you want to append (in other words, the number in the right-hand readout just before you pressed **COPY**). The left-hand readout will instantly change to **AP** for "append", and the right readout will show a flashing cursor.
5. In *append* mode, the Drum Sound Select buttons turn into Append Multiplier Select buttons.

Pressing button 1 leaves the segment as is, pressing button 2 doubles the length of the segment by repeating the segment twice, pressing 3 triples the length,

## 2K Adding Swing

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While in *segment* mode, you may specify that a segment have a particular rhythmic swing to it. The Drumulator normally provides a "swing factor" of 50%, which means that each quarter note is weighted so that the first eighth note takes up 50% of the quarter note, and the second eighth note takes up the other 50%. This is the way you would normally expect things to be.

However, you may change the swing factor to 54%, 58%, 63%, 67%, or 71%. For example, with a swing factor of 58%, the first eighth note spreads out slightly to take up 58% of the quarter note, while the second eighth note shrinks slightly so that it takes up 42% of the quarter note. This lets you program a swinging, less metronomic feel to individual

and so *on* until pressing 8 repeats the segment 8 times. The number you select will replace the flashing cursor. When you've made your choice, press **ENTER**. A beep will confirm a successful append.

### Notes:

◆ You cannot "un-append" a segment once you've appended it. So, if you want to keep a segment but also create a longer, appended version, first copy the segment you want to append to another segment. Next, append this second segment. The second segment will contain the appended version of the original segment, yet the original segment still exists in its unaltered form.

◆ You may re-append an already appended segment. For example; if you've appended a segment twice and later decide you should have made it *four* times as long, simply key in the new, appended segment and append it twice.

◆ Large segments use up a lot of memory - see Section 3O. Wherever possible use the *song* modes repeat function (described in Section 3F) to create a long repeating segment out of a short segment.

segments. To program a segment for swing, you must be in *segment* mode. Then, follow these steps:

1. The Drumulator must be *stopped* (RUN/s-cop light off). Press **SWING** (the left-hand readout shows SG.).
2. The Drum Sound Select buttons turn into Swing Factor Select buttons when in *swing* select mode. The following table shows, which swing factor corresponds to which button number:

Button Number	Swing Factor
1	50%
2	54%
3	58%
4	63%
5	67%
6	71%

Press the desired swing factor (the right-hand readout confirms your choice), then press **ENTER**.

### Notes:

- Swing can help add a more human “feel” to a series of repeating segments. For example, if you repeat the same segment four times, try setting a swing factor of 54% for, say, the third segment. This results in a series of segments which are more psycho-acoustically interesting than merely repeating the same pattern over and over.

- 67% is considered the ‘classic’ jazz swing factor, where the first eighth note is 2/3 of a

quarter note, and the second eighth note is 1/3 of a quarter note (i.e. the second eighth note behaves more like an eighth note triplet). If this sounds too “perfect”, try a swing factor of 64% instead. The results will be similar, but the “feel” will be slightly different.

If you’re trying to record or erase in a segment, which has a swing factor other than 50%, there are two cautions. To erase a specific note, you have to erase where the note would *normally* occur if the segment had a 50% swing factor. If you record while a segment is in *swing* mode, the beats may or may not fall where you want them to fall. Therefore, it’s best to go out of *swing* mode when recording or erasing, then re-enter *swing* mode after you’ve finished your alterations.

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## Checking Memory Space 2L

Whenever the Drumulator is stopped, you may check the amount of remaining memory by pressing **MEM**. The left-hand display shows **MM**; the right-hand display shows the remaining amount of memory, expressed as a percentage. See Section 30 for information on efficient use of memory.

If you’re recording segments and the display shows **FULL**, you’ve used up all the available memory space. The Drumulator will stop, and whatever you tried to record on the last cycle of the segment will not be put into memory. At this point, you have two alternatives: either erase segments which you don’t need in order to create more space, or save the existing information on cassette (see Section 4), clear the memory (Section 2M), and start programming new segments.

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## Clearing All Data 2M

If you reach a memory full condition (Section 2L), save what you have on cassette (see Section 4B). After doing this, you may want to clear all data in the Drumulator to create more space. Another occasion where you might want to clear all data is if you’ve finished working on a song/segment or group of songs/segments, saved the data, and want to start over from scratch. Here’s how to clear all data:

1. Make sure you are in *segment* mode (**SEGMENT** light is lit).
2. Hold **ERASE** and tap **CASSETTE**. The display will flash **PooF**, which means you’re
3. just about ready to blow away all the song and segment data in memory.
3. If you indeed want to clear out all the song and segment data, while continuing to hold **ERASE**, press **ENTER**. The display will continue to flash **PooF** until you release **ERASE** and **ENTER**.
4. You may change your mind about erasing the data any time before you hit **ENTER** by simply releasing any buttons you may be pressing down.