

Drumulator Pad Programmer Operating Instructions

Introduction

Your Drumulator Pad Programmer allows you to program the Drumulator (or other drum machines with standard CMOS 5V trigger inputs) in real time with ordinary drumsticks. Each of the Pad Programmer's four pads can be assigned to any Drumulator sound. The sensitivity of each pad can be individually adjusted to match your particular playing style. In addition, four trigger inputs allow programming from other external pads or control voltage sources.

Set up

Place the Pad Programmer on a flat surface near your Drumulator. You will need four interconnecting cables, each with an RCA phono plug on one end and a standard 1/4" phone plug on the other. Plug the RCA plugs into the Trigger Out jacks on the rear of the Pad Programmer. Plug the 1/4" phone plugs into the corresponding Gate jacks on the rear of the Drumulator (i.e. Trigger Out 'A' to Gate "A", Trigger out "B" to Gate "B", etc.)

Plug the mini-plug on the included AC power adapter into the Power jack on the rear of the Pad Programmer. Plug the AC adapter transformer into a standard AC outlet.

Assigning Sounds to Pads

The Pad Programmer's pads are labeled A, B, C, and D. They correspond to play buttons A, B, C, and D on the Drumulator. Assigning a sound to a Drumulator Play button assigns the same sound to the corresponding pad on the Pad Programmer (e.g. assigning the snare sound to Play button A allows you to play the snare on pad A.) Assigning an accented sound to a Play button also assigns the accented sound to the corresponding pad.

Adjusting Pad Sensitivity

The trigger threshold of each pad (i.e. how hard you have to hit the pad in order to have it cause the Drumulator to make a Sound) is set with the sensitivity trimmers accessible through the rear of the Pad Programmer. Turning a trimmer wheel to the right (clockwise) decreases sensitivity (you'll have to hit the pad harder) while turning it to the left (counterclockwise) increases sensitivity.

The object in adjusting each pad is to get the maximum sensitivity that doesn't result in "crosstalk". Crosstalk occurs when you hit a pad so hard that the impact is transmitted to an adjacent pad, causing it to trigger. By properly adjusting each pad, crosstalk can be eliminated in all but the most extreme cases. The actual adjustment depends on your playing style. If you play with a light touch, the sensitivity can be set rather high. If, on the other hand, you typically pound your drums into submission, a lower sensitivity level is called for.

To set pad A's sensitivity, start by turning trimmer A fully clockwise (lowest sensitivity). Now, while hitting an *adjacent* pad (e.g. pad B) as hard as you typically play (be honest!) turn trimmer A counterclockwise, increasing the sensitivity, until crosstalk occurs (i.e. pad A triggers in response to you hitting pad B). At this point turn trimmer A slightly clockwise, just to the point at which crosstalk no longer occurs. Repeat this procedure for each of the three remaining pads.

By observing the LED associated with each pad, it is even possible to adjust sensitivity without having to listen to the Drumulator.

Programming the Drumulator

Once you have set up your Pad Programmer and adjusted the pad's sensitivity, programming the Drumulator is simply a matter of hitting the pads while the Drumulator is in Record mode. The pads are functionally identical to the Drumulators four Play buttons and both the pads and buttons are active at all times.

Using the Pad Programmer With a Drum Machine Other Than the Drumulator

Since the Pad Programmer's trigger out jacks supply standard 5V Gates, the Pad Programmer can trigger any other device that will accept such signals. Adapter cables may have to be fabricated depending on the connector(s) used on the device to be controlled. If the device has more than four trigger inputs, multiple Pad Programmers may be connected simultaneously.

Pad Programmer - Theory of Operation - Revision of 2/27/84

The Pad Programmer consists of four independent trigger sensors with appropriate circuitry, with a common housing and power supply.

The power supply is a simple three terminal regulator +5V supply. The input voltage is between 8 and 25 VDC and the current requirements are small enough (around 40 mA when an LED is firing, less quiescently) that heat sinking is not required. The plug in wall unit supplies nominally 10V DC, which is filtered and regulated.

The sensor is a piezo-electric crystal mounted in a housing designed to transmit pressure from a vertical strike by a drumstick, and attenuate vibrations conducted by the housing. This assembly is glued together and tested at the factory. Service on these assemblies will generally be by replacement, as repairs are difficult to accomplish and will frequently be unreliable.

The sensor produces a substantial voltage spike (10 to 100+ volts), which is loaded by a parallel capacitor and resistor, and rectified by a full wave bridge. The resulting positive voltage is attenuated and applied to one terminal of a comparator. The other terminal of the comparator is adjusted for the desired sensitivity threshold. The trim range is set to stay within the common mode range of the comparator. Positive feedback around the comparator is provided to minimize marginal switching. The comparator output triggers a one-shot which will both swallow any comparator oscillation or multiple triggering, and provide sufficient pulse width for the LED amplifier and for the output trigger pulse. Both of these signals are buffered from the one-shot output.

For information on adjusting the sensitivity trims, refer to the earlier section.

Using the External Sensor Inputs

The four external sensor inputs allow the use of some external pad controllers. These inputs require a voltage similar to that supplied by the piezo-electric transducers used in the Pad Programmer. Trial and error is probably the best method of determining which controllers will and won't work. The sensitivity trimmers will almost certainly have to be recalibrated when using external controllers.

In Case It Doesn't Seem to Work

If your Pad Programmer doesn't seem to be working right, first check your Drumulator to be sure *it's* functioning correctly. If it is, refer to the following list of possible problems:

Symptom	Possible Problems
Pad(s) do not respond to being hit (no sound, LED. doesn't light)	AC power adapter not properly connected Pad sensitivity set too low
LED lights when pad hit, but no sound	Pad not connected to Drumulator Bad interconnection cable Level of the sound assigned to the pad is set to 0
Hitting pad triggers wrong sound	Sounds misassigned to Drumulator play buttons Interconnection cables misconnected (i.e. "A" to "B", "C" to "A", etc.)

If after checking the above, the problem persists, your Pad Programmer is probably broken. Contact your nearest E-mu authorized service center for help.

Have Fun!
E-mu Systems