ET4 The Environment Quarterly

SPECIAL EDITION - ENVIRONMENT BASICS

In This Issue

This special edition of ET4 is devoted to Environment basics—what you need to know in order to use Logic effectively. The topics covered include:

- Getting MIDI data in and out of Logic.
- Customizing Logic to your MIDI studio.
- Creating and using on-screen mixers.
- Modifying and re-routing MIDI messages.
- Some Toys to play with.
- What you'll find in the *The Environment Toolkit*.

ENVIRONMENT BASICS

It was the best of ideas, it was the worst of ideas...

With due apologies to a great Englishman, there are two ways to look at the Environment—as a necessity to be dealt with as little as possible and as a tool for creative expression. The necessities are fairly easy to grasp and they are what concern us in this special edition of ET4.

THE INS AND OUTS OF MIDI

The main job of the Environment is to get MIDI data in and out of Logic. It does this by communicating with your hardware MIDI interface. The interface passes incoming MIDI messages to Logic and Logic passes outgoing MIDI messages to the interface. In addition

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to the information contained in the MIDI messages, Logic and your hardware interface tell each other which MIDI port the messages come from or are going to. (For more detail on how this is accomplished see "MIDI Ports" on page 14.)

The Ins

Figure 1

There is one Environment object for getting MIDI messages into Logic—the PHYSICAL INPUT object shown in Figure 1. The PHYSICAL INPUT has 65 outlets representing 32 virtual modem ports, 32 virtual printer ports and one "SUM" outlet. If a particular virtual port is not separately cabled, MIDI messages from that port will appear at the SUM outlet.

On some versions of Logic (Windows and early MacOS version) this object appears as a MIDI icon with a single outlet. In this case, all MIDI messages appear at that outlet and there is no way of separating the input from different virtual ports.

The PHYSICAL INPUT object brings MIDI messages into the Environment but for them to be recorded they must somehow get to Logic Tracks in the Arrange window. There is another Environment object for that and it's called the "SEQUENCER INPUT" object. (In earlier versions of Logic this object is called "To Sequencer".)

Figure 2

The SEQUENCER INPUT object (Figure 2) passes all MIDI messages to the Track which is currently selected in the Arrange window. (Some Track is always selected even if it's not immediately visible.) One thing to notice about this object is that it has in inlet but no outlets. The inlet is for the data you want to send to the Arrange Track and there are no outlets because the SEQUENCER INPUT object does only one thing—it sends MIDI messages to the selected Arrange Track.

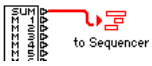


Figure 3

There is only one Environment connection necessary to make Logic work and it is shown in Figure 3. This is how MIDI messages get from your MIDI controllers to Logic Tracks for recording. They appear at the SUM outlet of the PHYSICAL INPUT object and travel down the cable to the SEQUENCER INPUT object which passes them to the selected Track in the Arrange window.

The Outs

Now that we've got MIDI data into Logic for recording, how do we get it back out of Logic for playback?

Logic has two types of Environment objects designed for this: port objects and INSTRUMENT objects. Port objects send everything entering them to a specific port of your MIDI interface. They do not change the data in any way—in particular, they do not attach any specific channel to the MIDI messages.

Figure 4

Figure 4 shows a typical port object together with its "Parameter Box". (For more information on Parameter Boxes see "Parameter Boxes" on page 14.) Aside from the name and

Icon parameters, port objects only have one parameter—their port setting.

Port objects have a different appearance in MacOS and Windows versions of Logic. But they perform exactly the same function—they route MIDI messages to a port or virtual port of your MIDI interface.

For most purposes, INSTRUMENT objects are more useful for getting MIDI data out of Logic than port objects and they're the objects that will concern us here. There are three kinds of Instrument objects—each one designed for specific kind of MIDI sound device. The simplest one is the "standard" INSTRUMENT which we'll just refer to as an "INSTRUMENT".

INSTRUMENT Objects

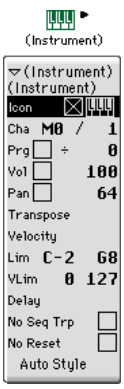


Figure 5

Figure 5 shows the INSTRUMENT object with its Parameter Box. The parameter below the Icon setting is labeled "Cha". This is where you assign a port and channel for the INSTRUMENT. You might think of INSTRUMENTS as port objects with additional settings—this is why port objects are not necessary (though they are often useful).

The first "Cha" setting, the one showing "M0" in Figure 5, sets the port. In this case "M" stands for modem and "0" means no specific virtual port is assigned. If your MIDI interface has several virtual ports assigned to the modem port the MIDI data from this INSTRUMENT will be sent to all of them. If you have a MTP compatible interface, you can select a specific modem port from "M1" through "M63". (Unless you have a humongous, multi-interface setup you will use at most "M1" through "M8".) There are similar port settings for the printer port labeled "P0" through "P63".

To the right of the port setting, after the "/", is the channel setting. The choices are "All" and "1" through "16". If you choose "All" then any MIDI messages passing through the INSTRUMENT will keep their original channel. Any other choice results in the MIDI messages having their channel changed to match (i.e. to channel 1 through 16).

The remaining INSTRUMENT parameters allow additional control of MIDI sound modules and of the MIDI messages passing through the INSTRUMENT. For more details on these settings see "Instrument Parameters" on page 14.

Logic has two specialized kinds of INSTRUMENTS which are explained in detail in "Multi & Mapped Instruments" on page 15. Let's take a look at how any of these INSTRUMENT objects is used in Logic.

Each Track in the Arrange window has some Environment object assigned to it. Usually this object is one of Logic's INSTRUMENT objects. Logic passes any MIDI data played back on any Arrange window Track to the Environment object assigned to that Track. *The object assigned to the Track is what determines where the MIDI data on the Track goes.*

(There are a couple of exceptions to this. One choice from the Track list's "Instrument menu" is called "No Out-

put". This is not an Environment object but rather an option to have the Track send the data nowhere. Another choice on the list is called "Folder". This is a neutral setting which, if the Track contains Logic Folders, will let the Track assignments inside the Folders determine the outcome. If you haven't dealt with Folders yet, don't worry about this.)

CUSTOMIZING LOGIC TO YOUR STUDIO

A Basic Setup

Figure 6

Logic's Environment window is organized in Layers. Figure 6 shows the Layers pop-up menu which can be opened by clicking the Layer name box just below the Environment's toolbar. Each Environment object resides on some Layer but they are all part of the same Environment and cables can run between Layers. The two top Layers are special. The "All Objects" layer is a text-style list of all Environment objects. Objects placed on the "Global Objects" Layer will appear on all layers.

You can have as many Layers in the Environment as you want—you create a new Layer by selecting "**Create!**" from the Layers menu. You can rename a Layer by double-clicking on its name. You can move objects from one Layer to another by selecting them and holding the Option-key while changing layers.

If you take a look at the Environment of Logic's default Song you will see many objects and quite a bit of cabling. (The "default" Song is the original "Autoload" Song on the Logic disks. You can also open it by holding the Option-key while selecting "New" from the File menu.) This is the "cover all the bases" approach to a starting Song and it illustrates some possibilities for MIDI input processing (before the data gets to the Arrange window) as well as providing a generic INSTRUMENT and MIDI mixer setup. For more information on Logic's default Song see "Logic's Default Song" on page 16.

Another approach—the one we'll take here—is to start from scratch adding just the Environment objects needed for your MIDI setup.

The first step in this approach is to create a new Song and clear out its Environment. The second step is to create the input objects you need—the PHYSICAL INPUT and SEQUENCER INPUT objects—and connect them as in Figure 3. The third step is to make an inventory of your MIDI studio and decide what Logic INSTRUMENTS you need. The final step is to create these INSTRUMENTS in the Environment and customize them. For step-by-step instructions on how to do this see "Starting from Scratch" on page 18.

An Autoload Song

Once you've created a custom Song you will probably want to use it as your autoload Song. This is the Song that Logic will present to you whenever you choose "New" from the File menu. For this to work, the Song must be named "Autoload" and it must be in the same folder as the Logic program. (If you

already have an autoload song and you're not sure you want to give it up, change its name first.)

With this basic Song you will be able to record and playback in Logic. Furthermore, you will be able to ensure that MIDI data played back from Logic Tracks is sent to the desired channel of the desired MIDI device by selecting the corresponding INSTRUMENT from the Track list's Instrument menu.

For recording (and also for MIDI thru), select a Track that uses the INSTRUMENT for the desired MIDI device and channel. Once you have selected a Track, all incoming MIDI data (i.e. what you play on your MIDI controller) will be sent to that Track's INSTRUMENT regardless of whether you're recording. In some cases this can lead to doubled notes or MIDI feedback. For details on how to avoid this see "MIDI Thru & MIDI Feedback" on page 19.

The important thing to remember is that it is the Track's Instrument that routes the MIDI messages—your controller's port and channel don't matter. If you want your MIDI controller's channel to control Logic's output, use an INSTRUMENT whose channel parameter is set to "All". (Create one if necessary.)

MIDI MIXING

The first thing to note about MIDI mixing is that it isn't—there is no MIDI signal to process as there is with audio. MIDI mixing amounts to adding MIDI controller messages to the stream of MIDI note messages that command your synths to make sounds.

That having been said, the notion of a MIDI signal is not without merit. MIDI messages can be processed and particularly in the case of note messages, some of this processing looks suspiciously like mixing. MIDI processing is covered in the next section, "MIDI Processing" on page 7.

The two most common MIDI controller messages used in MIDI mixing are volume messages (controller #7) and pan messages (controller #10). Almost all MIDI sound modules respond to these MIDI controller messages (some early synths are exceptions).

Logic has an Environment object designed specifically for sending MIDI controller messages, the FADER object. FADERS come in many "styles" but except for a few special ones, they all do the same thing—send out MIDI messages when clicked with the mouse.

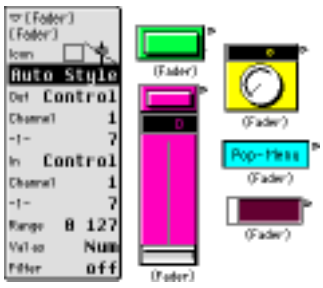


Figure 7

Figure 7 shows several styles of FADER together with the FADER'S Parameter Box. The menu at the top, displaying "Auto Style", is where you choose how the FADER looks and behaves when moused. The styles shown are horizontal slider, vertical slider (with mute), knob, text/menu and button. The button toggles between two values, the sliders and knob cover a range of values selected by the slider or knob position

and the text-menu sends out the number of the item selected from its pop-up menu. (The text/menu FADER can be made to scroll instead of opening as a menu.)

The three lines below the style menu determine what MIDI message the FADER sends. This is called the "Out" definition and it has settings for the type of message (controller, pitch bend, program change and so on), the MIDI channel for the message and a "-1-" parameter which has different meanings for different message types. For controller messages, the "-1-" setting is the controller number. As an example, for volume messages on channel 3, "Out" would be set to "Control", "Channel" would be set to "3" and "-1-" would be set to "7". For more details on types of MIDI messages see "Fader Types & MIDI Messages" on page 20.

FADERS can also respond to MIDI messages and the type and channel of the messages they respond to is set by the "In" definition. The choices and meanings are exactly the same as for the "Out" message.

Typically, as in Figure 7, the "Out" and "In" definitions will be the same but in some cases it is useful to have FADERS convert one message type to another and in these cases the "Out" and "In" definitions would be different.

The last three FADER parameters set the output range (incoming data can force the FADER outside of this range, however), the numerical display format (if there is a numerical display) and the "Filter" mode.

Figure 8

The FADER'S filter mode is very important—it determines what messages the FADER will filter out. Figure 8 shows the "Filter" pop-up menu. The top position (the default) turns all filtering off. The next three choices relate to the FADER'S "In" definition—either "Other" (non-matching) or "Matching" messages will be filtered out. "All" means that FADER will never send anything out in response to incoming messages. (Note that matching messages will always update the FADER—filtering only determines whether the FADER will send anything out in response.)

The "Thru" choice is explained in "MIDI Thru & MIDI Feedback" on page 19—it filters out messages coming in from your MIDI interface but allows messages originating in Logic to pass through.

The final choice, "Shot", is not really a filter choice at all. It causes sliders and knobs to only emit a message when the mouse is released rather than continuously as the mouse is scrolled.

MIDI mixers in the Environment are usually banks of sliders and knobs for controlling volume and pan on various MIDI channels. Logic's default song has simple MIDI volume mixers for the modem and printer ports. (See "MIDI Faders" on page 17.

Since FADERS have no output port parameter, they must be cabled to an output port object or an INSTRUMENT to

be effective. If each of the FADERS in a bank uses a different MIDI channel and uses the same port, they can be cabled in series with the last FADER being cabled to the port. Otherwise, the FADERS need to be cabled to their ports individually.

MIDI PROCESSING

So far we seen INSTRUMENTS for playing back MIDI sequences and FADERS for generating MIDI data with the mouse. An equally important Environment function is MIDI data processing.

Logic has a number of Environment objects for processing MIDI messages and we'll introduce each one briefly.

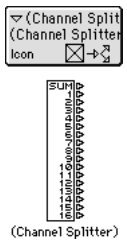


Figure 9

The CHANNEL SPLITTER routes incoming MIDI messages according to their channel. Messages for each channel are sent to the outlet of the same number. If there is no cable from that outlet, the message is sent to the top outlet (labeled "SUM"). One handy application for the CHANNEL SPLITTER is dividing the output from MULTI-INSTRUMENTS.

Figure 10

The purpose of the Voice Limiter is to limit the number of notes being held at one time. It does this by remembering what notes are currently on and generating its own note-off messages when new notes need to be turned on. Its only parameters are the number of allowed notes and the priority it assigns to notes in deciding what notes to automatically turn off. The priority choices are "Last" (turn off earliest notes first), "Top" (turn off lowest notes first) and "Bottom" (turn off highest notes first).

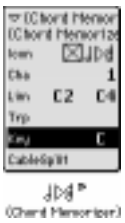


Figure 11

The Chord Memorizer converts single MIDI note messages to multiple MIDI note messages (i.e. chords). All notes of the same pitch class—all C's, all C#'s, all D's, etc.—have the same chord albeit transposed to different octaves. A chord can have as many or as few notes in it as you want. In particular, it can have one note in which case the Chord Memorizer becomes a "pitch class map". Alternatively, a chord can have no notes in which case the Chord Memorizer becomes a "pitch class filter". Keep these two options in mind, they can be very handy.

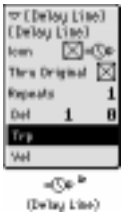


Figure 12

The DELAY LINE is the first of Logic's "timed" processors. These processors only work when Logic is recording or playing back (i.e. the Transport is running). The DELAY LINE repeats MIDI messages entering it at regular, timed intervals. Its parameters set the number of repeats ("Repeats"), the time interval between repeats ("Del"), how much each repeat is transposed ("Trp") and how much each repeat's velocity is offset ("Vel"). There is also a checkbox for allowing or suppressing the original MIDI message ("Thru Original").

Two things about the DELAY LINE are important to remember. First, it will repeat *any* kind of MIDI message, not just note messages. Second, if more

than one outlet is cabled, the repeated messages (including the original) will cycle through the cables.

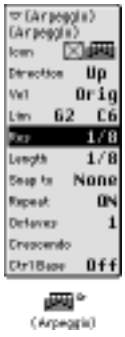


Figure 13

The ARPEGGIATOR will arpeggiate the currently held notes. The "Direction" parameter determines whether the arpeggio is up, down or up & down. In up & down mode it can either repeat the top and bottom notes or not. It can also arpeggiate in "random" order.

The "Vel" parameter controls the velocity of the arpeggiated notes. You can set a fixed velocity, use the original note velocities or have the ARPEGGIATOR randomize the velocities.

The "Lim" parameter sets what notes the ARPEGGIATOR will recognize. Notes outside this range are passed through without being arpeggiated.

The "Res", "Length" and "Snap To" parameters control the timing of the arpeggio. "Res" is the time between notes, "Length" is the note duration and "Snap To" controls whether the ARPEGGIATOR waits for Logic's Transport to reach a particular "grid division" before starting the arpeggio. (This is sort of like quantizing the arpeggio.)

The ARPEGGIATOR'S "Repeat" parameter determines whether the arpeggio plays once or repeats until the notes are released. If it is in repeat mode then the "Octaves" parameter determines how many octaves above the original pitches are added to the arpeggio (1 for original only, 2 for original and octave above, etc). In repeat mode, the "Crescendo" parameter determines what velocity offset will be added at each repeat of the arpeggio.

Finally, the "CtrlBase" parameter allows all the other ARPEGGIATOR parameters to be MIDI controlled. Setting this parameter to a number sets the MIDI controller number that affects the "Direction" parameter. Successive numbers control successive ARPEGGIATOR parameters counting down the list in the Parameter Box.

The TOUCH TRACKS object is only available on MacOS versions of Logic. It allows anything on any Logic track *except audio* to be assigned to any MIDI note number.

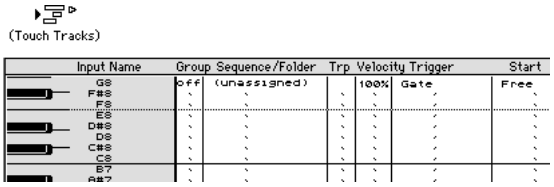


Figure 14

You assign Sequences or Folders to tracks by dragging them into the TOUCH TRACKS window. Then when the TOUCH TRACKS is used as a Track instrument, MIDI note messages trigger these Sequences or Folders.

It is important to note that what is played back is the original Sequence or Folder—nothing actually emerges from the TOUCH TRACKS object and there are no parameters for affecting the output. (The TOUCH TRACKS has a bogus outlet and placebo parameters in its Parameter Box which are vestiges or the MAPPED INSTRUMENT from which it was derived.) A good procedure to use is to collect all Sequences and Folders used in a TOUCH TRACKS into a separate Folder and then mute the folder. This prevents them

from playing back at their original positions.

The settings in the various columns of the TOUCH TRACKS window determine how the triggered Sequences are played back. The "Group" column allows you to group different Sequences so that only one at a time can play back—triggering any Sequence in a group terminates playback of any other Sequence in the same group. The "Trp" and "Velocity" columns set transpose and velocity-scaling amounts. The "Trigger" column controls the mode of playback. The "Start" and "Delay" columns determine whether TOUCH TRACKS waits for Logic's Transport to reach a particular grid division before starting playback and how long the start of playback is delayed. Together they allow playback to start at any relative position within the measure.

One thing that can be confusing is the use of the "`" symbol in the TOUCH TRACKS window. This symbol means that the value in that column is the same as the previous value (i.e. it means "ditto"). The effect of this is that if you change the previous value, the "`" will also change to reflect its true value (i.e. it is no longer the same so a real entry will all of a sudden appear).

Figure 15

The TRANSFORMER is probably Logic's most important MIDI processing tool. It's also the most abstract. Many pages of the ***The Environment Toolkit*** are devoted to the TRANSFORMER and we'll just take a brief look at it here.

What each TRANSFORMER does to MIDI messages passing through it is controlled by the settings in a window which you open up by double-clicking the TRANSFORMER object. The window has two sections, "Conditions" and "Operations" plus a menu of processing options. (For more details on the TRANSFORMER window see "The Transformer Window" on page 22.)

The TRANSFORMER can:

- "Transform" MIDI messages to match its Operations settings.
- Throw away MIDI message which match its Conditions settings.
- Copy MIDI messages sending out the original and changing the copy to match the Operations settings.
- Split MIDI messages between its outlets according to whether they match its Conditions settings.

Here are some places where you might use a TRANSFORMER:

- Between the PHYSICAL INPUT and the SEQUENCER INPUT to block certain kinds of incoming MIDI messages.
- Between the PHYSICAL INPUT and the SEQUENCER INPUT to "scale" the velocities of MIDI note messages and create your own "velocity curve".
- After a program change FADER to add a bank select message to the program change message.
- After an INSTRUMENT to double notes at some fixed interval (octaves for example).
- After an INSTRUMENT to generate MIDI pan controller messages from MIDI note messages to make pan position follow pitch.
- Anywhere you want something to become something it is not.

THE TOY STORE

Here are two, self-contained Environment processes to play with. Each illustrates in a different way, the power of Logic's MIDI processing engine.

These Environment patches have been designed to work on most earlier versions of Logic. Unless your version of Logic is truly ancient, you should be able to load them and play each of the demos right away.

If you are using a Windows PC, you will need to set up the output for each patch first. For MagicArranger, the output comes from the MULTI-INSTRUMENT named "MIDI Out" which is just below the main control panel. For AnalogStyle the output comes from INSTRUMENT named "Analog Out" in the lower left section of the control panel. In both cases you need to choose an output driver from the INSTRUMENT'S output settings in its Parameter Box.

The demos are designed for playback on a GM standard multi-channel synth. If possible, select output ports that are connected to such instruments and the first time you play the demos, start from position "0 1 1 1". This will ensure the correct program, volume and pan settings get sent to your synth.

Both MagicArranger and AnalogStyle are easy to import into your own Songs. If you have a later version of Logic, just choose "Layer..."from the "Import Environments" sub-menu of the Environment's Options menu. With earlier versions of Logic, open both the target song and the "Toys.lso" song then copy & paste all objects from the MagicArranger or AnalogStyle Layer. (Both MagicArranger and AnalogStyle are completely contained on one Layer.)

In addition to the Layers containing MagicArranger and AnalogStyle, there are two "tools" Layers. These are just for reference—copies of the patches here are used in the larger patches. You can import these tools for constructing your own patches or simply refer to them if you want to explore the inner workings of MagicArranger and AnalogStyle. (Each has a its own Layer of tools.)

MagicArranger

MagicArranger randomly selects sections and "takes" from Songs you create. The idea is to create up to 8 sections of a Song and also to create up to four "takes" of some part (typically the melody). MagicArranger then takes over by selecting from a large variety of possible arrangements (approximately 2,642,411,520).

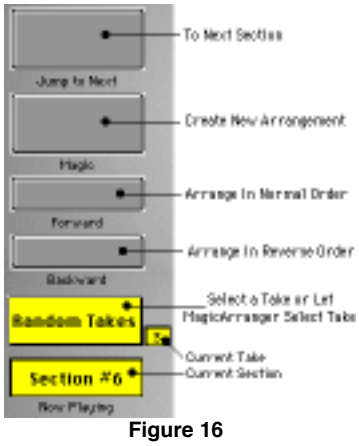


Figure 16

Figure 16 shows MagicArranger's front panel controls. There isn't much to do here. The "Magic", "Forward" and "Backward" buttons all create new arrangements. "Magic" arrangements contain all 8 sections—each only once. The "For-

ward" arrangement plays the sections in their left to right order while the "Backward" arrangement plays them in there right to left order. (The sections themselves still play forward, of course.)

The "Random Takes" button is actually a pop-up menu from which you can select one of the four "takes" or let MagicArranger select a new take each time a new section starts. The take number display (to the right of the take menu) and the section number display are just for display purposes—clicking them has no effect.

MagicArranger needs some basic material to work with—it has to have something to "arrange". One thing you need are the 8 sections of music. Typically these would be packed into separate Folders and arranged end-to-end on the same Track in the Arrange window. (This is not absolutely necessary—they can actually be anywhere in the Arrange window and can even overlap.) Figure 17 shows a typical Arrange window setup for MagicArranger.

Figure 17

Notice that there are 8 folders containing the sections to be arranged and 8 Markers in Logic's Bar Ruler corresponding to the sections. MagicArranger uses these Markers to make the arrangements—an arrangement is actually just a list of 8 Marker numbers.

The easiest way to set up the Markers for MagicArranger is to first delete any Markers that already exist then select the 8 sections and choose "Create by Objects" from the Arrange window's View menu's "Markers" sub-menu.

The other thing MagicArranger needs is "Trigger" events to tell it to jump to the next section. The MIDI messages that tell MagicArranger to jump are controller #80 messages on channel 1 with value 127. These MIDI messages need to be on a Track whose Instrument is the button, "Jump to Next". There should be a trigger event at the end of each section—the easiest thing is to put them at the end of one-measure sequences and position these sequences at the last bar of each section.

The "Take Switch" routes one of four Track Instruments to the output. To set it up, create four Tracks with Instruments "Take #1", "Take #2", "Take #3" and "Take #4". Then place the alternate takes (these can be Sequences or Folders) on these four Tracks at the time positions where they should be played back.

Figure 18

Figure 18 shows an example of this from the MagicArranger demo song. The material for the Take Switch can be contained in the individual sections or in a separate folder as is done in the demo song. If

MagicArranger is in “Random Takes” mode, it selects one of the four takes each time it jumps to a new section of the arrangement.

Takes selections are randomized by the TRANSFORMER named “take set” below and to the right of the control panel. *To accomodate earlier versions of Logic* the random range has been set to 0 thru 4 which results in only takes numbers 0 thru 3 being chosen. In later versions of Logic, take numbers 0 thru 4 will be chosen and this has two effects: take number 4 results in no take being chosen and the take number display shows “+++”. If you observe this behaviou, change the TRANSFORMER’S range to 0 thru 3.

MagicArranger’s random section selection has a similar accomodation. This time the random range is set in the TRANSFORMER to the right of the control panel named “rand val” (just below the large button named “reset”). If you find the “Now Playing” display showing “+++”, change this TRANSFORMER’S random range to 1 thru 8.

MagicArranger works best when “Chase Events” is disabled for all types of MIDI message. This avoids “hiccups” when MagicArranger jumps to a new section.

AnalogStyle

AnalogStyle is a 16 step analog style sequencer. Each step in the analog sequence consists of a note and a controller message. The note pitch and velocity as well as the controller value are set using AnalogStyle’s front panel shown in Figure 19.

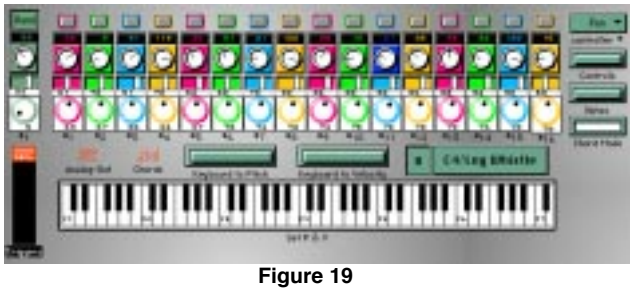


Figure 19

The speed and number of steps (up to 16) is controlled by the DELAY LINE at the lower left of the control panel. To change either, select the DELAY LINE and change its parameters.

AnalogStyle requires a trigger event for each cycle of the analog sequence. These triggers should be MIDI note messages (pitch and velocity don’t matter) placed at the locations where you want the analog sequence to play back. The trigger events should be on a Track whose Instrument is the DELAY LINE, “Triggers”.

One quick way to trigger the sequence continuously is to create a Logic Sequence of the same length as the analog sequence; place the trigger note at the beginning of it and loop the Sequence.

Notice from the demo that you can have more than one Track of triggers—the analog sequence will be triggered independently by each trigger note event.

The KEYBOARD at the bottom of the control panel can be used to enter pitches (i.e. set the row of pitch knobs)—each new note played on the keyboard will set the next knob. (The current position

is shown in the numerical above the KEYBOARD and this can be used to set the position as well.)

By using the KEYBOARD as a Track Instrument, you can use MIDI input or recorded Sequences to set the pitches and velocities. The two switches above the KEYBOARD, "Keyboard to Pitches" and "Keyboard to Velocities" determine whether notes form the KEYBOARD (either incoming or mouse-generated) set the pitch knobs, the velocity sliders or both.

Above the KEYBOARD at the right end is a pop-up menu for displaying and selecting notes (with GM drum names as an alternative) for the current stage. Use the numerical or simply use one of the pitch knobs to set the stage which the menu controls.

The top row of knobs set the controller values that are part of the analog sequence. These controller messages always precede the note messages. If for example, they are used for setting pan, this ensures the pan gets set before the note plays—a necessity on some synths.

The menu at the right end of the controller knobs sets the controller number for the controller events. The button below it can be used to turn controller messages off and the knob below that can be used to turn notes off. I.e. the analog sequence can contain notes or controller messages or both (or neither, though that defeats the purpose).

The last button in the right column, the one labeled "Chord Mode" determines whether the notes output by AnalogStyle are passed through the CHORD MEMORIZER above the KEYBOARD on the left. Double-click the CHORD MEMORIZER to set up the chords for each pitch-class. (It comes with guitar-style dominant-ninth chords for each pitch.)

The three controls at the left end of the panel set the entire row of controls. In the case of the controller knobs, the "Rand/Dir" button determines whether the knobs are set to the same value as the left most knob or are set randomly.

Finally, the top row of buttons act as LEDs showing the currently firing stage of the analog sequence.

The Environment Toolkit

Enhancements in the Environment of Logic 3.0 make many of the techniques used in these patches, obsolete. TRANSFORMER maps and "bang" meta-events can be used to greatly reduce the size and complexity of these patches. The ***The Environment Toolkit*** gives all the details on how to use these new options.

In ***The Environment Toolkit*** you will find dozens of tools and plug-ins for constructing your own patches plus some more interesting control panels along the lines of those featured in "Toys.lso".

Environment Basics - Notes

MIDI Ports

We are dealing with two kinds of “ports” here and this is sometimes cause for confusion. On the one hand, your computer has two “serial” ports which can be used for MIDI: the modem port and the printer port. One or both of these is connected to your MIDI interface either internally or by cables appropriate to your computer (not generally the familiar MIDI cables).

On the other hand, your MIDI interface has one or more MIDI ports which are connected to your MIDI devices with standard MIDI cables. Each MIDI port has at least two MIDI connectors—one for incoming MIDI messages and the other for outgoing MIDI messages. Some interfaces have multiple connectors for each output ports, but the important thing to remember is that each these connectors receives the same MIDI messages.

Your MIDI interface controls how your computer’s serial ports are matched up with the interface’s MIDI ports. There are two choices: one MIDI port per computer port and several MIDI ports per computer port. In the second case, the MIDI ports are called “virtual” ports and they may all be connected to the same computer port or split between the two computer ports.

There’s no provision in MIDI messages for selecting ports so if you’re using an interface with virtual ports, it and Logic must somehow tell each other what virtual ports MIDI messages come from and go to. In the case of MIDI interfaces compatible with Mark of the Unicorn’s “MIDI Timepiece”, Logic takes care of this. In other cases, a “MIDI operating system” like Opcode’s OMS stands between Logic and the MIDI interface to take care of this.

Parameter Boxes

Every Environment object has a Parameter Box where you can set specific properties of the object. Different objects have different kinds of settings but the top two settings are always the same: the objects name and the Instrument menu checkbox and icon.

Double-clicking on the objects name at the top of the Parameter Box allows you to change the name.

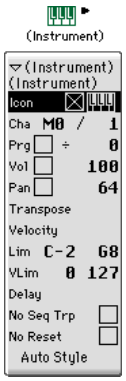
The checkbox next to the word “Icon” determines whether the object appears on the Arrange window’s Track list Instrument menu—the menu that opens up when you click and hold on an entry in the Track list. The icon next to the check box is a pop-up menu for selecting an icon for the object. The icon is used for the object in the Environment window and also on the Arrange window’s Instrument list if the object appears there.

An important thing to remember is that each object has its own Parameter Box and its own settings. Two objects of the same kind can have completely different parameter settings.

Another thing to remember is that if the object is used on an Arrange window Track its Parameter Box will appear in the Arrange window when the Track is selected. So, you can set parameters there as well as in the Environment window. (It’s the same Parameter Box in the Arrange window as in the Environment window, however. There is only one set of parameters.)

Instrument Parameters

Each of Logic’s Instrument types has its own set or parameters. The most extensive set is for the standard Instrument.



Aside from the usual name, icon and output (“Cha”) parameters discussed above, there are parameters for:

- Initializing MIDI program, volume and pan settings
- Transposing and adding a velocity offset to notes
- Limiting incoming MIDI notes to a pitch and/or velocity range
- Delaying notes on playback
- Restricting transposes and resets

The “Prg”, “Vol” and “Pan” settings only apply if the corresponding checkbox is checked. When active, either selecting a Track or choosing “Used Instruments MIDI Settings” from the Arrange window’s Options Menu “Send to MIDI” sub-menu will cause these settings to be sent to the INSTRUMENT’S assigned port.

The “Prg” setting has two values: program bank (displayed above as “÷”) and program number. There are many program bank selection techniques. The most common one uses MIDI controller #0 and this is what Logic uses unless you specify a customized scheme by selecting “Define Custom Bank Messages” from the Environment’s Options menu. (The MULTI-INSTRUMENT offers several other “standard” schemes to choose from.)

The “Transpose” and “Velocity” parameters cause their settings to be added to each note’s pitch and velocity. The transpose range is -96 to +96 (8 octaves up and down) and the velocity range is -99 to +99.

The “Lim” (pitch range) and “VLIM” (velocity range) parameters apply to both incoming MIDI data when the Track is selected and to playback.

The “Delay” parameter is intended to adjust Track playback for purposes of synchronizing both MIDI track-to-track and MIDI to audio. The range is -99 to +99 ticks which is roughly 1/10th of a quarter note. For delay effects use the corresponding Sequence parameter which has a much larger range.

“No Seq Trp” prevents Sequences on the Track from being transposed due to Sequence or Folder parameter settings. This is to prevent unintended transposing of multi-timbral INSTRUMENTS whose pitch selects a sound rather than a pitch.

The “No Reset” parameter prevents Logic’s “Smart Reset” messages from being sent for the Track. These messages re-center pitch bend, reset modulation & aftertouch and release the sustain pedal on each stop or cycle jump. If you want these settings for an INSTRUMENT to remain until manually changed, then check the “No Reset” checkbox.

The bottom parameter, labeled “Auto” in the illustration, selects the initial score style that will be used for this INSTRUMENT in the Score editor. This style can of course be overridden in the Score editor.

Sub-instruments of MULTI-INSTRUMENTS have the same parameters as the standard INSTRUMENT. The MULTI-INSTRUMENT’S global parameters only include “Prg”, “Vol” and “Pan” and in general, these should remain unchecked for the global MULTI-INSTRUMENT. The MAPPED INSTRUMENT lacks the “Transpose”, “Velocity”, “Lim” and “VLim” parameters because these can be set for individual notes in the MAPPED INSTRUMENT’S window.

MULTI & MAPPED INSTRUMENTS

Logic’s MULTI-INSTRUMENT and MAPPED INSTRUMENT are designed for use with particular kinds of MIDI devices. The MULTI-INSTRUMENT is intended for instruments that can play back different sounds on different MIDI channels (often referred to as multi-instruments). The MAPPED INSTRUMENT is intended for use with drum synths and multi-timbral devices in general. The feature of these devices is that different notes play different sounds rather than different pitches of the same sound. Either of these INSTRUMENT types can be used with any kind of MIDI device, however, and there is often good reason to do so.

The MULTI-INSTRUMENT is like 16 standard INSTRUMENTS in one package. It has 16 “sub-instruments” each on its own MIDI channel. The MULTI-INSTRUMENT’S global parameters determine the port setting; the individual sub-instrument’s number determines the channel setting and each sub-instrument’s Parameter Box determines the rest of that sub-instruments settings. (The sub-instrument Parameter Boxes are identical to the standard INSTRUMENT’S.)

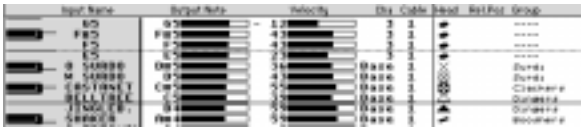
The MULTI-INSTRUMENT also has a name-bank window where preset names may be entered for the synth it controls. The names are organized into 15 banks of 128 because there are 128 MIDI program numbers. (Some modern synths have more than 15

banks and this is a current limitation of the MULTI-INSTRUMENT'S naming structure.)

At first only one bank is "initialized". To initialize a new bank, select it from the "Bank" menu at the upper left of the window. (Note that initializing a bank automatically initializes all lower numbered banks.) Each initialized bank uses up more Song memory so only initialize the ones you need.

The MULTI-INSTRUMENT offers a number of bank selection techniques. They are listed by the MIDI device they match in the "Bank Message" pop-up menu in the upper right of the window. Whatever scheme you choose, selecting a bank number in a sub-instrument's Parameter Box sends the bank message to the MULTI-INSTRUMENT'S port and displays program names from the corresponding name bank.

The MAPPED INSTRUMENT is intended for controlling multi-timbral synths like drum synths. It also has a window but this time it is for setting individual note parameters. In particular, it allows notes to be named (after the sound they play) and to be "mapped" so you can control what key plays what sound.



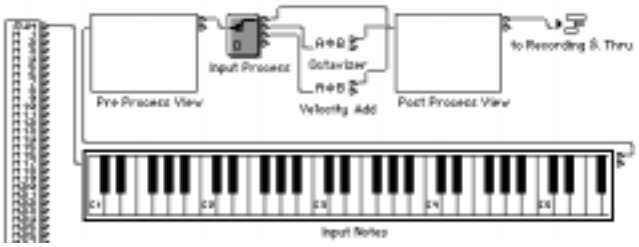
Initially the MAPPED INSTRUMENT does not alter the notes except that it does assign standard GM drum names to those notes in the GM drum note range. The outgoing note number (formerly known as pitch) and velocity will be the same as incoming and the note's channel will be the one set in the MAPPED INSTRUMENT'S Parameter Box. This can be changed for any individual note, however, by changing the setting in the appropriate column. Notice in particular, that notes can be routed to different outlets of the MAPPED INSTRUMENT and that they can be assigned specific scoring properties.

LOGIC'S DEFAULT SONG

The Environment of Logic's default song has eight Layers as shown in Figure 6 on page 4. The top two—"All Objects" and "Global"—are there in any Logic Song. The next six are there for convenience to illustrate one way to set up Logic.

"Clicks & Ports"

If you compare the default Song's "Clicks & Ports" Layer (shown below) to Figure 3 on page 2 you will see that it is quite a bit more complicated. There is still the necessary path from the PHYSICAL INPUT object to the SEQUENCER INPUT object but it passes through several other Environment objects on the way.



The first one, "Input Notes" is the KEYBOARD object. It shows the notes currently being held and also will generate notes when clicked. The KEYBOARD is handy for testing as well as viewing what's going on.

The two rectangular windows, "Pre-Process View" and "Post Process View" are MONITOR objects. MONITORS show a history of all data passing through them. The latest messages are at the bottom of the list and the MONITOR window can be made bigger but it can not be scrolled. You clear it by clicking inside the window.

After the first MONITOR there is an object called a CABLE SWITCHER which will route data to any one of its cabled outlets. The top outlet goes directly to the "Post Process View" MONITOR and no processing takes place. The next two outlets pass through objects called TRANSFORMERS which modify the data

in different ways. We'll discuss TRANSFORMERS in the section on " MIDI Processing" on page 7.

"MIDI Instr."

The default Song's "MIDI Instr." Layer contains two "banks" of standard INSTRUMENTS—one for each MIDI channel of the modem port (blue) and one for each MIDI channel of the printer port (green). (These INSTRUMENTS will send MIDI data to all virtual ports on MIDI interfaces that have virtual ports.) There are also MULTI- INSTRUMENTS for both ports containing the GM preset names. Finally there is a MAPPED INSTRUMENT for channel 10 of the modem port and a "layered" INSTRUMENT for sending MIDI data to both channels 1 and 2 of the modem port.

Notice particularly, the layering technique. If you want the same MIDI data sent to several MIDI devices—several channels of the same device or of different devices on different ports—this is the trick. Create a new INSTRUMENT for the Track containing the MIDI data and cable its outlets to the several target INSTRUMENTS.

Notice also, the method of using a MAPPED INSTRUMENT for a multi-timbral channel of a MULTI-INSTRUMENT. This allows individual note names while still allowing the programs of the MULTI-INSTRUMENT to be selected by name. For more on this technique see the final section of " Starting from Scratch" on page 18.

"MIDI Faders"

The "MIDI Faders" Layer of the default song contains volume sliders for the 16 MIDI channels of the modem and printer ports. (As above these will send MIDI data to all virtual ports.)

The individual FADERS are Environment objects that send MIDI controller messages when clicked with the mouse. In this case the controller message is for controller #7 which normally is MIDI volume. Moving the on-screen slider will result in MIDI volume messages with values from 0 (bottom) to 127 (top). Pressing the "mute" button at the top of a slider causes a zero-volume message to be sent and pressing it again restores the volume to the slider's value.

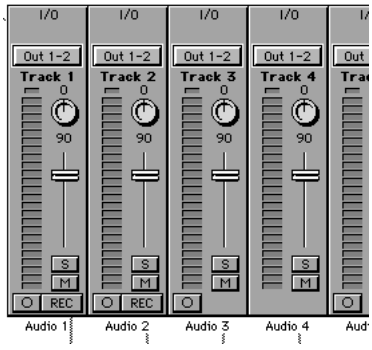
Notice that the FADERS for each port are cabled in series. Each slider sends MIDI messages for a different channel and each slider will be updated automatically by incoming messages for its MIDI channel. Messages for channels other than the slider's will pass through without any change—this is why cabling them in series works.

Also notice the objects "M-Playback" and "P-Playback" at the end of the slider rows. These are actually INSTRUMENT objects with their channel set to "All". Their purpose is to route MIDI data to the sliders for automated mixing. If you use these INSTRUMENTS on Arrange window Tracks, any MIDI volume information on those tracks will be reflected in the sliders.

Finally, notice the stubby cable coming out of the last slider in each row. These cables go to port objects on the "Clicks & Ports" Layer. This are how the volume data gets to the MIDI ports.

"Audio"

If you are using Logic Audio, the "Audio" Layer contains AUDIO OBJECTS for each channel of your HD recording system. The number and look of the objects varies depending your HD recording setup.



AUDIO OBJECTS act like a combination INSTRUMENT and mixing module. On the one hand they are used

as instruments for Arrange window Tracks for audio data. On the other hand, mousing the various controls affects the volume and pan (and other features when available) of the audio output.

One thing to remember is that the AUDIO OBJECT can be MIDI controlled—MIDI controller messages sent to an AUDIO OBJECT either from Tracks or from other Environment FADERS will affect the various AUDIO OBJECT settings.

"Instrument" and "Instrument"

The default Song's last two Layers are both named "Instrument" and they are both empty. These are a starting point for adding your own INSTRUMENTS or other Environment processes to a Song.

STARTING FROM SCRATCH

First, create a new Song and trash its Environment:

① Create a new Song by selecting "New" from Logic's File menu.
② Open an Environment window by selecting "Open Environment" from the Windows menu.
③ Select the "All Objects" Layer from the Layers pop-up menu.
④ Select all the objects on this Layer by choosing "Select All" from the Environment window's Edit menu.
⑤ Delete all objects by selecting "Clear" from the Edit menu.
⑥ Save this Song under some indicative name like "Scratch".

Second, create & cable the input objects:

① Select the "Clicks & Ports" Layer from the Layers menu.
② Select "Physical Input" from the Environment window's New menu.
③ Select "Sequencer Input" from the Environment window's New menu.
④ Click & hold on the "SUM" outlet of the PHYSICAL INPUT object and drag a cable to the SEQUENCER INPUT object.

Third, make an inventory of your studio:

① Make a list all the MIDI devices that are connected to MIDI output ports of your MIDI interface.
② For each device on the list, indicate whether it receives on one or several MIDI channels.

(Typically drum machines, "solo" or "lead" synths and many effects devices receive on one MIDI channel. "Poly" synths, GM synths and more complex effects units receive on several MIDI channels.)

③ For each sound-producing device on the list, indicate whether it is multi-timbral.

Multi-timbral means that different notes make different sounds rather than making the same sound at different pitches. Drum, percussion and sound effects modules are examples of multi-timbral synths.

One confusion that can arise involves poly synths with multi-timbral presets. For example, most GM synths have a GM drums preset. Treat these as "poly" synths under step ② above—we'll see how to handle their multi-timbral presets later.

Fourth, create an Environment INSTRUMENT for each MIDI device on your inventory list:

① Go to the Layer named "MIDI Instr." by selecting it from the Layers menu.
② For the devices that receive on only one MIDI channel but are not "multi-timbral", create a "standard" INSTRUMENT by choosing "Instrument" from the Environment window's New menu.
③ For the devices that receive on more than one MIDI channel, create a MULTI-INSTRUMENT by choosing "Multi-Instrument" from the New menu:
④ For the multi-timbral devices, create a MAPPED INSTRUMENT by choosing "Mapped Instrument" from the New menu.

Fifth, set the port and channel parameters for each of the INSTRUMENTS you've created:

① Set the port and channel of each standard INSTRUMENT using the "Cha" parameter in its Parameter Box.
② Set only the port of each MULTI-INSTRUMENT using the "Cha" parameter in the global Parameter Box—the one for the whole MULTI-INSTRUMENT not one of the sub-instruments.
③ Set the port and "base" channel for each MAPPED INSTRUMENT using the "Cha" parameter in its Parameter Box. (Recall that you can change the channel and cable for individual notes in the MAPPED INSTRUMENT'S window.)

Sixth, set up the Track list's Instrument menu:

① Select each of the INSTRUMENTS that you created (all three types) and choose a name and icon for it in its Parameter Box. For the MULTI-INSTRUMENTS ensure that you use the global Parameter Box and not one of the sub-instrument's Parameter Boxes. You can also assign a color to each object by choosing "Object Colors" from the View menu. The color applies to both the Environment window and the Arrange window's Track list.

② Remove each of the MULTI-INSTRUMENTS you created from the Track list's Instrument menu by unchecking its "Icon" checkbox in the global Parameter Box. You will want to assign the individual sub-instruments to Arrange Tracks rather than the global MULTI-INSTRUMENT.

③ For each MULTI-INSTRUMENT sub-instrument that you want on the Track list's Instrument menu, click the sub-instrument number in the MULTI-INSTRUMENT and check its "Icon" checkbox.

Seventh, if you are using Logic Audio, create the AUDIO OBJECTS to match your setup.

① Go to the Environment Layer named "Audio" by selecting it from the Layers menu.

② Create an AUDIO OBJECT for each playback channel of your HD recording system.

③ Set the audio device, audio track and MIDI channel for each AUDIO OBJECT. (The MIDI channel determines what incoming MIDI messages will affect the AUDIO OBJECT'S settings.)

At this point, you've created a fully functional working Environment for MIDI and Audio sequencing with Logic. As you work with this Environment there are a few odds and ends you will want to take care of, but you needn't try to do all these things at the beginning.

❍ If you've created MULTI-INSTRUMENTS they will have the default names in all their name banks—either the standard GM names or just numbers. If you are using MacOS, you can use any text editor to copy and paste banks of names into MULTI-INSTRUMENTS. If you have Sound Surfer or Sound Diver, you can use Autolink to automatically update these name banks. As a last resort, you can type names in by hand. MULTI-INSTRUMENTS with their bank names already filled in with the factory preset names are available on various web sites.

❍ If you've created MAPPED INSTRUMENT they will have the standard GM drum note names in them. You may eventually want the names of your multi-timbral sounds for the notes. The only way to do this is to enter each one by hand.

❍ If you have a MULTI-INSTRUMENT which has one channel (usually channel #10) devoted to drum presets, you may want to use a MAPPED INSTRUMENT for this channel. The easiest way to do this is to create a MAPPED INSTRUMENT and cable it into the MULTI-INSTRUMENT. Make sure you click "Remove" when Logic asks so that the MAPPED INSTRUMENT is no longer connected directly to a port (since the MULTI-INSTRUMENT still is).

❍ If you want to select programs by name for the standard INSTRUMENTS you've created, there are two options. One is to replace the standard INSTRUMENT with a MULTI-INSTRUMENT and use its sub-instrument for the channel corresponding to the standard INSTRUMENT'S channel. The other option is to create a MULTI-INSTRUMENT with the program names in it and cable the standard INSTRUMENT into it. As with the MAPPED INSTRUMENT above, click "Remove" when Logic asks.

❍ For each INSTRUMENT, MAPPED INSTRUMENT and sub-instrument of a MULTI-INSTRUMENT the "Prg", "Vol" and "Pan" checkboxes in its Parameter Box are initially unchecked. If you want these INSTRUMENTS to have initial program, volume and pan settings, you should check these boxes and enter the desired values. You may also want to set some of the other INSTRUMENT parameters.

❍ If you started with Logic's default Song, the Arrange window will now have lots of "No Output" Tracks. You can eliminate these by choosing "Delete Unused" from the Structure menu's Track sub-menu.

MIDI THRU & MIDI FEEDBACK

"MIDI Thru" simply refers to the fact that MIDI messages coming from your MIDI interface are passed "thru" the INSTRUMENT for the selected Track in the Arrange window. These MIDI messages are then (usually) sent back to the MIDI interface by that INSTRUMENT using its port setting. This is

what allows your MIDI controller to play any other MIDI device in your studio simply by selecting the appropriate Track.

But, if your MIDI controller is part of a MIDI sound module and a Track for that device is selected this can lead to doubled notes. Notes from the MIDI controller go internally to the sound module as well as being sent to it through Logic.

This problem can be further aggravated if the MIDI device then sends the data back to your MIDI interface. This is MIDI feedback.

The first problem, doubled notes, can be solved by turning "Local" off for the MIDI device. Most MIDI devices allow this (although some older ones do not).

The second problem, MIDI feedback, can be solved by turning "MIDI Thru" off for the MIDI device. Most MIDI devices also allow this.

If either of these solutions is not available, the problem can be solved by having Logic *not* pass incoming MIDI data thru to the output port. There are two ways to do this.

In the "MIDI Options" section of Logic's Song Settings you can designate one of the INSTRUMENTS from the Instrument menu as the "Instrument without MIDI Thru Function". If you only have one problem MIDI device and one Environment INSTRUMENT assigned to it, this is the way to go.

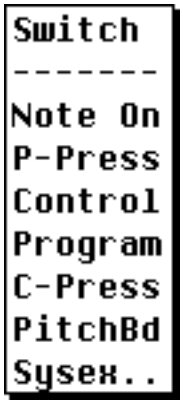
The alternative is to cable a FADER between the output of any INSTRUMENT that is assigned to the offending MIDI device then cable the FADER to the device's port. Set the FADER'S "Filter" parameter to "Thru" and incoming MIDI data will not be allowed through the FADER to the port. (Recorded data from Logic Tracks will still get through.)

FADER TYPES & MIDI MESSAGES

MIDI messages are "commands" that tell MIDI devices what to do. These messages are made up of two or three numbers and the first number, called the "status", identifies the kind of command. Examples are "turn note on", "change programs", "set volume, etc. After the status number there are one or two data numbers. For example, notes have two: one for pitch and one for velocity. Program changes have one: the program number.

There is a channel number (1 to 16) combined into the status number of most MIDI message types. MIDI messages with a channel number are called "channel messages" and other MIDI messages are called "system messages".

Logic's FADERS can send and react to any type of MIDI message as well as a class of internal Logic messages called "meta-messages". A FADER'S "In" definition tells what messages the FADER will react to and its "Out" definition tells what messages it will send out. Since these can be different, a FADER can be used to convert one type of message to another.



The illustration shows the FADER'S "In" and "Out" definition pop-up menus. The item above the dashed line, "Switch", and the last item, "SysEx" are special and we'll get to them later. The rest of the items are the "channel messages".

Note-on, P-Press (poly pressure), Control and PitchBd (pitch bend) messages are all followed by two data numbers. Program and C-Press (channel pressure a.k.a. aftertouch) messages are followed by one data number. The data numbers can range from 0 to 127. (Status numbers range from 128 to 255—that's how MIDI devices tell the difference between status and data numbers.)

MIDI Message Data Numbers

Message Type	*First Data Number*	*Second Data Number*
Note	Pitch	Velocity
P-Press	Pitch	Amount
Control	Controller #	Amount
Program	Program Number	
C-Press	Amount	
PitchBD	Fine	Coarse

The Table above gives the meaning of the data numbers associated with each of the MIDI message types.

FADERS are most commonly used for MIDI controller messages—they are almost never used for MIDI note messages (but anything is possible). There are 121 different controller definitions (controller numbers 0 thru 120) but only a few are commonly used. These are shown in the table below.

Common MIDI Controllers

Number	*Meaning*
0	Program Bank
1	Modulation
2	Breath
4	Foot Pedal
7	Volume
8	Balance
10	Pan
11	Expression
64	Sustain Pedal (on/off)
65	Portamento Pedal (on/off)
66	Sustenuto Pedal (on/off)
67	Soft Pedal (on/off)
69	Hold (on/off)
71	Resonance
72	Release
73	Attack
74	Cutoff
91	Reverb
92	Tremolo
93	Chorus
94	Detune
95	Phaser
96	NRPN Data Increment
97	NRPN Data Decrement
98	NRPN Data Fine
99	NRPN Data Coarse
100	NRPN Parameter Number (fine)
101	NRPN Parameter Number (coarse)

Note that the these are “intended” meanings—the actual effect of these controller messages depends on the MIDI device receiving them. For one thing, not all MIDI devices understand all of these controller types and for another, the effect of things like modulation, breath and expression can vary.

The last choice of FADER type, “SysEx”, is intended for sending what are called System Exclusive Messages. These messages are addressed to specific MIDI devices; they can have more than two numbers in them and their effect is completely up to the receiving device. FADERS for this type of message have a list window much like Logic’s Event list window where individual SysEx messages can be entered (or copied and pasted from Logic’s Event list window). There can be more than one message in the window and the messages do not need to be SysEx. Any MIDI message or meta-message can be put into the window. *Think of SysEx faders as message buckets—they can contain any list of messages that you want sent instantly when the FADER moused.*

One thing to know about the SysEx FADER window is that any events that are selected when the window is closed will have their value changed to the FADER’S value while those that are unselected will have the value that appears in the window.

When you set a FADER’S “Out” definition to “Switch”, the FADER becomes a CABLE SWITCHER instead of a FADER in the normal sense. The CABLE SWITCHER routes incoming messages to one of its outlets (it can have up to 128 of them). Incoming MIDI messages matching the CABLE SWITCHER’S “In” definition set the switch position to the incoming MIDI message’s value. (Actually, only values 0 thru 125 set the position—values 126 and 127 decrement and increment the position, respectively.)

The CABLE SWITCHER’S “-1-” definition setting is always 48. If you change this to a number above 48, you get a different FADER type called a “meta-FADER”. Instead of sending out MIDI messages, meta-FADERS send out messages called “meta-messages”. These are messages that only have meaning to Logic—they’re never sent to the MIDI interface and never reach MIDI devices.

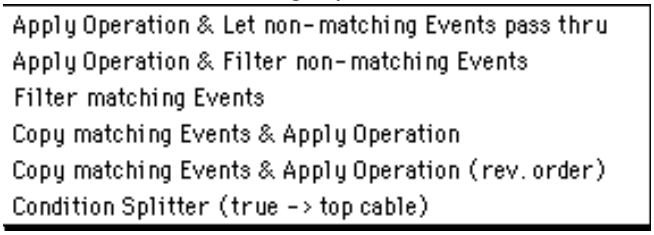
Like MIDI controller messages, the first data number determines what kind of meta-message it is (i.e. what it tells Logic to do) and the second data number is an amount. Meta-messages are covered in detail in ***The Environment Toolkit***.

THE TRANSFORMER WINDOW

TRANSFORMER Conditions and Operations have settings for the four parts of most MIDI messages: the "Status" (kind of message), the "Cha" (MIDI channel), the "-1-" (first data number) and the "-2-" (second data number). Note that if the MIDI message has only one data number, the "-2-" setting applies rather than the somewhat more logical "-1-" setting.

Incoming MIDI messages which match the Conditions settings are typically "transformed" into MIDI messages matching the Operations settings. There is one exception to this—when "Filter matching Events" is selected from the menu.

The figure below shows the TRANSFORMER'S menu choices. (The bottom choices are not available in earlier versions of Logic.)



The top two choices determine what happens to incoming MIDI message that don't match the Conditions: they can passed through unchanged or they can be thrown away. With the third choice, "Filter Matching Events", MIDI messages which match the conditions are thrown away and those which do not match the conditions are passed through unchanged.

The next two choices, "Copy matching Events..." cause the TRANSFORMER to send out two MIDI messages when it receives a MIDI message which matches the conditions—the original message and a message matching the operations. The difference between these menu choices is whether the original MIDI message comes first (first choice) or whether it comes last (second choice).

The last menu choice, "Condition Splitter (true-> top cable)" sends MIDI message matching the Conditions to the TRANSFORMER'S top outlet and sends other MIDI messages to the second outlet. The matching MIDI messages are also transformed to by the operations.

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