

SENSORS

BASIC CONCEPTS:

The Ztar Sensors are standard and optional hardware devices including the Pads, Triggers, Pots, Breath, Neckstrip, Pedals, and everything else you touch to create a MIDI performance, with the exception of the Fingerboard.

Each Sensor can drive up to 8 MIDI “EVENTS” for each Song or Ztar preset.

Each Sensor can accept a variety of modes called “PlayFunctions” that govern how the assigned Events are played back for each Ztar Song.

Events can be Notes, Program Changes, and MIDI Continuous Control functions.

Event such as Notes can be given timing values or can be timed by your touch on the Pad or other Sensor. You can also use onboard or outboard MIDI clock sources to time the Events.

TIP: To select Sensors quickly, turn CHASE on in the RESPONSE menu. Then, when you touch a Sensor that’s assigned to note-output, the menu-screen will jump to that Sensor. A limitation in this is that when Sensors are set to ‘Continuous Control’ they will not chase in the menu system.

TIP: To turn a Sensor OFF, select it in the Events Menu and set its PlayFunction to OFF, or set its Events to OFF.

The word PAD is often used interchangeably with the word SENSOR. The word NOTE is often used interchangeably with the word EVENT.

SENSORS MENU

SENSORS screen # 1

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG1	Mode: Strum	String# 1	6-TRIGS
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

The Sensor-name is shown in the upper-left corner of the screen. Use softkey#1 and the Up/Dn keys to select a Sensor to edit.

(PLAY) MODE: [Off, Events, Strum, Dual]

Off: the Sensor will not output anything.

Events: the Sensor will play its own programmed set of up to 8 events.

Strum-mode: the Sensor will trigger notes from the fingerboard according to the fingerboard's Scan-Mode. The Ztar's Triggers are normally set to Strum-mode. *When the TRIG front-panel hotkey is used to turn off the Triggers and put the fingerboard into Tapping Mode, the Triggers will revert to playing their assigned MIDI events.*

DUAL-mode: the Sensor will both trigger fingerboard-notes and its own programmed set of events. The Dual-Mode will apply to and Sensor. This can have some interesting effects and allow the simulation of various acoustic instruments. Consider setting up the Breath with the Dual-mode to initiate a note and apply volume-changes, as does a real wind instrument. Or a Pad in Dual-Mode with pitchbend applied to act like a conga-head or tympani.

STRING#: Use softkey#3 to select a Fingerboard-String for the Sensor to trigger when in Strum-Mode.

6-TRIGS: Press softkey#4 to automatically set the Ztar's six triggers to Strum like a guitar. This is the default setting and you should rarely need to use this.

Sensors Screen #1 cont.>

Sensors Screen #1 cont. -

TIMING: selects the TIMING menu, which sets up several options to determine how a Sensor's events will be played.

EVENTS: enters the Events menu to assign MIDI functions to a Sensor.

OUTPUT: sets up several parameters that route the Sensor's MIDI output.

TRIGGER-FUNCTION: When The PlayMode is set to STRUM the Trigger-Function menu appears as a choice in the top Sensor Menu-screen. This menu will isolate the Strumming settings.

SENSORS / TIMING menu

Up	TRIG1	HitMode: Touch	TRIGGER-GATE: 100	
Down	Loop: Off	Delay: 0	Gate-Shift: Off	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

HitMode: There are three Hit-modes, **Timed**, **Touch**, and **Latched**.

When set to **TIMED**-mode the Sensors' notes will turn off automatically according the programmed Gate-time in the Events-menu. The Hit-Mode must be set to TIMED for a Sensor to fire a Sequence. This is because the sequence events themselves are using a timed duration. This tells the Sensor to use the BPM timer in the Clocks screen.

When set to **TOUCH**-mode the Sensor will release the notes when your finger releases the sensor.

When set to **LATCHED**-mode the first strike will turn the notes on and the next strike will turn them off. Use this for looped-drum samples and large, sustained chords.

TrigGate: When a Trigger is set to Strum-mode it's possible to have the fingerboard notes terminate automatically according to the TriggerGate timing. Use the softkey#4 and the Up/Dn keys to set a duration in either milliseconds or MIDI clocks.

Sensors/ Timing cont-

Loop: [On, Off, N-times] Use the softkey#5 and the Up/Dn keys to set the selected Sensor's events to loop indefinitely, n-times, or not at all. This applies to chords, sequences, and any event-types. *The LOOP setting option does not appear on the screen when the Pad's PlayFunction is set to ContinuousControl.*

Delay: this sets a delay-time between the time you strike a Sensor and the time the events actually play. Set in either milliseconds or MIDI clocks.

GateShift: When enabled, the Pad-velocity will modify the note-duration for a TIMED-ed Pad (Sensor). A harder hit will give a longer note.

TRIGGER-FUNCTION menu, DUAL-Mode Off

Up	TRIG 1	Strum : String 1	Dual: Off
Down			
EDIT	Softkey#5	Softkey#6	Softkey#7 Softkey#8

When the Sensor PlayMode is STRUM the Trigger-function menu will appear.

DUAL-MODE ContinuousControl sensing will only respond to the pick attack of String-Triggers, but will respond to varying pressure on the KeyTriggers.

Sensor#: Use softkey#1 and the Up/Dn keys to select the Sensor for editing purposes.

STRUM: Use softkey#3 and the Up/Dn keys to select a fingerboard string that will be triggered by this sensor.

DUAL: softkey#4 toggles the DUAL Mode, and displays the Dual-Mode setups on the bottom line when enabled.

Trigger-Function cont-**TRIGGER-FUNCTION menu, DUAL-Mode On**

Up	TRIG 1	Strum : String 1	Dual: Off	
Down	DUAL	Aftertouch Threshold: 0	Curve: 1	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

When Dual Mode is enabled (it's one of the 3 Play-Modes) the DUAL-prompt appears in the lower left corner and the aftertouch response settings are displayed.

Aftertouch Threshold: When pressure is applied to a Trigger after the fingerboard-note is triggered, a programmed effect will be applied if the pressure rises above this level. The particular effect is programmed in the Events-menu.

When Dual-Mode is turned OFF the bottom line text will disappear from the DUAL-MODE menu.

EVENTS menu

The Events menu programs the various notes and other events that the Sensor will perform.

Some fields in the EVENTS menu will change depending on the SensorMode or the EventType selected.

The Sensor-Name appears in the upper-left corner of the screen. Use softkey#1 and the Up/Dn keys to select a Sensor to edit.

Up	TRIG1	PlayFunction: Basic	Velocity: 0/ 127	MACRO
Down	Evt:1 Note	Channel 10:	35/ B1 PAD	Gate: 100
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

PlayFunction [see PlayFunction List]: use the softkey and the UP/Dn keys to set the type of function the Sensor will play out. See the Play-Function List for descriptions of the various choices.

Sensor Play-Function List:

Off	SequencePlay
Basic	Sequence RePlay
All	Sequence StopPlay
Seqntl	Sequence Record
NtShft	Sequence RecordNext
AltUp	Sequence Undo
AltDn	ReTrigger
AltUpDown	Kit Increment (Song Increment)
AltRandom	Kit Decrement (Song Decrement)
Slice	Chain Increment
ContinuousControl	MuteAll
Ribbon Bi-Directional (RibBi)	
RibbonPot (RibPot)	

SENSORS/ screen #1 cont -

Vel: [0-127/ 0-127]

Each Event has a velocity-range or “window” within which it will respond. The upper and lower limits for this range may be set in this field. By careful setting of these limits a variety of musical effects may be achieved, such as velocity-switching, velocity-shifting, velocity-adding, etc.

All of the velocity-response settings of the Ztar still effect the note that appears within a narrow response window; that is,

To set a velocity-window:

Press softkey#3 to toggle between the Lower and Upper Velocity fields.

Use the Up/Dn keys to set the value.

See the section, “VELOCITY CURVES” for more details.

For clarity's sake we will refer to these two settings as “Input Velocity-Low” and “Input Velocity-High”

InputVel_L: The lowest velocity value that will trigger this event. This value has already been processed by the velocity curve. (See the Velocity processing Flowchart)

InputVel_H: The highest velocity that will trigger this event.

Event-number: Event-Type Softkey #5 will toggle between the Event-number and its assigned Event-type. Use the **UP** and **DOWN** arrow-keys to change the Event-number and Event-Type. Use the Up/Down keys to adjust the type.

MIDI Channel number:

Use softkey#6 and the UP/Dn keys to select and set the MIDI Channel for this Note.

Event-Data/ Note-number/ Velocity-source:

Use softkey#7 to toggle between the Note-number and the Velocity-source fields.

The Note-number reads both as a decimal number and in standard musical notation.

Use the Up/Dn keys to set the values.

The velocity-source may be set to follow the touch, position, or pressure of the Sensor by setting the screen-value to “PAD” or you may assign a Fixed velocity- or data-value for this Note by assigning a number.

Gate: *This sets the programmed Event-duration when the Pad's Hit-Mode is “TIMED”, not “TOUCH”*

SENSORS/ Gate-time cont-

Press softkey#8 to toggle time between “absolute” (milliseconds) and “scaled” (MIDI clocks).

MIDI clocks are displayed as nnn#, range 0-999. These events will play out according to the Tsig and BPM (if INT clock is selected), or the external MIDI clock (if A or B is selected).

Note for internal clock: there are 96 MIDI clocks per whole note, so if the Tsig is $x/4$, each beat is 24 clocks, but if Tsig is $x/8$, each beat is 12 clocks - remember that BPM is beats, but events are programmed in clocks. If you're using external MIDI clock, the Ztar's Tsig doesn't affect the event timing.

Note: set BPM as high as possible when importing sequences

To see the Metronome change the timing for a sequence, program a pad in Sequential mode with the “Loop” turned ‘On’. Program each event with a Gate time of 24# (i.e., 24 MIDI clocks). Hit the pad, then go into UTILITIES/CLOCKS menu and change the BPM.

To change the sequence timing from the MIDI Input ports, switch the MIDI clock to an external source, and then change the BPM in your external unit. .

EVENT TYPES

Standard Event-Type List :

Off
Note
Control Change
Program Change
Channel Pressure
PitchBend
Song Select
Start Sequence
Continue Sequence
Stop Sequence
System Reset

When the PlayFunction is set to Control Change these are the available Event-types:

Off
BendUp
Bend Down
Volume Up
Volume Down
Velocity Up
Velocity Down
Mod Wheel
Sustain
Expression
Channel Pressure
Polyphonic Key Pressure
User-entered ControlChange number
UserUp Control-number for center-detented effects
UserDown Control-number for center-detented effect
----- Vacant entry
Clock+
Clock-
Bend

MACRO screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	S01 / TR1	Notes All	VelocityShift	Velocity Add
Down	Velocity = Pad	Chords		
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Each event has a pair of numbers that define a velocity-range where the event will respond. By setting the velocity-ranges for the various events assigned to a pad, several unique effects or pad-modes can be created. Rather than defining set modes in the PlayFunction List, we chose to provide macro settings that initialize the events' velocity-ranges to default values. These values may then be modified in the SENSOR/EVENTS menu to more accurately create the desired result

The Velocity-related MACROS here are just conveniences that set the velocity windows for all 8 events in a Sensor's buffer to default values. You'll want to adjust these values in the EVENTS screen to dial in your touch.

NotesAll

All of the Sensor's events will play simultaneously as a chord. This holds true for ControlChange events as well.

VelSw Velocity Switch

The complete MIDI velocity range is split equally between the 8 events so that none of the ranges overlap. Each event then responds within its own unique range. (This may not be present in your version of software and you'll have to set it up manually in the EVENTS menu.) In this way it's possible to play up to eight different sounds from a single Pad just by varying the force of your hit.

VelShf (Velocity Shift)

Velocity ranges are set for each event so that the ranges of adjacent events overlap, playing both events together. This allows note-events to blend together, usually in pairs, with varying velocity of a pad-hit. This is useful for controlling multiple samples of real acoustic sounds, which tend to vary subtly in timbre according to the input velocity to the patch. Or you can blend samples from completely different instruments for an endless variety of effects.

VelAdd (Velocity Add)

Each event has its velocity-range set with a lower-limit of zero and an upper limit at successively higher points in the MIDI velocity range of 0-127. This way the softest hit will play event #1, a slightly harder hit will add Event#2, a somewhat harder hit event#3, and so on. This is an interesting way to build up chords with velocity.

SENSORS/MACROS cont-

Vel=PAD

This is a handy shortcut that sets all of a Pad's events to track the Pad's hit-velocity rather than output a fixed value. You can otherwise set each event one-by-one in the SENSORS/EVENTS screen

Chords:

This selects the CHORDS screen that allows automatic generation of chord-notes into the 8-event buffer for the selected pad. This is a handy shortcut for many chord types. To generate inversions of these chords, go into the SENSORS/ EVENTS screen, shuffle the notes into a different order, change octaves for individual notes, and add notes to un-assigned events for chordal extensions, or remove notes if there are too many. When a Sensor's Chords are used with velocity-switching/adding/etc, the notes may be changed by varying the force of your touch.

SENSOR PLAY FUNCTIONS, descriptions

Basic

Only the first event is played from the Pad's 8-event block. Also, only the first event is displayed in the EVENTS screen. This mode is normally used in the common situations where only one note or event is required.

All [All-Notes]

When the Pad is struck, all of the events programmed into the Pad's 8-Event buffer will play together as a group according to the response settings for the Pad and the individual event velocity-settings. The various events' durations will time out according to their programmed gate-times. Chords or note-"stacks" may be played in this mode.

Seqntl [Sequential-Notes]. *The 8-note pattern sequencer.*

When the pad is struck once, each of the events programmed into the Pad's 8-Event buffer will play automatically in sequence, according to the programmed gate-times for each event. The sequence may be looped by setting the loop switch in the TIMING menu. (see LOOP). ***Most importantly: you can only hear the Sequential-Notes if the Hit-Mode is set to 'TIMED' in the TIMING menu.***

NtsShft: [Shift Notes]

When a single note is assigned to a Sensor, it's pitch, or MIDI note-number, may be changed by varying the velocity, or force of your touch.

Play Functions cont -

ALTERNATING MODES

The pad's programmed events are played back one by one on each successive hit. These modes will operate on either the fixed 8-event buffer or the variable-length MIDISequence buffer. The order of event-list playback is different depending on the Alt-Mode selected.

AltUp: (Alternating Up)

Events are played starting with Event#1 stepping up to the highest numbered event.

AltDn: (Alternating Down)

Events are played starting with the highest numbered event stepping down to Event#1

AltUpDn: (Alternating Up/Down)

Events are played starting with Event#1 stepping up to the highest numbered event where the direction changes and events are stepped back to Event#1.

AltRnd (Alternating Random)

The order of events is selected randomly.

Slice: Slice mode is enabled to operate with variable-length sequences.

Each hit plays the next time slice of the sequence. The time slice is specified in MIDI clocks in the EVENTS screen. Note that a MIDI clock may be either 1/24 or 1/12 of a beat, depending on the metronome time signature. After the last slice is played, the next hit will restart from the beginning of the sequence.

CntCtl (Continuous Control):

This mode is used to issue MIDI Continuous Control messages tracking from an input device, usually a pedal or pressure-pad.

Ribbon Bi-Directional: Sets up a Ribbon Sensor such that the first tap will become "0" and sliding in either direction from that point will move the value up or down.

Ribbon Pot: Sets up the Ribbon Sensor such that the last touch as you lift your finger will latch that value, allowing you to emulate the action of a potentiometer.

THE SEQUENCERS

In discussing the sequencers we use the word “NOTE” to refer to any MIDI event whether it’s a note, Control Change, ProgramChange, any outgoing message.

NOTE: A Sensor or Pad must be set with its Sensor-Mode to “EVENTS” (Sensors menu) and its HIT-mode (SENSORS/ TIMING menu) set to TIMED in order for it to fire a sequence.

There are actually two separate but similar sequencers in the Ztar; one that uses a fixed-length 8-note buffer that allows special control over the individual notes and playback modes, and a variable-length sequencer that can record performances on the fly with a number of special looping modes.

The Fixed Length 8-note sequencer is setup by step-entry in the EVENTS screen.

The Variable Length sequencer is best recorded live but you can enter and edit these sequences via the Sequence-Edit menu with a lot of patience. Also you may download a sequence from an external MIDI sequencer or computer.

You set up whether to use a Fixed length sequence in the EVENTS screen when a Pad is assigned to a NotesSequential (SEQNTL) or Alternating (AltUp/Dn/UD/Rnd by assigned the Sequence to FIXED, the 8-note buffer. Also, the NOTES_ALL function will play all of the notes in the buffer together as a chord.

You set a Sensor to a Variable length sequence in the EVENTS menu by assigning the Play Function to MIDISq and the Sequence# to one of the V.L. sequence numbers 1-999. A V.L. sequence will include all controller-data as well as notes, Program Changes, and any outgoing MIDI messages.

NOTE: In order for the sequence to play out automatically, you must set the HitMode for the Pad or Sensor that triggers it to TIMED. If it’s set to TOUCH you’ll only hear the first note.

SEQUENCER MODES and Operation:

The next series of Sensor-modes control the Sequencer functions. You can record and playback basic multi-tracked performances by setting up a Sensor-Pad to initiate recording and separate Pad to initiate playback.

Note: The zTar currently supports 999 sequences and 56,000 notes.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	PlayFunction: Play		EDIT
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8
	Play: 1 / Off	Off / Off	Off / Off	Off / Off

Play - Assign up to eight Sequences #1-256 in the eight slots on the bottom line of the Sequence-Play screen. A Pad-hit starts at the beginning all of the sequences assigned to the pad. A second hit will stop the sequences

RePlay - each hit re-starts the assigned sequences from the beginning.

StpPlay - stops recording, stores the result as the sequence# 'n' assigned to this Pad, and then immediately starts playing back the sequences from the beginning. Successive hits will stop the sequence then re-start from the beginning. The top line in the display shows the recording sequence-number to be stopped. The bottom line shoes the Sequence-numbers to playback.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	PlayFunction: Record Sequence#: 1 1 st Note		EDIT
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8
	Play: 1 / Off	Off / Off	Off / Off	Off / Off

Record - (Records a variable-length sequence) first press of the Sensor you have set up as a Record-Pad starts recording. The second press stops recording and stores the sequence 'n' associated with this pad.

The top line of the display shows the sequence number to record to.

The bottom line shows the sequence-numbers that are monitored for playback during recording.

Softkey #3 allows you to set the Sequence-number you wish to record. Pressing the Softkey#3 repeatedly will toggle the way the recording Starts:

First-Note: The sequence will begin when you play the first note.

PadHit: The sequence will start recording as soon as you hit the Record-Pad

To set up a Record Pad:

- 1) Assign "Record-Sequence mode to a pad or input trigger and
- 2) Select a MIDI sequence number to store the recorded MIDI events.

SEQUENCERS cont-

Strike the pad once to start recording. Strike it again to stop recording. The sequence is automatically stored.

RecNxt - first press starts Record and increments the sequence number 'n'.
Second press stops the record & stores it.

Undo - decrements the sequence number on the last pad that did a RecNxt.

Importing sequences:

The zTar can import any sequence of MIDI notes or CC commands and store them into any sequence number. The zTar can not import Standard MIDI Files at this time.

1) **Utilities/ MIDI-In:** turn on "Capture". All MIDI events will be captured from all channels.

2) Set up a Record-Pad by assigning the Sensor-Pad .Any Pad or String Trigger will do. In the SENSORS/EVENTS menu, set *PlayMode = RecordSeq*. Assign a sequence number on the top line of the display. You can monitor up to eight playback tracks (sequences) by assigning the sequence numbers on the bottom line.

In the TIMING menu, set the Hit-Mode for the Sequence-Playback Pad to TIMED.

In the UTILITIES/CLOCKS menu you have the opportunity to set the MIDI Clock source to INTERNAL or the MIDI Input Clock setting which is "L"

Make sure the Metronome is turned Off by setting the Output to "None".

Assign a Play-pad to the same number.

ReTrig: When a Sensor is set to ReTrig, striking it will re-trigger any notes that are fretted on the assigned String-number on the fingerboard. Use this when you want to tap notes from the fingerboard and then re-trigger them with the Key- or String-Triggers. Set the String# to ALL-STRG to have this sensor re-trigger the entire fingerboard.

The Re-Trigger function will follow the fingerboard mode, so that in Guitar-mode you'll still get hammer-ons and in Poly-mode you'll get multiple notes-per-string.

Note: In Guitar-Mode, to eliminate triggering unwanted open-strings, set the fingerboard Zone to have its lower boundary at the first fret instead of the "zero" fret.

KitInc: Increment the Kit number by one

KitDec: Decrement the Kit-number by one.

ChainI: Set the Kit-number to the next Kit in a Chain.

MutAll: Mute all Sensors. A global version of the LINKS/MUTE function.

SENSORS/OUTPUT menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	Curve: 4	Pedal: TR1	MIDI: L
	Link: Off	Off Off	Off Off	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Several important parameters for the Sensor's MIDI output are set up here.

Sensor#: use softkey#1 and the Up/Dn keys to select the sensor.

Curve: selects and sets the Curve number assigned to this sensor.

Pedal: sets a continuous controller in the system to control this sensor when acting in a HiHat setup. *This feature is not currently in use.*

MIDI: set the MIDI output port; Left, Right, or Both, None for 32 channel systems.

Link: Link the activity of this sensor to trigger other sensors' events.

NotesOn: triggers the linked-sensors from a Note-On message.

NotesOff: triggers the linked-sensors from a Note-Off message.

Off: no links enabled

LINKS: Repeatedly press either softkey# 6 or #7 to select up to four Links for this sensor. Use the Up/Dn keys to assign your linked Sensor Pads