

# **ZPC USER'S MANUAL**

Rev1.4

1/05

Starr Labs  
San Diego, CA

## **All Rights Reserved**

This Manual and all of the products, descriptions, menu-screens, software, hardware, firmware, algorithms, and processes discussed are the property of Starr Labs. All rights are reserved by Starr Labs, Inc and none of the aforementioned may be copied, photocopied, reproduced, translated, reverse-engineered, or reduced to any electronic medium or machine-readable form without prior written consent from Starr Labs, Inc.

"Ztar" and "Z-tar" are trademarks of Starr Labs, Inc. The designs and the functionality of the Ztar hardware and software are protected by US patents.

Copying or reproducing the look and behavior of the ZTAR fingerboard, body, control panel, or performance modes may constitute infringement and will be prosecuted by law.

The Ztar is fully warranted for a period of 90 days. Thereafter, the warranty extends for one year to cover the cost of parts replacement. Any service labor will then be billed at our shop rate.

In order to qualify for warranty coverage, all service and repairs must be made at Starr Labs factory or an authorized service depot. Any violation of this voids all warranty coverage. Abuse, mis-handling of the instrument, or connection to an unapproved power supply will also void the benefits of this warranty.

Copyright Starr Labs © 1993-2003

# TABLE of CONTENTS

Getting Started .....	p.5
Hardware diagrams .....	p.6
Hardware versions .....	p.7
The Basics .....	p.11
OVERVIEW .....	p.14
Sensor Hardware .....	p.18
Menu TREE .....	p.20
MENUS System .....	p.21
SONG MENU .....	p.23
FRETBOARD MENU .....	p.25
Fingerboard Key-velocity, Transpositions.....	p.26
AfrterPressure.....	p.27
MIDI OUTPUT .....	p.28
SCAN-MODES .....	p.29
Hammer-Ons .....	p.30
WRITE-MENU .....	p.31
SENSORS-MENU .....	p.32
SENSOR MODES	
Sequencer setup	
TIMING menu screen .....	p.34
EVENTS menu screen.....	p.35
Event type lists .....	p.36
Sensor Function-List.....	p.37
Setup Macros.....	p.39
Sensor Play-Function descriptions .....	p.40
Sequencers .....	p.44
Sensors Output menu .....	p.45
RESPONSE-MENU.....	p.46
UTILITY MENU.....	p.48
LIBRARIAN.....	p.49
INITIALIZE.....	p.51
MIDI INPUT setups.....	p.51
TUNINGS.....	p.53
BULK DUMPS.....	p.55

CLOCKS .....	p.57
CURVES .....	p.59
CURVES TUTORIAL .....	p.60
SEQUENCE-EDIT.....	p.61
> MORE	
ARPEGGIATOR menu	
SHOWALL-MENU.....	p.62
Tips and Tricks.....	p.68
STRING TRIGGER SETUPS.....	p.72
PEDALS.....	p.73
BREATH CONTROLLER SETUP.....	p.73
MORE PERFORMANCE NOTES.....	p.74
LEARNING the ZTAR.....	p.77
NECK ASSEMBLY/ DIS-ASSEMBLY INSTRUCTIONS.....	p.80
TROUBLESHOOTING and MAINTENANCE.....	p.81
BLANK SENSOR ASSIGNMENT CHART .....	p.85
ZTAR INDIVIDUAL SONG SPECIFICATION .....	p.86
SYSEX FORMAT	
GLOSSARY .....	p.95
INDEX .....	p.97

# **GETTING STARTED QUICKLY**

*If you're absolutely new to MIDI and want to know more, you can find the MIDI specifications at [www.midi.org](http://www.midi.org)*

- Use a **5-conductor** MIDI cable (all 5 pins must be wired) from the controller to the PB-1, power supply.
- Plug into the **MIDI Output** connector, closest to the center of the guitar. From this position the connectors are: MIDI Out, MIDI In, Sustain and Volume Pedals, and the Power switch.
- Connect the Ztar MIDI Out cable to the Controller input of the PB-1 power adapter.
- Connect a MIDI cable from the SYNTH jack of the PB-1 to the MIDI IN on your synth.
- Connect the supplied DC wall-supply to the PB-1.
- Flip the power switch on the instrument and you should see the display light up. If it doesn't, check your MIDI cable and wall-wart for correct type and connections. If you're stuck here go the Troubleshooting section at the rear of the manual.

If the **TRIG** and **G/POLY** LEDs are now lit you're set up like a guitar so start picking! *Touch a key on the fingerboard* and press the **TRIG** button to play the fingerboard tapping-style. Press the **G/Poly** button to play more than one note per string. You'll also hold a fingerboard key down while changing the PAT+/-, OCT+/-, and SOLO keys.

**Use the Live Menu**, the power-up run-time screen, **to** select onboard patches or **SONGS**. Each Song can have a unique setup for the instrument, including tunings, synth patches, and Sensor assignments.

Hit the **EDIT-KEY** to enter the **Song Menu**, the Ztar's top-level Edit-screen. From there you'll access all of the edit functions.

**Use the Fretboard Menu** to set up the fingerboard according to your needs. This includes defining areas of the neck for selected voices, MIDI channels, transpositions, Velocity Inversion, and Base Volume setting.

Within the Zone menu, use the **Scan-Mode menu** to set up the fingerboard for Strumming, Tapping, Polyphony-per-string, and Hammer-ons. You can create fingerboard zones that respond differently for these settings.

**Use the Sensor Menu** to program the Pads, Triggers, Joystick, and Pedals for MIDI effects, chords, and sequences.

**Use the Utilities/Tuning Menu** to set the tuning for the fingerboard, the Open-Strings, Right/Left switch and Enable the HammerOns/PullOffs.

**Use the Triggers front-panel key** to turn on/off the Triggers. With the Triggers On you can strum them like a guitar. With the Triggers Off you can tap the fingerboard like a keyboard.

**Use the Guitar/Poly key** to switch between One-Note-per-String or All-Notes-per-String. You can play the “Open-Strings” in GUITAR mode with the TRIGGERS ON. Strike the Trigger with nothing fretted to hear the open string.

**Use the Pat+/Pat-** and **Oct+/Oct-** Hotkeys to set the synth patch(es) and Octave.

After you’ve created a special setup for the Fingerboard and the Sensors according to your needs you can save it to battery-backed memory by using the **Write** key or the “Write” menu from the display.

### **Setting up the KeyTriggers, Trigger-Pads, TPA1 or TCA1 attachments:**

***The KeyTriggers and Trigger Pads on the TCA1 may be set to STRUM mode to fire their associated strings on the fingerboard as a guitar-like right-hand technique.***

The T pads can be used to Trigger the fingerboard strings in different ways by setting the Hit-Mode differently.

- a. Pressing the Tpad triggers the frets and releasing the Tpad mutes the notes even if you’re holding the frets: Set the Hit-Mode to TOUCH.
- b. Pressing the Tpad triggers the fret, and releasing the Fret mutes the note even if you’re holding the Tpad: Set the Hit-Mode to TIMED and **set the TRIGGER-GATE to ‘0’ milliseconds** (not MIDI clocks). This is the most ‘guitar-like’ setup for the T pads.

*[to toggle between Milliseconds and MIDI clocks, press the Trigger-Gate softkey]*

Pressing the Tpad plays a fretted note for a fixed duration: set the Hit-Mode to TIMED and set the TRIGGER –GATE to a number (either msec or MIDI clocks) that sets the duration.

### **Setting up the Ztar String Triggers as a guitar:**

With the ZPC-OS installed, the Ztar may be thought of as a fingerboard and a group of Sensors that may be programmed to act together and play as a guitar. A preset has been created that defaults to the most Guitar-like performance.

In the **FRETBOARD>SCAN-MODE** menu you set up fingerboard-zones to respond to the Triggers in *Triggers-On* mode.

In the **SENSORS** menu you set up the Triggers to *Strum-mode* so that they now select notes from the fingerboard. The Fingerboard and Triggers are separated to allow more possibilities for variation in programming.

Our only Macro for quickly setting up the Ztar like a guitar is the “6-TRIGS” function found in the **SENSORS** menu. Press this to set up the Triggers and go to ZONE menu and Turn the TRIGS=ON. This should be saved as an onboard SONG including your preferences for hammer-ons and touch-response.

The **6-TRIGS** button does this:

- 1) Sets the Sensor Mode to STRUM.
- 2) Sets the Hit-Mode in the TIMING menu to TOUCH
- 3) Sets the linked (Strummed) Fingerboard Strings to the proper alignment.

*If you're tapping the fingerboard, you can set the T Pads (StringTriggers or any Sensors) to "ReTrigger"-mode, which will re-trigger fretted notes much like the Strum-mode.*

**Trigger sensitivity:**

You can use the 6 trimpots at the rear of the Ztar to adjust the individual String-Trigger Gain. Also, you can assign a separate response curve to each trigger in the SENSOR/ OUTPUT menu. Go there to set the curve number, and if necessary, go to the UTILITIES/ CURVES menu to adjust the assigned curve(s) to match the requirements of your touch. See

**HARDWARE VERSIONS**

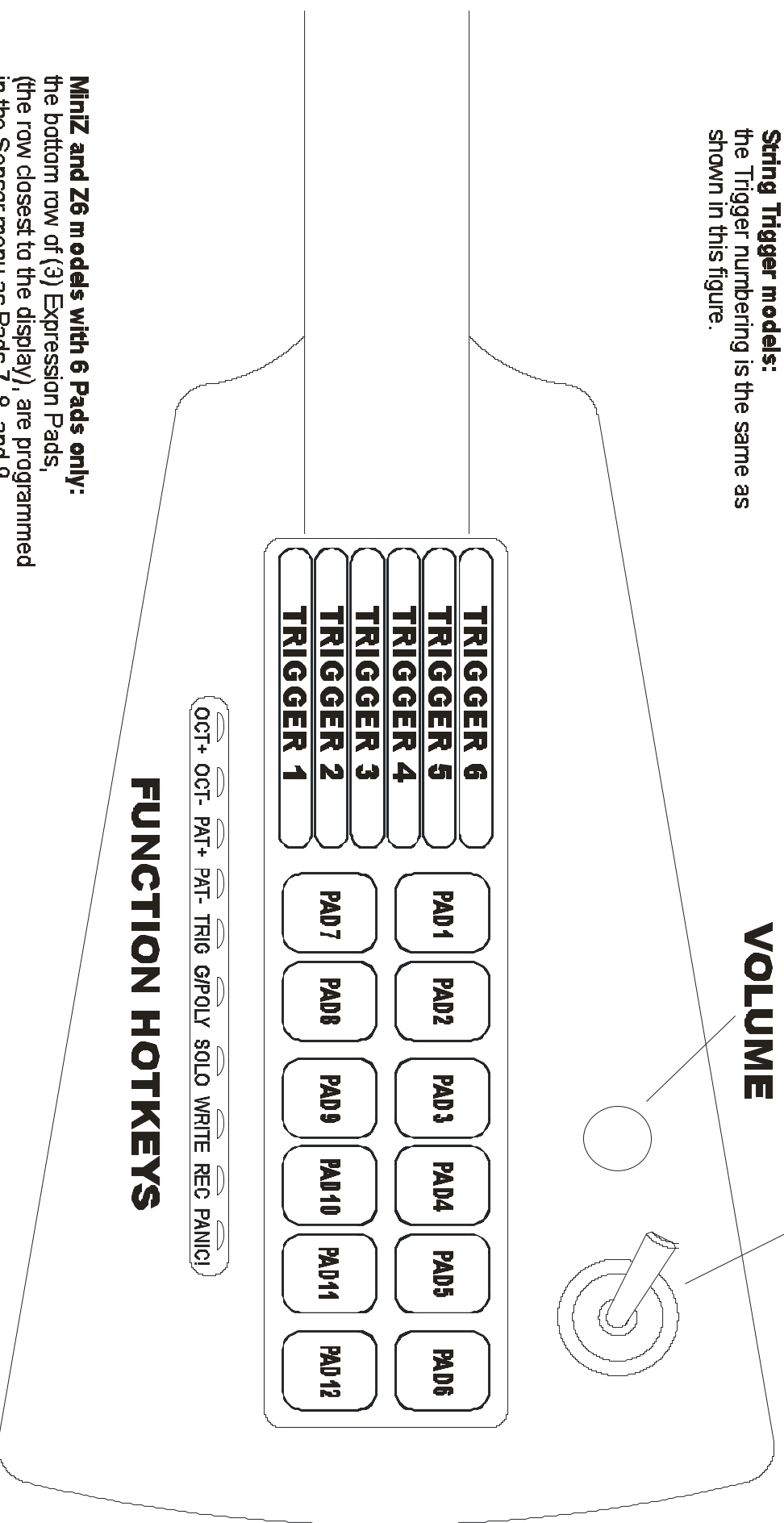
This manual serves several Ztar models that each have slightly different configurations in terms of number and type of Pads and other Sensors. Because there are many features in common, and the zstars are expandable, there are items that will appear in the menu system that may not be installed on your instrument. Likewise, an optional Sensor may be loaded into a general-purpose programming slot, say PAD12 for convenience and cost. As software and feature upgrades are made available they are implemented into just one model at a time. So be sure to occasionally inquire about the current version for your system.

# MarkII/ Z1/ Z6 Key Trigger and Pad Array

**JOYSTICK**

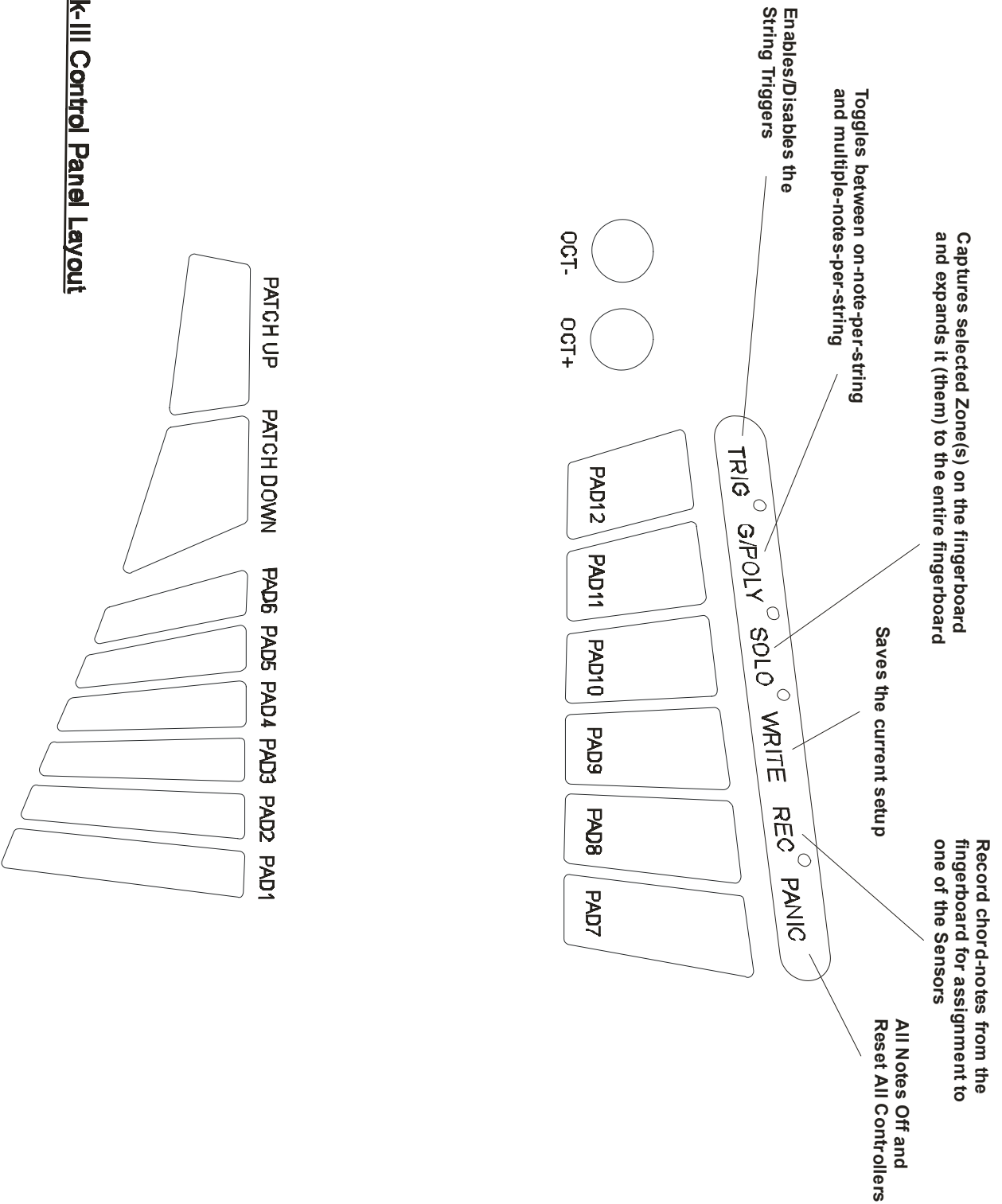
**VOLUME**

**String Trigger models:**  
the Trigger numbering is the same as shown in this figure.



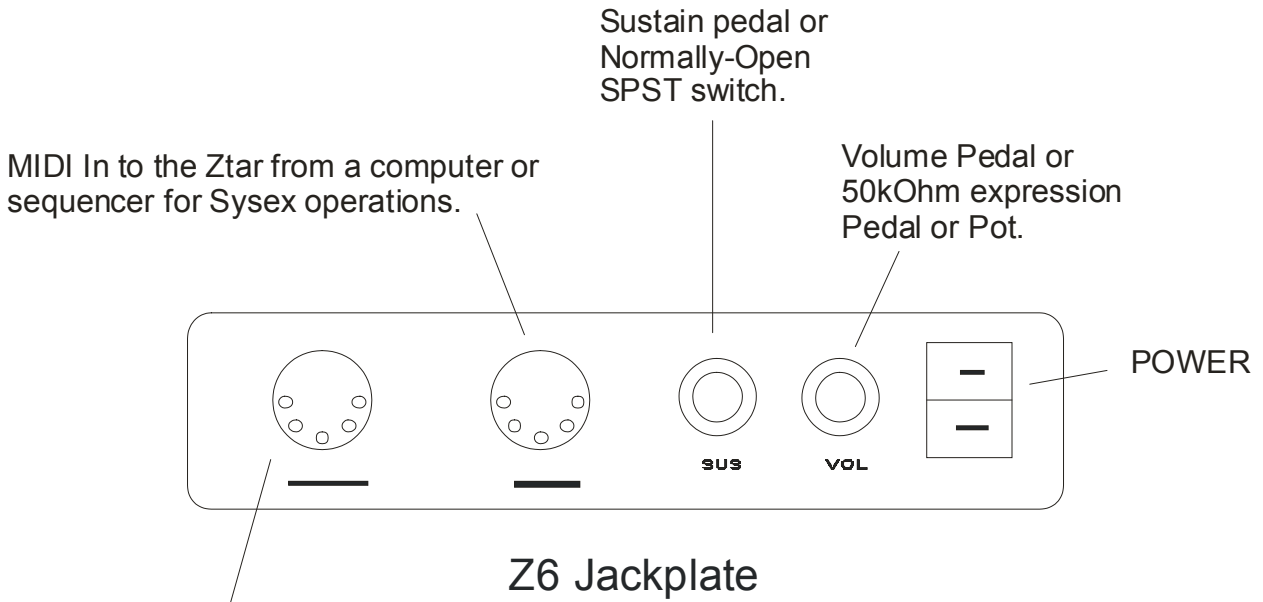
**Miniz and Z6 models with 6 Pads only:**  
the bottom row of (3) Expression Pads, (the row closest to the display), are programmed in the Sensor menu as Pads 7, 8, and 9



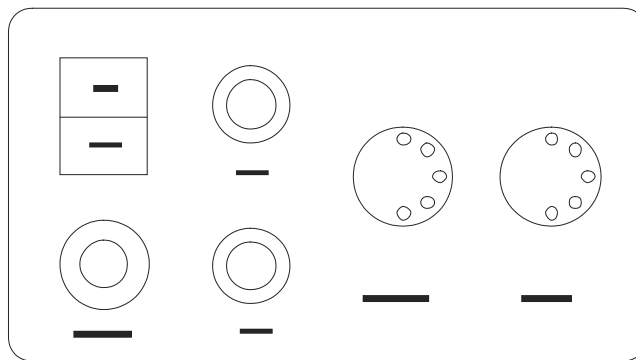


**Mark-III Control Panel Layout**

# ZTAR CONNECTIONS



MIDI out to the synthesizer and Phantom DC power In to the Ztar. Connect this to the 'Controller' jack on the PB-1 power adapter.



Mini\_Z and Z1 Jack Plate

# The Basics

## Ztar terminology and concepts

### SENSORS

In the Ztar, “Sensors” refers to any programmable performance hardware other than the fingerboard. This includes the Triggers, Pads, Joystick, pedals, knobs, breath, ribbon, Neckstrip, and any other installed devices.

Occasionally when describing a programming feature, we refer to any Sensor as a “Pad” both in this manual and in the menu-system as the structure that holds setup assignments for each of the hardware inputs within each SONG.

**ZONES** in the Ztar are user-defined areas of the fingerboard and are similar to the Layers that are often found in MIDI keyboards.

### EVENTS

Events are individual MIDI messages programmed to the Sensors. An Event may be a MIDI note, Continuous Control message, Program change, or any of a number of other MIDI data-types. Each Pad may be assigned up to eight events or a sequence of variable-length.

### SONGS

The full group of Sensor inputs may be programmed with all of their various assignments and saved along with the various assignments to the fingerboard and the metronome to form on-board patches or SONGS. There are currently 24 Songs in the Ztar without the addition of a RAM card.

When you select a saved SONG it is copied into the **Scratch Song** buffer where all of your live edits may be made without affecting the saved version until you’re ready to WRITE it.

### HOTKEYS

This is the strip of named function keys the are mounted on the top or side of the instrument and are provided for quick access to commonly used features.

***If you've been using our original Ztar pre-ZPC operating system you will notice these general changes:***

**An onboard clocking system has been added which now allows us to time MIDI events and support sequences and patterns.**

**Some new setup modes have been added into the system in an effort to add versatility in the use of the Sensors, unfortunately at the expense of simplicity:**

- 1) Each Sensor may be used as a Trigger for the fingerboard, so now there is a setup-mode called "PlayMode" which may be set to 'Strum', 'Events', or 'Dual'.**
- 2) A "Hit-Mode" has been added which sets a Sensor to time its assigned functions by the duration of your touch, a duration specified by your programmed 'gate-time', or by latching and un-latching the event with consecutive hits. Triggers may be timed, or 'gated' as well, by their own separate TriggerGate.**
- 3) The Sensors, Scan-Mode, and Utility menus have been re-organized to incorporate the new features. Take a few minutes to familiarize yourself with the new layout.**

These are the new features you'll encounter:

The SENSORS menu has expanded into several screens to include quite a few new modes and options, including a variety of note-timing options, pattern-play options, and mixing of MIDI event-types within a single Sensor's event-block.

Each note or MIDI event played from a Sensor has a programmable velocity window so that a variety of effects may be created by changing the force of a hit or varying the pressure with a Continuous Controller. For instance, a scale might be played from a single Pad by controlling your velocity, or chord extensions added with increased force. This applies to small sequences as well.

Sensor MIDI output assignments may now be looped.

Sensors may now be Linked to trigger or mute the notes sent from another sensor.

There are now 32 programmable Fingerboard Zones.

Each Fingerboard Zone may have its own Trigger-mode; Tapping or Strumming. That is, you can set up the fingerboard so that some notes may be tapped and others played only by strumming. Overlap zones of this type to play a note when you tap a key and a second note when you strum it.

There are additional Triggering modes for both KeyTriggers and StringTriggers that can be accessed by the AutoSustain switch in the menu.

Each Fingerboard Zone may have its own response curve.

Fingerboard aftertouch may now be switched between PolyKeyAfterpressure and Channel Pressure (or disabled entirely) on a *per-Zone* basis.

There are now user-programmable 8-point velocity curves for fine control over touch response.

The Poly-Trigger mode has changed in the way it operates. You may now fret keys after the fingerboard is strummed (Triggered). Think of this as polyphonic hammer-ons.

Each key of the fingerboard may now be individually tuned for note and channel number.

Two types of onboard sequencer have been added. One uses 8-note fixed length buffers; the other will record variable-length patterns.

Support for a second MIDI output channel has been added

There are now several menu screens for RESPONSE settings.

There is a CLOCKS menu for setting tempo and timing for events in the system as well as a 32-beat metronome with multiple accents to define your own key-signatures.

There is an assignable Tap Tempo feature to time sequences.

There is a set of SHOWALL menus for quick overviews of groups of settings.

A Chord-generator has been added to create chords automatically.

A number of MIDI input tracking features have been added including:

- The ability to accept incoming Program Changes to switch Ztar Songs.

- The ability to map incoming note-numbers to trigger Sensor-playback assignments.

- The ability to download sequences from an external source.

- The ability to program the Sensor menus using an external keyboard.

For the Triggers' DUAL-mode, the trigger-velocity and trigger-aftertouch may have separate response curves.

The DUAL-mode now can apply to any sensor so that you could for instance, assign it to the Breath controller to create a woodwind effect that sends both Note-On/Off and Volume.

Each onboard Ztar Song (patch) can store and send 32 Program Changes.

## OVERVIEW

Congratulations on your purchase of a ZTAR MIDI guitar controller! With its combination of hardware and software features it may be the most versatile and expressive electronic musical instrument that can be had at any price and it should afford you a lifetime of creative exploration.

We've made every effort to design the Ztar for ease of use, considering the number and variety of setups that can be created. *If you decide to jump into the Ztar menu system before you read this manual you may get stuck with something you don't understand. The answers are usually simple and can be found in the manual. Also, the familiarity you gain from flipping a few pages can give you an idea of what you can and can't do with the Ztar and a little browsing is well worth the effort.*

The Ztar hardware is best understood as two separate systems, one that governs the use of the **Fingerboard** (programmed in the FRETBOARD menus); and one that governs the use of the '**Sensors**', the collective term for all of the other hardware devices on the instrument, including the Triggers, Expression Pads, Sliders, Knobs, Pedals, Joystick, Breath controller, Ribbon controller, and Pressure strips (programmed in the SENSORS menus). Each of these systems has separate software for its control.

The ZTAR fingerboard is a six string by 24-fret matrix of touch-sensitive keys which may be assigned to various MIDI channels, patches, tunings, response curves and other parameters. Areas of the fingerboard may be blocked out into zones which may be programmed separately according to your musical requirements.

The SENSOR controllers on-board the ZTAR encompass all of the performance devices other than the fingerboard. Included are six **Triggers** for strumming and picking and which have special setup software to tailor their operation. The Triggers may be installed either as String Triggers, real strings that capture a guitarist's picking techniques, or KeyTriggers, pressure- and velocity-sensing bars that may be used to create new, expression techniques for controlling synthesizers and other MIDI controlled devices. There is a wealth of controllable features in modern synths that lies untapped and the various new touch-surfaces of the Ztar attempt to open that door for you. There may also be installed on your Ztar a bank of Expression Pads, usually 6 or 12 on most instruments. Two pedal inputs, Sustain and Volume, are fully programmable. Any of the SENSOR controllers may be assigned to control any two MIDI effects or Continuous Controller assignments to four channels each. They may also be used to capture and play back up to eight MIDI notes across one or more channels, control external sequences and looped-samples, and other special functions.

***The Sensors are often referred to just as "PADS" for brevity's sake.***

***The term "NOTE" is often used to refer to any MIDI event.***

## User Interface

We hope you enjoy this new user-interface and that you find the menu system easy to navigate, considering the size of the display and the amount of information that is available to be viewed and programmed.

The ZTAR is supported by a Programming/Display system with a 2 line by 40-character backlit LCD and a '**softkey**' based User Interface. What this means is that the eight keys that surround the display are used in varying ways to select different items depending on the particular menu screen showing. Where necessary numeric values are scrolled up and down using the Up **and Down arrow** (^ v) keys or the joystick. Most menus are entered with the softkeys.

The menu-system is a tree-like structure. The Ztar has quite a few programmable parameters but every effort has been made to keep the nesting of menus to a minimum and the navigation of the system as simple as possible.

The **EDIT** key is used both to enter an edit-screen in some menus and more often to exit from a menu-screen when you're finished programming. In general, pressing EDIT several times will back you out of a series of menus and bring you back to the top-level LIVE-mode screen.

The Ztar Operating System has a LIVE mode and an EDIT mode. Pressing the EDIT key from the LIVE-MENU enters the top-level SONG-EDIT screen to alter the various setup parameters of the fingerboard, pads, triggers, joystick and pedals. The ZTAR will continue to play while in the EDIT mode. Make sure to exit back to the LIVE mode after completing an edit, however, as you may accidentally change one of your setups by hitting the joystick or another programming key. Also, the instrument will play a bit faster in the LIVE mode, as there it isn't the necessity to update any Edit screens

### **Programming, Mode Selection and Data Entry:**

Many of the programming features on the ZTAR have been implemented in the screen/menu system and also in shorthand fashion on the front-panel "hot-keys". In the screen/menu system the eight "soft" keys surrounding the display will be physically near their selections on the screen. Use of the hot-keys will save a number of keystrokes. Also, the joystick is used both as a performance tool and a data entry device in conjunction with the data Up/Down buttons when programming the system.

"Chase" features:

In several of the menus a String, or a Key, or other Sensor may be selected by simply touching it, in addition to using the Display keys

### **A little more Terminology**

In an effort to make the ZTAR as fully user-programmable as possible some existing MIDI concepts have been expanded and are slightly re-defined:

Patches for the ZTAR are called SONGS. A Song stores the complete configuration for the instrument. This includes all of the fingerboard splits/zones, transpositions, patches, tunings, and all of the MIDI control assignments for the SENSORS, including any recorded Notes, Chords or Drums, Continuous Control EFX, and a list of other parameters. SONGS may be thought of as 'Kits' in the sense used in an electronic percussion device, a set of assignments of hardware Triggers to MIDI output functions and the player's response setups for all of the hardware. There is no analogous term in guitar playing so we chose 'SONGS' as you might use a different configuration for each song in a set, different voices, etc.

ZONES in the ZTAR environment are arbitrary rectangular areas of the fingerboard defined by two diagonal corner points like a select-window on a computer screen. Zones are each assigned a MIDI channel as well as a number of other values.

Up to thirty-two zones may be configured at any time. A zone may be as small as one note or as large as the entire fingerboard. Where Zone boundaries overlap they will share qualities in those areas. A 'keyboard-split' occurs where adjacent zones do not overlap. Zones may be defined by simply picking a high and a low note from the fingerboard. When all of the desired parameters influencing a zone have been punched in the zone may be saved into a Song Memory location. Zones may thus be set up to perform melody, accompaniment, percussion and effects all from a single instrument. Library functions are available for copying a previously configured Song for use as a template in creating a new Song.

A SOLO mode has been provided to expand the versatility of the zone features in live performance. When notes are being held in one or more zones and the SOLO Hotkey is pressed, those zones will be expanded to fill the entire fingerboard. That is, if a piano is on Zone#1 and a Flugelgong is on zone#2, when notes from both zones are touched and SOLO is pressed now the entire fingerboard will sound Piano/Flugelgong. Sort of an on-the-fly super-layering function. This feature shouldn't be confused with the SOLO function in the Zone menu, which allows you to isolate and audition single layers in a multi-layered setup.

### **Triggering: Picking, strumming, and other options:**

On the Ztar, the Triggers are either Strings or flexible bars used to play notes selected from the fingerboard. They are also capable of playing their own user-programmed notes and other events. The fingerboard-zones may be independently assigned to be tapped or strummed. Because there is only one set of Triggers, all of the zones will need to be set to Tapping-mode (TRIGGERS:OFF) in order for the Triggers to play just their own set of events.

*Actually, any of the Ztar's Sensors may be set up to trigger the fingerboard strings; however, there are special features that relate specifically to the first six sensors in the Sensor-menu, the installed Triggers.*



In a setup with a single fingerboard-zone it's easy to toggle between Tapping and Strumming by pressing the TRIG hotkey. When the fingerboard goes into Tapping-mode you can hear the Triggers playing their own notes.

By setting the DUAL-mode, the Triggers can be made to both play the fingerboard and their own notes simultaneously.

The Triggers can be made to play notes with various options relating to sustaining, timing, and note-duration. Setups for the Triggers are made in the SENSORS-MENU, EVENTS-MENU, and TRIGGER-FUNCTION menus. Setups for the fingerboard-zones' Trigger-modes are made in the FRETBOARD/ SCAN-MODE menu.

## **HOTKEYS/ FUNCTION KEYS**

Several function keys have been placed on the surface of the Ztar to allow quick changes to the setup of the instrument: The Ztar has several features that may be applied to the way the fingerboard and triggers work. By using Zones on the fingerboard you can apply these features in different areas of the neck.

So, to change the following setups to the various Zones of the fingerboard, press a key on the fingerboard, within the Zone you wish to change, and press the HotKey. Even if you're using just the factory default, which is one Zone only, touch a key on the fingerboard while you press the hotkey.

**OCT Up/Down:** These buttons allow you to change the Octave for any Zone on the fingerboard giving you access to the full MIDI note range.

**PAT Up/ Down:** These buttons allow you to access up to 128 MIDI patches within any Zone

**TRIG:** Turn the Triggers 'On' to strum like a guitar or 'Off' to tap the fingerboard like a keyboard. When the LED is lit the Triggers are 'On'.

**G/POLY:** When the LED is lit the fingerboard plays one note per string, like a guitar. When it is off, the POLY-mode allows you to hear whatever you press.

**SOLO:** SOLO allows you to select one or more small zones on the fingerboard and expand them to fill the entire fingerboard. This is used to quickly change sounds and try out new combinations of sounds over the full range of notes. Pressing SOLO again will revert the fingerboard to its prior multi-zoned state. If multiple zones are selected when SOLO is pressed those sounds will be stacked and spread over the fingerboard. Use this as a quick layering tool.

**WRITE:** WRITE lets you save your current edited setup "on the fly" to its battery-backed RAM location. There are many adjustable parameters in the Ztar and Write will copy all of them so that the full setup may be recalled with a single keystroke. The WRITE hotkey is a shortcut version of the WRITE function found in the top-level EDIT screen.

**REC:** This button activates the CHORD RECORD feature. Press the button, hold down some notes on the fingerboard, strum them if necessary to hear them, and tap one of the Pads (or a Trigger, or any other Sensor) to assign the notes to that Pad for playback. This is a quick way to capture notes to a Pad, in addition to the CHORD-NOTES screen.

**PANIC!:** Sends a note-off to every note on and resets all controllers for every channel. Currently we use the brute force approach that takes a little extra time but should definitely clear any stuck messages for any synth,

The PAT, OCT, and SOLO keys are 'Zone-based' controls that allow you to select a zone by playing and holding a note within it and adjust the parameter for just that Zone. So, if you have say two zones on the fingerboard, you can touch a key in one (or both) and then press the hotkey to change the Patch, etc for that zone. This shortcut lets you make changes while you're performing rather than having to wade through menus to re-program the system.

## **SENSOR HARDWARE**

### **TRIGGERS**

These are the six right hand sensors that are used to trigger the fingerboard the same as you'd play a guitar. Ztars are equipped with either StringTriggers or KeyTriggers and occasionally both.

### **STRING TRIGGERS:**

These are six real guitar strings, short enough just for picking. They are velocity-sensitive to your picking force and have a muting capability that is applied just by touching them. Contact with the Muting bar enhances the muting effect to the strings.

### **KEY TRIGGERS and Add-On TRIGGER PADS:**

These are six long, narrow bars or pads that are used for tapping out notes from the fingerboard, playing drums, triggering samples or sequences, and adding pressure effects, in particular bends and modulations to the fingerboard strings.

### **MUTE-BAR**

This is the metallic bar in the tailpiece or plate mounted elsewhere on the instrument that is used to enhance the muting of the StringTriggers. If you skin is in contact with both the Mute-Bar and a String Trigger the trigger will mute its triggered note(s).

### **NECK SENSOR STRIP**

This is a narrow strip mounted to the edge of the fingerboard that can be programmed to send a variety of MIDI messages when pressed with a thumb.

### **JOYSTICK**

The joystick is used as a performance device by programming MIDI messages to any of its four directions. Also, when programming the menu-system, the joystick is used for data-entry by scrolling values underneath the blinking cursor.

### **PADS**

These are the touch-sensitive surfaces that come in a variety of shapes and are mounted to many Ztar configurations and are programmed to a variety of performance controls.

### **PEDALS**

There are commonly two jacks provided on a Ztar for pedals, Sustain and Volume which use a SPST Normally-open switch and a 50K linear pot, respectively.

### **BREATH CONTROLLER**

A breath port is provided as an option to the Ztar which accepts a ¼" vinyl hose for breath input.

### **POTS AND SLIDERS**

The Ztar has one volume pot as a standard feature and a ModWheel and additional pots available as options.

# MENU TREE

TOP LEVEL LIVE-SCREEN

SONG-MENU

NAME-EDIT

WRITE

UTILITIES

LIBRARIAN

SONGNAME

SAVE

COPY

DELETE

SWAP

COPY-PAD (s/b SENSOR)

INITIALIZE

MIDI

TUNING

BULK-DUMPS

CLOCKS

METRONOME ENABLE

METRONOME CHANNEL

NOTE#

TempoPad Enable

CLOCK: INTERNAL/EXTERNAL

MIDI CLOCK OUTPUT ENABLE

BPM SETTING

TIME SIGNATURE

CURVES

(8) FORCE:VELOCITY POINTS

SEQUENCES

INSERT-EVENT

DELETE-EVENT

PROGRAMMING-LOCK

FRETBOARD

NOTES ON/OFF

BOUNDARIES

KEY/TRANSPOSITION

AFTERPRESSURE

UNISON

TRANSPOSITION

SOLO

VELOCITY: TOUCH/FIXED

VELOCITY INVERSION ON/OFF

CURVE#

MIDI

Patch/Velocity Send ON/OFF

Channel#: RIGHT/LEFT

SEND PROGRAM CHANGE

PATCH#

BANK#

VOLUME

SCAN-MODE

TRIGGERS: ON/OFF

TRIGGER CAPTURE ON/OFF

ZONE-SOLO (Audition)

Scan-Mode: GUITAR/POLYPHONIC

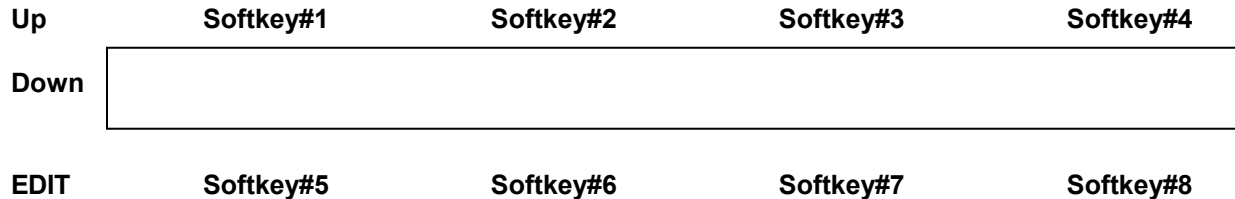
HAMMER-MENU

HAMMER-ON/PULLOFF ENABLE  
 HAMMER-THRESHOLD LEVEL  
 OPEN STRING PULLOFF ENABLE  
 HAMMER-PICK-DELAY  
 FINGERBOARD AUTO-SUSTAIN: ON/OFF  
**SENSORS**  
 SENSOR-MODE  
 FINGERBOARD STRING LINK  
 6-TRIGGER, GUITAR SETUP MACRO  
 TIMING MENU  
 EVENTS MENU  
     PLAY FUNCTION  
     VELOCITY-WINDOW  
     (8) EVENT-SETTINGS  
         EVENT-TYPE  
         MIDI CHANNEL/NOTE, OTHER DATA  
         FIXED VELOCITY-VALUE or SENSOR-TRACKING  
         NOTE-DURATION  
     MACROS  
         CHORD-GENERATOR  
 OUTPUT SETTINGS  
     CURVE ASSIGNMENT  
     MODULATING SENSOR (PEDAL#)  
     MIDI OUT 1, 2 ROUTING  
     LINK ASSIGNMENTS  
 TRIGGER-FUNCTIONS  
     FINGERBOARD TRIGGER LINK  
     DUAL MODE  
         Aftertouch Threshold  
         Aftertouch CURVE  
**RESPONSE**  
 GAIN  
 RESPONSE BARGRAPH  
 SCAN-TIME  
 MASK-TIME  
 THRESHOLD  
 CHASE ON/OFF  
 TRAIN SENSOR LOW POINT/ HIGH POINT  
**SHOWALL**  
 SONGS  
 PADS (s/b SENSORS)  
 EVENTS  
 GATES  
 LINKS  
 CHAINS  
 PATCHES

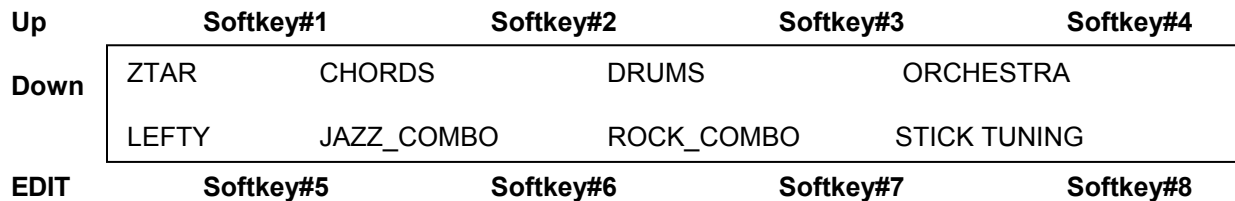
## MENU SYSTEM – DATA ENTRY

---

The menu system uses eight “soft” keys around the perimeter of the display to select various functions as indicated by the messages on the screen. Press the button nearest to your desired selection in order to activate it. An UP and a Down key are provided for data entry. The joystick, when installed, may also be used for data entry. Use the EDIT key to enter and exit the programming menus. The soft-keys are numbered here for reference in this manual.



## LIVE-MODE MENU



This is the top-level menu, which appears when the ZTAR is in LIVE-mode. The ZTAR is in LIVE-MODE when you first power-up.

It displays the names of the various system configurations that have been saved as “SONGS”. A drummer would refer to these as “KITS”; A SONG is a collection of hardware with all of our computer-assigned options and setups. The first eight songs are provided from the factory as templates for your use. These are saved in ROM and may not be overwritten. The following twenty-four song locations are provided to store your own setups. These are saved in a battery-backed RAM so that your changes will remain after you remove power from the ZTAR. The Song banks may also be stored off-line via the MIDI Bulk-Dump utility.

Use the EDIT key to leave the LIVE mode and enter the EDIT mode. After editing, use the EDIT key again to return to the LIVE mode.

## **SONG MENU**, the Top-Level SONG-EDIT screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG: #01 FRETBOARD	ZTAR SENSORS	WRITE RESPONSE	UTILITIES SHOWALL
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

This is the top-level edit screen, which displays sub-menus for the various programmable features for each Song.

A **Song** consists of:

- 1) One or more Zones with all of their programmed settings.
- 2) Assignments for the Sensors.
- 2) Physical response settings for the Sensors.
- 3) A Tuning for the fingerboard keys and Open-Strings, and settings for Triggering modes.
- 4) A setup for the metronome.

### **SONG-MENU sub-menus:**

**Name-Edit:** Press the name of the SONG to enter the Name-Edit screen.

**Write:** Takes you to the Write screen so that you may save your current setup.

**Utility:** enters the Utility menu to edit a variety of objects.

**Zone:** enters the Zone menu to set up the fingerboard. All of your settings can be made into 32 independent fingerboard Zones.

**Sensor:** enters the Sensor menu to set up the Pads/Triggers/Joystick configuration.

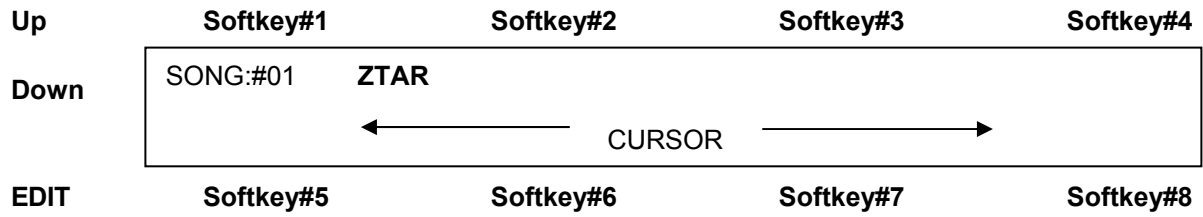
**Scan-Mode:** enters the Scan-Mode menu.

**Tuning:** enters the Tuning menu.

The top-left of the screen shows the Song number followed by its name. By placing the cursor over the song number and using the joystick or Up/Down buttons you may scroll through the Song Banks without going back to the LIVE menu to make your selection.

## **SONG-MENU\ NAME-EDIT** screen

*To enter a new Song name:* Place the cursor over the name field using the softkey#2 button above the name. Use the Joystick or Up/Down buttons to enter a character, then use the soft keys to the left and right of the "CURSOR" message to move the cursor over to the next character position.





## FRETBOARD (ZONES) MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1: KEY/TRANS	NOTES:ON MIDI	LOW: i: 0 SCAN-MODE	HIGH: vi: 24
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Every Song setup must have at least one active zone.

**Scan-mode:** This sets the way you play notes from the fingerboard. With *TRIGS: ON* you can play it like a guitar where you fret the fingerboard and then strum the Triggers, or with *TRIGS: OFF* you can tap the notes from the fingerboard like a keyboard. There are also some other options in the Scan-Mode menu to tailor the performance to your needs.

**Zone#:** Displays the number of the zone you are adjusting. You may change this with the data buttons or the joystick to quickly select the different zones in a Song setup.

**Notes: On/Off** Usually a Zone is set up to play notes but not always. A Zone may be silenced but still have Program Change messages and Volume messages assigned as well as all of the other settings. For example, you might want to send patch changes to your rack-EFX boxes, lighting controller, or other hardware that has no knowledge of Notes. When the Song is selected the Program Changes will be sent.

**Low:** Select this and press a note on the fingerboard to select the lowest note for the zone that you are creating. The string and fret numbers will appear on the screen.

**High:** Select this and press a note on the fingerboard to select the highest note for the zone that you are creating. The string and fret numbers will appear on the screen.

**Key/Trans:** selects a menu for zone transposition, Unison tuning select and fixed-velocity/touch-sensing for the current zone.

**MIDI:** selects the MIDI setup menu. This is where you select the channel and patch number.

### TO CREATE A ZONE:

Select the **ZONE** menu with the soft-key. Select a zone number. (Keep the numbers in sequence for clarity's sake.) Using the soft-keys, select the "**Low**" and "**High**" fields and use the fingerboard to enter the note boundaries for the zone. Make sure the "Low" note is lower than the "High" note. To assign a zone to just string six alone, the low note and high note would be "vi-0" and "vi-24". Experiment with this feature to discover its versatility.

If you want to play notes from this zone turn the “**Notes**” **ON**. If you wish to send only patch change information from this zone, turn the “**Notes**” **OFF**. By sending only patch changes from a zone you can setup effects units or other devices that do not receive note data at the time this Song is selected.

Select the **KEY/TRANS** menu and the **MIDI** menu to complete the zone setup and don’t forget to save your changes when you’re finished by “**WRITE**”ing this Song to a USER location (Songs 17-Max-Song#).

## **FRETBOARD>KEY/TRANS menu**

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1:	AFTERPRESS	UNISON:OFF	TRANSP: 0
	SOLO: OFF	Velocity; TOUCH	Invert: OFF	Curve: 4
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**AfterPressure:** This enters the Afterpressure menu where you set the Afterpressure assignments for the selected zone.

**Unison:** When **ON**, sets all of the keys in the selected zone to the same MIDI pitch value. Use this to create drum roll effects. This will let you pick a single drum from a master drum patch. Use the joystick here for an interesting effect. When Unison is **OFF**, the fingerboard responds normally.

**Transpose:** Use this parameter to alter the base pitch of this zone. For instance, you might layer a zone for a sound that is transposed up a Fifth or an Octave. With this field selected, use the Data buttons or the joystick to hear the results of your transposition. “TRANSP” appears when UNISON is **OFF**.

When UNISON is **ON** “UniNote#:\_\_\_” appears at the upper-right to allow setting the fixed pitch for this UnisonZone.

**SOLO:** When SOLO is ON in a multi-Zone setup, only the selected Zone will play while the others are muted. This allows you to easily audition changes to single Zones.

**Key velocity [TOUCH or FIXED]:** Selects fixed-velocity or touch-sensing for the selected zone. You may not have more than one non-fixed velocity curve active in a song; however, you may mix up fixed and non-fixed zones in one song.

When Touch-Sensing is active you may choose to “**INVERT**” the velocity response for this zone. Velocity crossfades between voices may be created by layering one zone with a normal velocity response and a Zone playing the same pitch on a different channel/voice with an inverted response. A heavy touch will play one voice. A soft touch will play the other. A medium touch plays both. Use the response curves in your sound module to fine-tune this effect.

**CURVE#:** Set the number for a velocity-response curve assigned for this Zone. There are 16 edit-able curves in the global pool of curves for the Ztar.

## **FRETBOARD>KEY/TRANS>AFTERPRESSURE menu**

This menu sets the After Pressure parameters for the fingerboard. When Afterpressure is enabled you can press the fingerboard keys with increased pressure to activate either PolyKeyAfterpressure or Channel Afterpressure.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	FretBoard Aftertouch			Pressure: On
	P-Key	Thresh: 55	Sens: 25	Curve: 1
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Pressure-Enable:** softkey #4 toggles pressure On/off for the selected zone.

**Pressure-Type:** softkey#5 toggles between **PolyKey** pressure and **Channel** Pressure for the selected Zone.

**Threshold:** set the lowest pressure level that will initiate an Afterpressure response.

**Sensitivity:** increase this number to make the aftertouch more responsive.

**Curve:** the fingerboard afterpressure may have a response curve independent of velocity. It is possible to make all of the pressure-response settings here by creating and selecting a special curve. The Threshold and Sensitivity settings are convenient adjustments that compensate an existing curve.

## FRETBOARD\MIDI MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	ZONE# 1	P&Vsend:Y	Chan 1: L	SEND
	Patch: 0	CC#0: 0	CC#32: 0	Volume:127
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Patch and Volume Send Enable:** You may choose to enable Patch and Volume changes sent to the MIDI channel for the selected Zone by using the PAT +/-hotkeys. Or, disable the P/V sends when you're controlling all of your Program Changes from an external sequencer or controller and don't want to disturb the settings when pressing the onboard PAT +/- keys or selecting the saved SONG. The menu's SEND function will operate regardless of this setting.

*Note:* You may decide to send a single program change from a separate zone that has notes disabled. This could go out to an external MIDI mapper or to a separate program change receive channel in a synth module that would then assert a group of program changes in a multi-channel setup.

**Channel:** You may set the Zone's MIDI channel to #1-16 for the Left, Right, or Both MIDI output ports. IF you have a second MIDI Output Port installed on your instrument, this is the Right-side MIDI Port and becomes your channels 17-32. Press the softkey #3 to toggle between the Channel# and the Port-select fields. You may also set the Port assignment to NONE to disable all MIDI output from this Zone.

*Note:* Either the Right or Left channel (or both) must be selected. If NONE is selected there will be no output and the Program Change will not be sent on Song-select nor will you hear any notes. If you select "R" and do not have a second MIDI Output port installed, the instrument may lockup when you play a few notes.

**SEND:** Press this to send out your programmed Patch, Bank, and Volume settings.

**Patch:** Sets the Program Change number 1-127 for the selected Zone. This number is sent when the saved SONG is selected.

**CC#0:** Sets the Bank-number Most Significant byte or MSB. Refer to your synth documentation for the proper settings.

**CC#32:** Sets the Bank-number Least Significant byte or LSB. Refer to your synth documentation for the proper settings.

**Volume:** Sets the base volume for this Zone when the saved Song is selected.

## **Pre-setting and sending a Program Change with Bank Select**

Modern synthesizers are commonly filled with more than 128 patches or programs, the limit that can be addressed with a single ProgramChange command. In order to access these higher-numbered patches MIDI provides two Bank Select messages, ContinuousController #0 (Most Significant byte or MSB ) and CC#32 (Least Significant Byte or LSB). You need to enter data values for CC0 and CC32 which you will find by looking in the back of your synthesizer manual. Every manufacturer uses a different set of numbers to select their bank-system.

For instance in the Korg Wavestation SR, if you wanted Patch 21/ Rom Bank5, you would send these three bytes from the FRETBOARD/MIDI menu: "PGM: 21, CC0: 0, CC32: 3" .

To program the same Program and Bank select messages to issue from a Pad or Sensor just by striking the Pad, in the SENSOR/ EVENTS menu do this:

- 1) set the Sensor Mode = EVENTS
- 2) Set the Play-function= ALL
- 3) Set Event1 = ControlChange, CC0, 0.
- 4) Set Event2 = ControlChange, CC32, 3
- 5) Set Event3 = ProgramChange, 21

Refer to SENSOR-MENU for more information.

## FRETBOARD/SCAN-MODE menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1: Scan: GUITAR	Trigs: ON	Capture:Off HAMMER-MENU	Solo:Off Sustain:Off
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

### What is a TRIGGER-MODE?

Simple really. There are just two basic states for the fingerboard notes. They are played by strumming the Triggers or just by tapping the fingerboard itself, like a keyboard. When the Triggers are ON and the front panel LED is lit, this is GUITAR mode for this ZONE. When the Triggers are OFF and the LED is OFF, you have a Tapping-mode set for the selected ZONE.

Because the Trigger-Mode setting can be made for each ZONE individually, this means that you may strum or tap selected areas of the fingerboard. By layering both a Tapping mode and a Strum-mode on the same keys, and assigning different MIDI channels to the various layers, you can have at least two radically different sounds on each key.

Once the fingerboard has had Triggering-methods applied to its various ZONES, there are some other options that are available to the Triggers themselves that allow them to play their own set of notes or other MIDI events. These options need to be set in the SENSORS menu where the Triggers are listed with the rest of the SENSORS.

If you want to perform this instrument like a guitar, the Fingerboard must be told to play its notes when strummed with the Triggers, and the Triggers must be told to either play notes from the Fingerboard, play their own events, or Both. All of the options regarding the execution and timing of events from hitting the Triggers are located in the SENSORS menu

**Triggers:** When Triggers are “**ON**” the fingerboard notes *within the selected Zone* are played when the StringTriggers or TriggerPads are strummed. When Triggers are “**OFF**” the notes *within the selected Zone* are played from the fingerboard alone. The front panel “**Triggers**” key has the same function. Note that this parameter is set per Zone so that you might at a given time have some areas of the fingerboard which are strummed and some which are tapped.

**Capture:** When set, this allows you to “capture” a fretted chord with the right-hand TriggerPads. You may then release the frets without losing the notes. This won’t do much with StringTriggers installed.

**Solo:** Disables all the zones in the currently selected Song but for the current zone selected so that you may hear it by itself.

**Scan-Mode:** The Ztar’s internal computer scans the fingerboard in two basic modes. When set to “**Guitar**” the fingerboard sounds only the highest note played on a string. When set to “**Polyphonic**” the fingerboard can sound all of the notes played on a string at

any time.

### **AutoSustain Mode (String Triggers only):**

When enabled the feature is best described this way: Fret a chord, strum the Triggers to hear the chord. Now release both hands from the instrument and the notes will sustain. You can then re-fret the fingerboard but no notes will be either muted or added until you Strum the Triggers again. There are no hammer-ons or muting from the fingerboard in this mode.

### **FingerboardSustain Mode (KeyTriggers only):**

When *dis*-abled and Triggers are ON, fingerboard notes will only sound when the KeyTriggers are held down, much like the playing of a piano keyboard. When enabled, the notes may be sustained normally from the fingerboard.

## **FRETBOARD\SCAN-MODE\HAMMER-MENU**

Hammer-ons affect the way the Ztar fingerboard simulates the experience of real strings. By adjusting the following settings you can match the touch of your right and left hands with the response of your synth's programs.

You can adjust the force from your fretting hand to hammer, or tap, or mute notes. Remember that each fingerboard Zone can have its own response curve that you assign in the ZONES> KEY/TRANSPOSITION menu. The curve will affect hammer-on velocity.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	ZONE# 1	HammerOn/PullOff:NO		Hammer Level :75
	OPEN PULL: Y	Decay: 25	Hammer Pick Delay:	0
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Hammer On & Pull-off:** When "ON" this enables Hammer-ons and Pull-offs in Guitar-mode. This can effect your style of playing.

**HammerLevel:** Set a number here from 0-255. In GUITAR-mode, when a fret is pressed with a force below this number, the string will mute. When the fret is pressed with a force above this number a Hammer-on will play.

When the Hammer-Level is set to 0 and Hammers are enabled, fretting the fingerboard after plucking the StringTrigger will always play the hammer-on and will **never** mute the string. When Hmr-Lvl is set to 255, fretting the fingerboard after plucking will **always** mute the string. The proper level for your touch will let you mute the string with a light touch and hammer-on with a firmer touch.

When Hammers are OFF, a light touch will mute and a firm touch will do nothing.

**OpenPull:** This enables or disables PullOffs to the Open-strings. Disabling this can help to clean up fast picking techniques.

**Decay:** This sets the decay-time for this "Virtual-String". When a new note is triggered, the initial velocity level is the triggered-note or, the velocity of any new hammered-note. As the "string" decays the velocity of the next pulloff note will decrease as

the "String-vibration" decreases until the timeout of the "string-vibration". At the timeout point the **Velocity = Zero**, and a pulloff will not trigger a new note (silence, you'll hear nothing, nada, **no** pulloff). However, you can still continue to hammer-on the newly fretted note if you wish.

Use the following table to relate the Decay Time to the numbers you set in the menu screen. The number you entered is divided into 10 to provide a convenient range of values. 1000 msec (milliseconds) = 1 second.

Decay-number	Actual time
1	10 secs
2	5 secs
3	3.3 secs
4	2.5 secs
5	2 secs
6	1.66 secs
7	1.4 secs
8	1.25 secs
9	1.1 secs
10	1 second
20	.5 secs
50	200 msecs
100	100 msecs
200	50 msecs

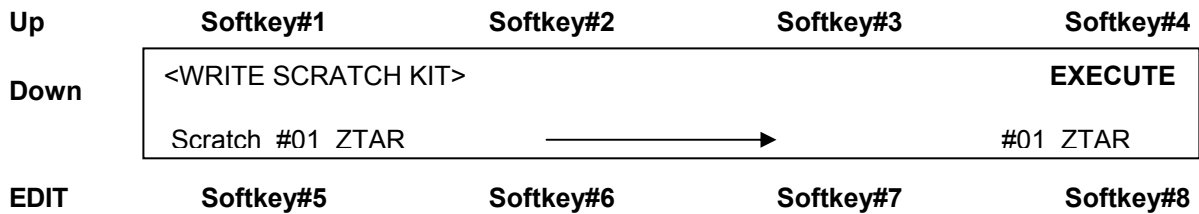
**Hammer-Pick-Delay:** This is used to test a small period of time between a hammered note and a possible picked note at the same location. This can help clean up errant hammer-ons that occur when your fretting finger arrives ahead of the pick, which is quite normal with a real guitar. The idea is to eliminate what is commonly called "double-triggering" if your real intention is to play only one note. Set the lowest number here that satisfies your ear.



## **WRITE MENU** [ available at the Top-level Edit menu]

This shows the temporary SCRATCH buffer on the left that is now holding all of your current changes to the configuration you're playing right now. To the right side of the arrow you are prompted for the location number of the song you wish to save your changes into. The ZPC version of the Ztar OS allows you to overwrite all of your Song-locations including those programmed from the factory. To re-initialize the first four SONGS back to their factory-settings go to the UTILITIES\ LIBRARIAN\ INITIALIZE menu.

Use Softkey# 8 to select a destination location for the SCRATCH buffer, and press the EXECUTE soft-key to complete the WRITE operation. You may also make changes to the Song setup at any time from the LIVE mode and save your changes via the WRITE hot-key on the front panel.



## SENSORS MENU

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

### Sensors screen # 1

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	Mode: Strum	String# 0	6-TRIGS
	TIMING	EVENTS	OUTPUT	TRIG FUNC
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:** There are three Play-modes for a Sensor; **Events**, **Strum**, and **Dual**.

In the **Events-mode**, the Sensor will play its own programmed set of events.

In the **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.***

In the **DUAL-mode** the Sensor will both trigger fingerboard-notes and its own programmed set of events. The Dual-Mode will apply to any 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-mode, assign them to their corresponding fingerboard-strings, and set the Hit-Mode to "TOUCH". (See the TIMING menu for this.) You'll still need to set the fingerboard's active zones' Trigger-mode to TRIGGERS-ON to set up the Ztar as a guitar. Who would've thought a guitar could be so complicated!

**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.

## TIMING menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1 Loop: Off	HitMode:Touch Delay: 0		TrigGate: 250 GateShift: 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.

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.

**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.

[SENSOR menu, cont.]

## TRIGGER-FUNCTION menu, DUAL-Mode Off

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	Strum: String# 1	DUAL: Off	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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

**DUAL-MODE will only respond to the pick attack of StringTriggers, 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 menu, DUAL-Mode On

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1	Strum: String# 1	DUAL: On	
	DUAL	Aftertouch Threshold: 64	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.**

[SENSORS, cont.]

## EVENTS menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1 Evt1: Note	PlayFunc: All Channel 3:	Velocity:: 0 / 127 48 / C3 PAD	MACRO Gate: 250
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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.

**PlayFunction:** 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.

### 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.

## **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

## **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 note-duration.*

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.

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. .

## Sensor Play-Function List:

Off  
Basic  
All  
Seqntl  
NtShft  
AltUp  
AltDn  
AltUpDown  
AltRandom  
Slice  
ContinuousControl  
SequencePlay  
Sequence RePlay  
Sequence StopPlay  
Sequence Record  
Sequence RecordNext  
Sequence Undo  
SongIncrement  
SongDecrement  
ChainIncrement  
MuteAll  
ReferencePad  
HiHatPedal1  
HiHatPedal2  
HatPad

Detailed descriptions of the Play Functions are given at the end of this section.



[EVENTS, cont.]

## MACRO screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	S01/Trigger1 Velocity = Pad	NotesAll CHORDS	VelocityShift	Velocity Add
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.

### 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

**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.

**Curve#:** The applied afterpressure will follow this assigned curve. You can therefore setup separate curves for the Trigger-velocity and the Trigger-Aftertouch

## **SENSOR PLAY FUNCTIONS**

**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 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.

## 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 AltMode 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 from an input device, usually a pedal or pressure-pad.

## **SEQUENCER MODES:**

**Play** - starts the sequence 'n' assigned to the pad. A second hit will stop the sequence.

**RePlay** – each hit re-starts the assigned sequence from the beginning.

**StpPly** – stops recording, stores the result as the sequence# 'n' assigned to this Pad, and then starts playing the sequence. Successive hits will stop the sequence then re-start from the beginning.

**Record – (Records a variable-length sequence)** first press starts record, second press stops recording and stores it sequence 'n' associated with this pad.

*To set up a Record Pad:*

- 5) assign this mode to a pad or input trigger and
- 2) select a MIDI sequence number to store the recorded MIDI events.
- 6) 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.

**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.

**RefPad:** When set as a Reference Pad the Pad will be used to set a noise threshold to silence crosstalk from impacts that affect the entire guitar.

The following three modes relate to setups where the pressure from one sensor affects the playback of another sensor. The simplest description of this is a drummer's High Hat where the depression of a foot pedal changes the sound of the stick hitting the cymbals.

#### **HHPed1: (HiHat Pedal#1, part of a 2-sensor setup)**

This mode is assigned to any continuously variable Sensor in combination with an assigned 'HiHat Pad' to create the effects of a drummer's Hi Hat. In this mode, the varying Sensor's position or pressure is used to select from the ordered-list of Notes programmed into the HatPad's event-buffer. In this way the Sensor is used for instance, to select OpenHat, MidHat, and Closed Hat sounds, or any set of different sounds, or ControlChange settings or Program Changes, for that matter. The HatPad likewise has a Sensor location assigned for its companion pedal that controls its events. This is assigned in the "PEDAL" slot in the OUTPUT menu.

Also, the HiHatPedal1 will play its own programmed event at the fully depressed pedal position, programmed as Event#1. This is normally used to create the FootHat or "chick" sound that can be heard whenever a real HiHat is closed. The pedal-position for this sound (note-event) may be adjusted with the lower velocity-threshold for Event#1.

The complete HiHat effect is created by adding a LINK to the Sensor setup for the HiHat pedal. This LINK is assigned to MUTE the HatPad.

For example: If the HHPed1 is on Rim15 and the HatPad is on Pad4, then Rim15 is assigned a LINK to MUTE Pad4 when Rim15 is activated.

#### **HHPed2: (HiHatPedal#2)**

This mode is similar to HHPed1 with the addition of a programmable ContinuousControl

message-stream that tracks the pedal position.

**HatPad:** The second half of the HiHat setup HatPad's programmed events are selected by the position of a HHPedal. Velocity for the events will issue from the HatPad.

## 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.*

***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 1-255

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.

### **5-sequence rotating buffer:**

The RecordNext feature uses a 5 sequence circulating buffer. So if you start at sequence #3 and start loading up consecutive sequences, after you Record #7 the next Record will wrap around to #3 again. You could say that all increments and decrements are ‘modulo 5’ So another example of a block of sequences would record to numbers 21,22,23,24,25.. then wrap back to.21,22,23,24,25. A future version will make this sequence buffer size a programmable value.

### **NOTE:**

The variable-length ‘live’ sequencer records everything that goes to the MIDI Out port. This means that if you’re recording while listening to an existing track, the original track will be recorded with your live performance onto the new track, an implicit overdub. A future release will include features to isolate tracks.

## [SENSORS, cont.]

### SENSORS/OUTPUT menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1 Link Off	Curve: 5 off off	Pedal: TR1 off off	MIDI: L
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.

**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.

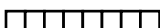
**NotesOn:** triggers the linked-sensors from a Note-On message.

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

**Off:** no links enabled

**LINKS:** use softkeys# 6 and #7 to select up to four Links for this sensor. Use the Up/Dn keys to create your links.

## RESPONSE menu screens

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG 1 0% 	Gain: 100%	32%	MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

The Response screens allow setups to the GAIN and several other parameters for the individual hardware Sensors on the Ztar. These settings will be saved globally and will apply to every SONG configuration. The response for the same Sensor may be varied from Song to Song by applying different curves in the SENSORS/ OUTPUT menu.

**GAIN:** softkey#2 and the UP/Dn keys may be used to set the basic gain for a Sensor. 100% is usually the best setting but use other settings if needed.

The bottom line of this screen shows a response bar-graph that will move to show the raw output of the Sensor. The level of the last hit will also read as a percentage of full-scale within the Ztar's processing range. Use this Gain bar-graph to check the response or to find something that's active when it shouldn't be.

## RESPONSE menu, Screen #2

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	TRIG 1 Chase: On	Scan: 0	Mask: 0	Threshold: 0 MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Scan:** by increasing the number stored in this setting the onboard processor will wait additional scan-cycles before finishing its determination of a peak-velocity. This can be used to eliminate ghost triggering in some situations. The '0' setting has the fastest response.

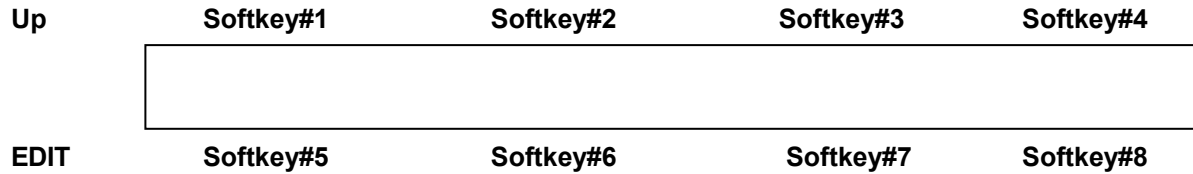
**Mask:** by increasing the number stored in this setting the onboard processor will wait the specified number of scan-cycles before accepting another hit in order to help eliminate ghost-triggering in some situations. Again, the '0' setting has the fastest response.

**Threshold:** This setting stores the lowest raw force-data from the Sensor that will give a MIDI response. Hits below this value will be ignored. Use this setting to help eliminate certain types of ghost-triggering.

**Chase:** When Chase is enabled, touching a Sensor will bring up its profile in the selected menu-screen as a convenience for editing purposes.



## RESPONSE menu, Screen #3



**TRAIN>** Press the “TRAIN” softkey and strike pad softly four times to enter the average of your softest hit. Then four times again to record the average of your hardest hit. Use this to quickly set the useful range of force required for your touch with this Sensor.

**LOW POINT:** This directly sets the force-value for the beginning, or lowest point of your currently selected curve. The full curve will be scaled, compressed or expanded, depending on the settings for the high and low points.

**HIGH POINT:** This directly sets the high-force endpoint of the currently selected curve.

# UTILITIES MENU

The UTILITIES menu houses a variety of sub-menus and programming features.

Up	<b>Softkey#1</b>	<b>Softkey#2</b>	<b>Softkey#3</b>	<b>Softkey#4</b>
Down	LIBRARIAN CLOCKS	MIDI CURVES	TUNING SEQUENCES	BULK Unlocked
EDIT	<b>Softkey#5</b>	<b>Softkey#6</b>	<b>Softkey#7</b>	<b>Softkey#8</b>

**LIBRARIAN:** enters the Librarian menu.

**MIDI:** enters the setup screen for the MIDI Input ports.

**BULK:** enters the Bulk Dump menu.

**TUNING:** enters the Tunings setup menu.

**CLOCKS:** enters the setup screen for the Metronome.

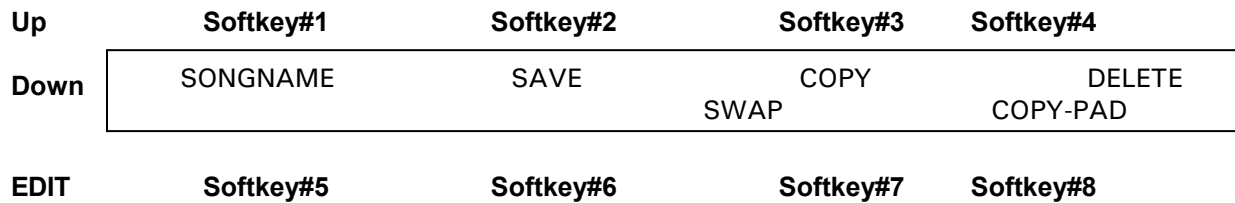
**CURVES:** enters the Velocity-Curves' setup screen.

**SEQUENCES:** enters the step-entry Sequence-Editor.

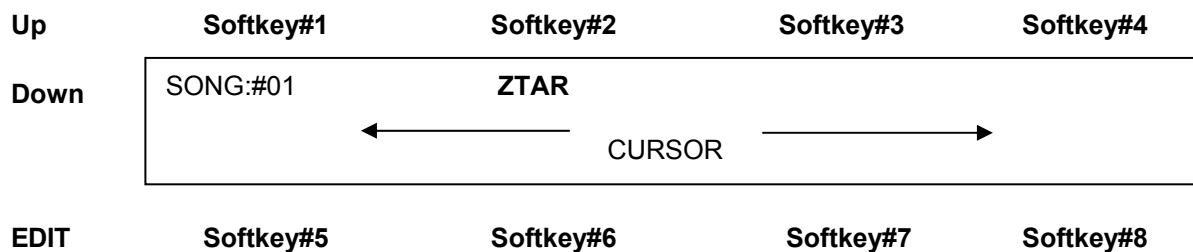
**Locked/ Unlocked:** when set, this locks the front panel hotkeys so that your settings can not be accidentally modified. You might use this if you leave the instrument on-stage between sets, or if you hand it to you 9-year-old nephew.

[UTILITIES, cont.]

## LIBRARIAN menu



**SONGNAME:** enters the Songname-Edit screen, which may also be reached, from the top-level SONG-EDIT-mode screen. Use the softkeys for your CursorRight/Left controls and the Up/Dn arrow keys or joystick to change text-values.



**Save:** Writes the Scratch Kit Buffer to a Song-Location. This is the same screen that you enter from the WRITE softkey.

**Copy:** Copies any song location to any other Song location.

**Delete:** Restores the selected Song from Song#1.

**Swap:** Exchanges any two song locations.

**COPY-PAD:** allows you to copy all the settings from one Sensor to another Sensor for convenience.

**INITIALIZE:** enters the Initialize screen where you can choose to reset groups of objects to their original factory settings.



[UTILITIES, cont.]

### LIBRARIAN\ INITIALIZE menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	INITIALIZE>	SONGS	RESPONSE	SEQUENCES
	CURVES	MIDI-IN-MAP	CHAINS	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**SONGS:** Restores the RAM copy of the first 4 (or 2) ROM songs, then resets all RAM songs to the first ROM song.

**RESPONSE:** Initializes “global” Sensor-response variables from ROM; Gain, Scan, Mask, Threshold, and Trained high and low curve endpoints. The Curves or curve-numbers are not initialized.

**SEQUENCES:** clears all sequence data.

**CURVES:** restores all curves to the Rom default settings.

**MIDI-IN-MAP:** Clears all assignments which map MIDI Input notes to fire onboard Sensors.

Perform a complete initialization of the system memory when new ROM software is loaded or whenever you feel you need to clear out everything from memory and start fresh. You may wish to bulk-dump your Songs and Keymaps before you do this.

Press the Initialize-SONGS button. Three dots appear while the routine is working. When it finishes, go on to initialize the rest of the individual areas by pressing the keys, working around the display in clock-wise fashion. The last press will be COLDSTART which will re-start the Ztar.

### UTILITIES\ MIDI-IN menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	MIDI-L-IN	Ch: 1		
	Note-Edit	Trig: N-On	Foll:Note:	Capt: Off
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

The MIDI-In menu provides settings for various functions that monitor the MIDI Input ports

**MIDI-X-IN:** Use softkey#1 and the UpDn keys to select MIDI Input Port Left or Right.

**Channel:** set the MIDI channel 1-16

**Trigger:** An incoming MIDI note is used as a trigger for one of the Ztar's Sensors. When the note arrives it fires whatever events are programmed to be played as if the assigned Sensor were physically struck.

Available trigger-types are **Note-On, Note-Off, Both**. Set to **None** to disable the function.

**Follow-MIDI:** When Follow-MIDI is enabled an external MIDI keyboard may be used to enter note-numbers into the Ztar's edit-screens. Enter the screen you wish to edit in order to view the process.

**Off:** Follow-MIDI disabled

**On:** Incoming MIDI note-values are captured into the current Event.

**Chord:** Successive incoming MIDI note-values will fill up all the available Event-slots for the current Pad. Once the 8-event buffer is filled, additional notes will over-write Event #8.

**Capture: [Off, On]**

Capture an incoming sequence from the selected MIDI port and store it as a variable-length sequence. Assign the new sequence a number in the global pool of 256 sequences so that it may be played back as a "MIDI\_Seq" (pad-mode).

**NoteEdit:**

Enters the MIDI-In-Triggers screen where you may assign Ztar-Sensors to incoming MIDI note-numbers. Any note-number (C-G9) on the selected channel may be assigned as a trigger. Eight MIDI notes are shown per screen. An Uppercase "L" or "R" shows at the left edge of the screen to indicate selection of the Left or Right MIDI port.

#### UTILITIES\ MIDI-IN\ NoteEdit menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	L C -> TR6	C# -> off	D -> off	D# -> off
	E -> off	F -> off	F# -> off	G -> Pad3
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Use the softkeys and the UpDn keys to select a MIDI-IN Note and assign a Ztar-sensor.

## TUNING Menu

	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Up	EDIT	Preset: Guitar		RIGHT/LEFT
Down	E2 /	A2 /	D3 /	G3 / B3 E4
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

This menu allows programming the Open-String tunings for the fingerboard. The pitches for the Open-Strings are shown along the bottom of the screen.

### To change an open-string tuning:

Press the soft-key nearest the String number you want to change. Each soft-key controls two string numbers. Alternate between the two strings by pressing the key again. Alternatively, you can tap the fingerboard string in the TRIGGERS-OFF modes and the cursor will 'chase' to the string you're touching. Or, in the TRIGGERS-ON modes, you can pluck a Trigger to select the string.

Now simply use the Data Up/Down keys or the joystick to adjust the open-string note anywhere within the entire MIDI note-range. If you hold a note while you're doing this you can hear it change.

### Presets:

Press the PRESET key to scroll through a list of common tunings. If none of these suit you, use the open-string tuning fields to enter your own tunings.

### RIGHT/LEFT:

Press this button to change the instrument's tuning for Right-hand or Left-hand players.

**EDIT:** Enters the KEYMAP-EDIT sub-menu screen.

***Each key on the Ztar fingerboard may now be individually tuned to a MIDI channel and Note-number. A Key-Note map is saved for each Song preset. These maps default to standard tunings when you select a Tuning Preset and they adjust automatically when you change an Open String Tuning. Make adjustments to individual keys to create new scales or separate instruments in areas of the fingerboard.***

## KEYMAP-EDIT screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	FRET	i: 35/ B1	ii: 40/ E2	iii: 45/ A2
	OPEN	iv: 5-/ D3	v: 55/ G3	vi: 60/ C4
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

The display shows one fret at a time for all six strings. The fret-number is shown in the bottom-left corner of the screen.

Use softkey#5 and the UP/Dn keys to select frets 0 (Open-string) through 24.

Use the softkeys to select a string-number for this fret so that you can set the MIDI channel and note-number. Press the softkey to toggle between the Channel and Note fields.



[UTILITIES, cont.]

## **BULK-DUMP MENU**

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	BULK	SEND	RECEIVE	
EDIT	SONG #01 ZTAR			
	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Send:** Press softkey#2 to dump the selected Song Memory from the ZTAR to a receiving device. Use the Up/Dn keys or the joystick to select a Song. Song '#0' will select ALL Songs. When "ALL" is selected a Bulk-dump will also send all 16 of the global Response Curves and all Keymaps.

**Receive:** Prepares the ZTAR to receive a Bulk-dump to its Song-Memory.

### ***To Save the Ztar Songs to an external MIDI system:***

- 7) Connect the MIDI Out port from the Ztar to the computer or sequencer's MIDI IN port.
- 2) Set up your computer to receive a Sysex data dump. You can use most MIDI sequencer programs or MIDI monitor programs to do this.
- 8) When the computer is ready and waiting for data press the **SEND** soft-key on the Ztar keypad. The words "*Sending data...*" will appear while the process is running. The Ztar display will indicate when the operation is finished saying, "*Function Complete*".

### ***To Restore the Ztar Songs from an external MIDI system:***

- 9) Connect the MIDI IN port from the Ztar to the computer or sequencer's MIDI OUT port.
- 2) Press the **RECEIVE** soft-key on the Ztar first, then start the transmission from your computer. The ZTAR gives you about 20 seconds to start the transmission before it flags an error.

## **BULK DUMP ERROR MESSAGES**

--- CONDITION ---

--- MESSAGE ---

- |                                               |           |
|-----------------------------------------------|-----------|
| 1) 20 seconds elapse before any data received | “timeout” |
| 2) MIDI cable unplugged / too few data bytes  | “timeout” |

- Check your cables and connections
- Make sure the MIDI device in your computer is set up correctly and the sending program is configured to use it.

- |                                     |                |
|-------------------------------------|----------------|
| 3) Wrong SysEx dump / Bad MIDI data | “Data corrupt” |
|-------------------------------------|----------------|

- Possible faulty cable or loose connection
- Corrupted file stored in computer

- |                                                  |                |
|--------------------------------------------------|----------------|
| 4) Wrong checksum / no EOX (End of Transmission) | “Bad Checksum” |
|--------------------------------------------------|----------------|

- Corrupted transmission. Retry the procedure.

- |                                          |                 |
|------------------------------------------|-----------------|
| 5) CRC/Framing or Receive buffer overrun | “MIDI off line” |
|------------------------------------------|-----------------|

- Corrupted transmission. Retry the procedure.
- Possible faulty cable

[UTILITIES, cont.]

## **Clocks menu (2 screens)**

The Notes and other events played from the Ztar may be timed in reference to either of two separate clocks:

- 1) The onboard milliSecond-timer which represents Absolute time, or
- 2) The Metronome which is expressed in MIDI clock-ticks or Beats-per-minute.

### **Clocks Screen #1**

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	Metr: L	Channel: 10	Note: G#3	MORE>
	TempoPad: off	Clock: Internal	ClockOut: OFF	BPM: 120
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Metr:** this sets the MIDI output channel for the metronome to Left, Right, Both, or None (OFF).

**Channel:** selects MIDI channel for metronome sound.

**Note:** selects MIDI note for metronome sound.

**MORE>** : takes you to the Metronome-Edit screen.

**TempoPad:** selects the Tempo pad from the Sensor List, or Off for none. Tapping on the TempoPad will adjust the timing of the metronome, the BPM-timer. This can be used to sync the timing of internal or external sequences, either the short 8-note sequences or the variable-length sequences.


This function works whether the metronome is off or on. When the metronome is off, the TempoPad adjusts the Gate-times for the 8-note sequences. Three taps on the TempoPad will set the new timing.

**Clock:** selects the source of the MIDI clock: INT (internal timer), MIDI IN LEFT, or MIDI IN RIGHT. Note that if you select an external clock, and you don't have one connected, the metronome will stop.

**Clock Out:** Select this and use the Up/Dn keys to enable or disable MIDI clock output over the normally assigned MIDI Output port.

**BPM:** sets beats per minute for the INTERNAL MIDI clock. Range 6-600.

## Clocks Screen #2:

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TSig: 4/4 	Preset	BPM: 120	MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

This is the Metronome-Edit screen where you can create custom time-signatures up to 32 beats per measure with multiple accent beats.

**TSig:** sets the time signature. Press the softkey once to select the number of beats in a measure, in the range 2-32. Press a second time to select the unit-beat which can be either 4 or 8 (1/4 note or 1/8 note). Use the Up/Dn keys or Joystick to set the number of beats per measure.

**Preset:** scrolls through four preset signatures in rotation: 2/4, 3/4, 4/4, 6/8.

**BPM:** selected and set the same as on screen #1.

**Bargraph:** shows the Time Signature graphically in groups of eight beats. As you change the time signature you'll see the length of this bargraph change to match. Each beat may be given an accent by setting its relative volume as shown on the bar graph.

**SoftKeys #5 or #6:** move the cursor left to select a beat; The selected beat is indicated by a flashing cursor (except if the beat is at full volume, obscuring the cursor). When a beat is selected, you can press Up and Down to increase or decrease the volume in eight steps from zero to full. Use the zero-setting for a rest.

**SoftKeys #7 or #8:** move the cursor right to select a beat.

### NOTES:

- The Preset signatures will also reset all the beats' velocity levels!
- A unique Time Signature may be saved for each Song in the Ztar.

## CURVES Edit screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	# 1-4: 3- 4 1 5-8: 84- 40	30- 15 90- 60	50- 20 95- 95	76- 30 100-127
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

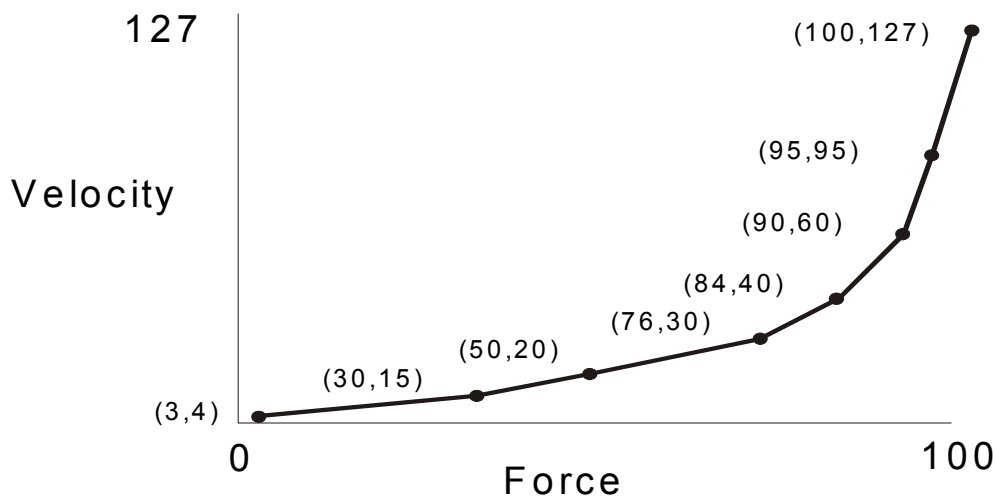
There are 16 programmable curves stored globally in the Ztar that may be applied to individual Sensors or Zones on the fingerboard. Use these curves to adapt your touch to the Ztar and the synth and patch you're using. If one Sensor in a group seems to have a different response than the rest you may give it a special curve to balance its response. Each curve is drafted using eight programmable points and may be thought of as a graph relating physical force and MIDI velocity.

The curves also affect the way that Continuous Controllers such as pedals respond. You can assign and save a curve-number with each Sensor for every Song in the Ztar, so a Sensor may have different response as you select new Songs.

The left-hand side of the menu-screen shows the Curve-number. *When you first enter the menu, use the Up/Dn keys to select a new Curve-number for editing. If you press any other key first, you'll have to exit the menu and re-enter it to select a different curve.* When you make your edits to a curve you're changing the MIDI Velocity output to match the Force of your touch or the travel of a pedal-type sensor.

Each of eight points on a curve is described by a pair of numbers. Each pair has the Force-value on the left and the Velocity-value on the right. The Ztar's computer draws a smooth curve between these eight points to create the velocity-response for the selected curve-number. For the curve shown here, you might read Point#3 as "having a Force of 50% and a MIDI Velocity 20". This particular curve is skewed to give more response in the lower force-range with full volume only coming with maximum force.

Use the softkeys to select a point and toggle between the Force-field and the Velocity-field. Use the Up/Dn keys and the Joystick to set the values.



## Troubleshooting response problems:

If you notice that a sensor responds late, then comes on too strong when it does fire, probably the threshold, the lowest point of the curve is set too high.

If a sensor seems too “Hot” you may notice that it’s showing a MIDI 127 at a force level much lower than you’d like, say 50%. Try to match the MIDI velocity to the relative force you feel when you play.

## Ztar ZPC Curves Tutorial

Describing how to set the response curve for a Sensor using the Curve-edit menu.

We’re going to draw a response curve that gives a Sensor a smooth response to your touch using 8 programmable points, in the way you might enter them on a piece of graph paper.

### *Find the hardware’s endpoints:*

Go to the first RESPONSE menu screen that shows the GAIN bargraph. When you hit a pad or string, the bargraph will show the relative strength of the hit. Try to see what the lowest and highest levels are for the pad you’re hitting.

### *Set the response endpoints:*

Now go to the UTILITIES/ CURVES edit screen for the CURVE number that’s assigned to the Pad. Or go to an un-used curve-number and edit a new one for saving.

Set the FORCE value, the left-hand number, for Point#1 to the LOWEST force value from the GAIN screen. Now set the FORCE value for Point#8 to the highest force value you took from the GAIN screen. These are your physical performance limits.

Now go to the MIDI value, the right-hand number, for Point#1 and set it to a low MIDI velocity like 10. Now go to the MIDI value for Point #8 and enter a 127, the highest MIDI velocity value.

Go to Points#2-7 and enter values that ascend evenly from point #1 to Point#8 for both the FORCE and MIDI-output values. If the actual response of the entire system is skewed in some way (“non-linear”) even though you’ve drawn a fairly straight line with your choice of numbers, then you can adjust either the FORCE line of numbers or the MIDI-output line of numbers to make your response smooth for that sensor.

The easiest way to create new curves is to set all of the right-hand numbers in equal increments from Point#1=0 to Point#8=127. The you can adjust the left-hand (FORCE) numbers anywhere you want to scale the curve to the dynamic range of your touch. You’ll always want a MIDI output of 0-127 but the force requirements will vary with for a number of reasons.

## UTILITIES\ ARPEGGIATOR MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ARPEG:ON	Ch: 2	Port:L	Time: 2/16
	CIK: INT	ALL	NONE	Loop: On
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

### ARPEG: [on/ off]

Toggles the Arpeggiator ON or OFF

### Channel: [1-16]

Select MIDI channels to respond to the Ztarpeggiator. Pick the Channel-number and direct its arpeggiator output in the PORT-settings under Softkey#3.

### Port: [ None, L, R, Both]

Select the "Left" or "Right" MIDI Output ports for each MIDI channel. Instruments that have only a single MIDI Out jack will only respond to the LEFT port.

### Time: [ 0-9999msec or 1/16- 16/16]

Set the duration for each note played by the arpeggiator. This can be expressed either in milliseconds or in 1/16 notes. Press the TIME softkey (#4) repeatedly to toggle between Milliseconds and 1/16 notes.

When you are using the Internal clock in the Ztar, you may set either Milliseconds or 1/16 notes, and you then adjust the clock-rate using the BPM setting in the UTILITIES/ CLOCKS menu. To use an External MIDI clock source the setting must be in 1/16 notes. 24 MIDI clocks per ¼ note is the standard.

### CIK: [L, R, INT]

Press again to scroll through the settings. External clock from the Left or Right MIDI Input port, or use the Internal Ztar clock source. Most ztars are equipped with only a single MIDI In and MIDI Out. You can switch easily between an External clock and the internal clock source this way.

### ALL

Enable the Arpeggiator on all MIDI channels.

### NONE

Disable the Arpeggiator on all MIDI channels.

### Loop: [ On, Off 2-16]

Notes may be set to arpeggiate any number of times when they are held on the fretboard.

ON will arpeggiate for as long as notes are held. Other numeric-settings will loop the programmed number of times while still fingered, and then stop.





[UTILITIES, cont.]

## SEQUENCE EDIT screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	Sequence: #1	INSERT	DELETE	
EDIT	1: Note	Channel 1: 45 / A2	127	GATE: 100#
	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Sequence:** press the softkey and use the Up/Dn keys or the joystick to select the Sequence number to edit.

**INSERT:** press the softkey to insert a MIDI event.

**DELETE:** press the softkey to delete a MIDI event.

**The bottom line of this sample screen reads this way:**

“ Event #1 is a Note, Channel# 1, MIDI Note 45 (decimal) or standard pitch A2, velocity is 127 and the note-duration is 100 MIDI clocks.”

Press softkey#1 to toggle between the Event-number and the event-type fields. Use the UP/Dn keys and joystick to set the values. You'll notice that events may be types other than notes.

Press softkey#2 to toggle between the Channel and note-number fields.

Press softkey#3 to select and set the velocity for a note or data-value for a fixed ControlChange command.

Press softkey#4 to select the Note (event's) duration in either Milliseconds or MIDI Clocks. Press the softkey to toggle between the two types. A “#” will appear after the number when MIDI Clocks are selected.

## SHOWALL screens

You can view entire groups of things here and jump into the appropriate editor for the selected objects. When first entering one of the SHOWALL screens, using the UP/Dn keys will scroll the banks of objects. After an object has been selected however, the Up/Dn keys will alter its values

### Top-level SHOWALL screen:

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONGS	PADS	EVENTS	GATES
	LINKS		CHAINS	PATCHES
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

**Songs:** jumps to the LIVE menu showing the first bank of eight Songs.

**Pads:** shows a bank of eight Sensors, including the MIDI Channel and Note or ControlChange assignments for their first event-slots.

**Events:** shows the eight events for the selected Sensor.

**Gates:** shows the eight gate-times for the selected Pad's events, whether or not they are active.

**Links:** shows the first of four possible Links for the selected Pad.

**Chains:** quick selection of eight Chains for editing purposes.

**Patches:** jumps to the Patch-send editor for the selected Song.

### Showall SONGS

View all the Songs in your Ztar. Each menu-screen will display 8 Songs .

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZTAR	CHORDS	CHORDS#2	CHORDS#4
	ZTAR 05	ZTAR 06	ZTAR 07	ZTAR 08
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Press a softkey to select a Song.

## Showall Pads

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TR1 10:35	10:37	1: 90	10:CtlChg
	TR51:PgmChg	1:ChPres	1: 93	3:93
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

View all of the Pad-assignments in the currently selected Kit.

Each screen shows the *first* event-assignment for each Pad in a bank of eight Pads. If the first event for a Pad is a Note message, the channel and note-number will appear. If the first event for that pad is another type of message the message-type will be displayed.

Use the softkeys to toggle between a Pad's MIDI Channel and Note# or function-type. Use the Up/Dn keys to change values.

If a Pad has been selected, pressing the EDIT key will jump the Sensor-edit screen for that Pad.

If a Pad has not been selected, pressing the EDIT key will exit back to the SHOWALL menu.

## Showall Events

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	PAD1 10:PgmChg	1: PgmChg	1: Off	1: Off
	1: Off	1: Off	1: Off	1: Off
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

View all of the Events for the currently selected Pad.

Use the Up/Dn keys to select a Sensor to edit.

Use the softkeys to toggle the channel and note number or MIDI function for one of the eight Events and the Up/Dn keys to adjust the values.

The EDIT Key jumps to the full EDIT screen for that sensor.

If you had not pressed one of the softkeys when entering this menu, pressing the EDIT key will take you back to the SHOWALL screen.

## Showall Gates

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TR2 900 ms	260 clk	999 clk	1000 ms
	100 ms	200 ms	200 ms	5500 ms
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

View the Gate-times assigned to the Events in the current Pad.

The softkeys select the gate-time for an Event and toggle the timing reference between the Absolute-timer expressed in milliseconds and the Metronome expressed in MIDI clock-ticks. This is discussed in further detail in the CLOCKS section of this manual.

## Showall Links:

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG TR1:P3	TR2: off	TR3: off	TR4: off
	#0 TR5: off	TR6: off	Pt1: off	Pt2: off
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Display, select, and edit the Links assigned to each Sensor in the current Kit. The Song-number is identified at the left of the Screen.

Each value-pair shows a sensor-name on the left and its first link (if any) on the right. If a Pad has been selected, hitting the EDIT key will enter the Links-edit screen for that Pad.

## Showall Chains

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	Chain#1	Chain#2	Chain#3	Chain#4
	Chain#5	Chain#6	Chain#7	Chain#8
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

A CHAIN is an ordered grouping of up to 8 Ztar-Songs that you step through by incrementing the Chain-pointer number with a "Chain-Up" command. You can use this for quick changes in a set-list format. The Showall-Chains screen shows the 8 Chains available in the Ztar. Each Chain may contain up to 8 Kits.

Use the softkeys to select a Chain# and jump to the Chain-Edit screen for that chain.

## Chain-Edit Screen

<b>Up</b>	<b>Softkey#1</b>	<b>Softkey#2</b>	<b>Softkey#3</b>	<b>Softkey#4</b>
<b>Down</b>	Chain 1: K1	2: K5	3: K2	4: K1
	#3 5: K2	6: K21	7: K9	8: K4
<b>EDIT</b>	<b>Softkey#5</b>	<b>Softkey#6</b>	<b>Softkey#7</b>	<b>Softkey#8</b>

This screen displays the Kits assigned to the 8 slots in the current chain. Select a Slot-number and adjust the Kit-assignment with UP/Dn keys.

## Showall Patches

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	Sng:02	PatchSel:1	Vol: 0	SEND
	Ch: 3--Left	Program Change: 121	CC#0: 0	CC#32: 1
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Each Song can store up to **32 Patch-Select commands** that are issued whenever the Kit is selected. Each Patch-Select command is a group of data including Channel, ProgramNumber, and two Bank-Select bytes.

You can also set up individual PatchChange commands and SEND them directly from this window.

The **Song number** is shown in the Upper left corner.

**PatchSel:** Select one of 32 PatchSelect commands.

**Volume:** select a master volume base-level to send to this channel

**Ch:** Press the softkey to set the MIDI channel-number for the current Patch Select. Press the softkey again to toggle to the MIDI Out port port field on the right. The available values are **(N)**one, **(L)**eft, **(R)**ight, and **(B)**oth.

**Pgm:** Set the Program number.

**CC0:** Set the Most Significant Byte of the BankSelect message. Refer to your synth manual for the correct Bank-Select numbers.

**CC32:** Set the Least Significant Byte of the BankSelect message.

**SEND:** Immediately Send the current PatchSelect command with both Program-number and BankSelect information.

**EDIT:** Backs out to the top Showall screen.

### *To set up Patch-selects for a Kit:*

Enter the SHOWALL/PATCHES menu.

At the top-left you'll see the current Kit# to hold all of the patch-selects you'd like. You may adjust this to work in a different Kit.

Go to the Patch-select field and pick a number 1-32. The first available number without any patch-data will be the best one to use.

Now enter into this Patch-Select data-group the Channel, ProgramChange number and the bank-select numbers from your synth-manual.

You can send this directly using the SEND command or SAVE your settings to this KIT so that you can issue them on a KitChange. To do this, either use the WRITE hotkey, (the second one down in the bank of four on the right), or go to the UTILITIES/LIBRARIAN/SAVE screen.

## **Maintenance**

Your Ztar shouldn't need any regular care other than occasionally wiping the fingerboard with a dry cloth. Be sure to keep the fingerboard free from dust, grease and foreign matter that might jam the keys in any way.

The Data-retention battery is located on the main CPU card. Suitable replacements are Duracell DL 1/3N or Panasonic CR-1/3N

## **Tips and Tricks**

### **Use a small zone at the top of the fingerboard as Triggers for the rest of the fingerboard**

What?? Yes, in the *FRETBOARD* Menu you can assign the 24<sup>th</sup> fret as a separate Zone, which does not issue notes. Put the fingerboard into TriggersOff/Guitar mode, Tapping style/one note per string. When you press, say, the first string at the 24<sup>th</sup> fret you will hear nothing. But, if you have a note held somewhere else on the first string, when you release the 24<sup>th</sup> fret you will hear the lower note. The notes you hear are actually played on the upstroke at the 24<sup>th</sup> fret. Sort of backwards intuitively, but easy to work up the technique and very effective at high speeds.

### **Use the Joystick as a Trigger for the Fingerboard**

In the *SENSOR* menu, set up both 'Joystick Left' and Joystick Right' as a 'Single-Key-ReTrigger' for the channel(s) assigned to the fingerboard. The Joystick can then be used with a back and forth motion as if it were a guitar pick.

### **Hint when in the Edit menu system**

When MIDI notes are called for in a menu, simply play the fingerboard to select and enter them on the screen.

### **Switching sounds quickly while playing by using the Sustain Pedal**

Set up the fingerboard with two voices layered on each key. Use the *FRETBOARD* menu to create two Zones with the same boundaries. Then, in the *FRETBOARD/MIDI* menu setup Zone#1 with a base volume of 127 and Zone#2 with a base volume of 0. In the *SENSOR* menu, setup the Sustain pedal to send 'Volume Up' to channel #2 and "Volume Down" to channel #1. When you step on the pedal the sounds will instantly switch and when you release the pedal they'll switch back. There are many variations on this which can use multiple channels. Also the *SOLO* feature can be used to quickly provide new layer combinations for your switching selections. The volume pedal or joystick may be used with this technique to create smooth crossfades instead of simple switching.

### **The Octave and Patch keys seem to respond inconsistently**

The Ztar fingerboard is zone-based. A zone has an assigned MIDI channel. Because the fingerboard is able to play from multiple channels you need to first select a channel by pressing a key within a zone and then pressing the Octave or Patch buttons. This also holds true for the TRIG and G/POLY buttons. Either tap and sustain a note from the fingerboard in the 'triggers-on' mode or pluck and sustain a note while in the 'triggers-off'



mode, and then press the 'OCT' or 'PAT' buttons. I think you'll find that the buttons respond consistently. Also, the 'pads' response curve in the utility-menu does not affect the 'OCT' or 'PAT' buttons or any of the function keys on the Ztar.

### **Regarding the sensitivity of the String assembly**

*Adjustments are made using the six trimpots located inside the guitar, which are accessible by removing the rear cover plate. Please be careful when making adjustments not to drop screwdrivers or bits of metal into the electronics. The power is on!*

Several factors affect the way the strings respond. This is not a pitch-converting system; in fact the computer can interpret the resonating of the string after it's been struck as additional pick attacks. This means that the string must remain fairly dead after it has been plucked. The dampening felts along with the proper string tension should keep the string from bouncing or continuing to vibrate. If double triggering occurs, make sure the string makes only a brief, dull sound and has no buzzing. If the double triggering is very consistent try reducing the sensitivity adjustment pot for each string, available by opening the rear panel.

The overall sensitivity of the strings is governed by the settings of the individual sensitivity trimpots and the height of the strings above the pickup. Also, to a degree, the string tension plays a part because a looser string will vibrate a little more and so will provide more energy to the magnetic pickup.

Crosstalk between the strings may occur when the string tension is loose enough that one string vibrates into the magnetic field of its neighboring pickup. Also, if the sensitivity adjust pot is set too "hot", a string pickup may sense the neighboring string. Try to balance these two effects when you're setting the string tension to your touch.

### **Trigger Mutes**

A brass bar is provided on the tailpiece between the string clamping screws and the tensioning screws. Its purpose is to provide a consistent means for muting the strings regardless of the prevailing humidity, the moisture on your hands, your diet, type of shoes (if any), and some other factors which are found to affect this type of circuit on other instruments. If the presence of the bar is in an awkward location for you and causes unwanted muting effects for your normal hand position call the factory for instructions on how to move the bar to another location. If you are satisfied with the muting without the use of the bar and the bar is messing you up you may disable the brass bar entirely. Sometimes Muting is too sensitive in which case it's possible to adjust the internal trimpot R20 a little to deaden them a bit.

### **To disable the Mute Bar**

You may wish to disable the mute-bar if your picking hand rests on bridge and you find that you are un-intentionally muting the plucked notes. To disable the mute-bar, remove the back cover of the Ztar and unplug the plastic film connector, J19 at the pointy end of the CPU circuit board. Or, you might want to simply cover the mute bar with a piece of tape. We have available a 'MuteCap', a cover cap that mounts over the tailpiece where the MuteBar resides. The top of the cap has an aluminum plate where you rest the heel

of your palm. The strings will mute when you touch them with your fingers while in this position. Normal picking is not affected. Some people find this very comfortable with their style.

### **Mounting new strings:**

Thread the new string through the small head-block near the neck. There is a small recess where the ball-end will rest. Pull the string over the dampening felt, over the damper felt at the tail-block and in to the proper hole. Using a blunt object (like a pencil eraser) press the string down in front of the hole as you thread it through the end of the block. This will help to feed the string straight through.

Pull the string snug with a small pliers and tighten the rear screw. Tighten the front screw to add tension to the string. When you clip the string you may wish to leave a little string length to grab on to in case you need to remove or re-tension the string.

You can also re-use the remainder of the strings by creating your own “ball-end”. Double over the string-end and wrap it around a little post like a piece of the string itself. Stick the free end back into the hole to lock it and the string will draw up tightly.

### **Quick Setup adjustment for the Strings**

Bear in mind that the closer the string is to the pickup polepiece the more sensitive it becomes. When you insert the string, pull it snug and tighten the clamping screw. Use the tensioning screw to both bring up the tension and bring the string down close to the polepiece.

When the strings have been installed and the string-tension has been set up, adjust the individual trimpots inside the guitar in this way to achieve the proper sensitivity:

(The trimpot labeled “STG1” adjusts the low “E” string for a right-handed player.)

- 10)** Set the guitar in the Triggers-On Mode and in Guitar Mode. This will turn on the open-strings. Using a small screwdriver turn each trimpot counter-clockwise just until its open-string note sounds and then turn the screwdriver a tiny bit back in the other direction. This will set the maximum sensitivity.
- 11)** Now play one open string at a time with your thumb or forefinger in a downward direction. Listen for strings that are sounding, other than the one you just plucked. In particular, the adjacent string will probably sound. Go ahead and turn back the trimmers slightly for any strings, which sounded without being plucked. Pluck the rest of the strings in the same way and make the necessary adjustments.
- 12)** Play the strings again but in the other direction and listen for unwanted ringing. Make any needed adjustments and you're done.

## String trigger FAQ

A little info here:

I've noticed that there's a wide variety of success with our String Triggers. I've also discovered that many people don't spend much time or are reluctant to spend time setting up their instruments. Sadly, the Ztar is a 'tech' device with a computer inside and a bunch of electronics and sensors and software. It's not a guitar with vibrating strings so instead we have to use our hardware and software to emulate **everything** in your guitar technique to generate a performance. Some ztar 'programming' may be required.

So we gather expression inputs, pressure and velocity, from both hands the best we can and deliver it to the software that is supposed to make intelligent decisions about playing/muting notes, hammering/pull-offing and the timing variations between the two hands. People's techniques and approaches vary quite a bit which affects the sensor inputs that feed the system. So... the ztar needs to be programmable to 'normalize' or even out the data to give the best dynamic response for your touch and the sounds you're using. It all works together. Our goal with the StringTriggers is to be sure that they can respond to the lightest touch and the fastest picking. As long as those requirements are met I know the software will have enough information to work with and with proper coding and user-setups the system **can** work.

So... what we've found is that some people pick pretty hard and aren't precise with their picking and the stringTrigger sensitivity needs to be cut back to eliminate ghost notes or a saturated condition that swamps the string trigger preamp.

Some people have a really light touch and notes may not easily sound when plucked. Then the sensitivity can be increased to respond properly. The point being that a new instrument rarely arrives already set to a players touch. I'm sorry but this has to be dialed in to work at its best. We have programmable response curves and a TRAIN function that will learn your lightest and hardest pluck and scale your chosen curve within those bounds.

Also, there is a Mute circuit that is driven from the StringTriggers. When your hand is touching the strings the note should not play. It should play only when you release the string. The strings are attached to a tailblock with steel screws that conduct electricity. The tailblock sits under your hand as you pick and if you rest it there, on any of the screws, the notes will mute or not appear at all. This bothers some people and they either learn to stay off the tailblock or cover it up with tape or something. If you can get along with this you can use it as a feature for staccato muting effects. We're working on an alternative design that lets you rest your hand on the tailblock but still mute well from the fingers.

Again, it's important to try to set up the instrument to your touch and it's best not to assume that if it's not responding correctly now that it never will. Think of it like adjusting the action on a guitar neck.

**String trigger setup:**

String Tension, Trimpot gain, response curves, hammer-ons, hammer-threshold.

Get a tiny screwdriver (jeweler's screwdrivers are best)

**Tension:** Make sure the strings are not too slack. The adjustments are done with the string tension set at what you'd expect from a real guitar. You don't have to break them, just get them snug.

**Trimpots:** The 6 individual trimpots may be adjusted to set the Gain for each string. Clockwise will increase the gain. If it's set on the high side you can get a full response from a very light touch. If it's too "hot", turn it back counter-clockwise to get softer dynamics. At the highest gain setting, you can lose picking speed if you pick **very** fast. At the lowest gain setting the response may be sluggish if your touch is very light.

The basic setup procedure is to turn the individual string levels up at the 6 pots until they just self-trigger, and then back off a tiny fraction.. Check for the 'a' string cross triggering the 'd' string etc, and the condition that the string triggers with just the very lightest touch. Back off a tiny bit more if you need to..but not too much.. the trick is to make the action hot as possible.

**Response Curves:** Use the Response/Gain screen to find your picking range. Use the Utilities/ Curves screen to set up a curve that matches the MIDI velocity output to your picking force. Set that curve number to the Triggers. Refer to the CURVES section of the manual for more details.

### **Adjustments to hammer-ons**

You can change the hammer-threshold setting to differentiate between fretted and muted notes from the fingerboard. Values from 50-175 are usually good. A setting of '0' will disable all muting from the fingerboard.

You can change the Hammer-to-pick-delay settings to eliminate double-firing of fretted notes.

You can set the AutoSustain Mode ON which will pass only picked notes and mute only from the right hand String Triggers.

You can turn OFF Hammer-Ons completely.

You can turn ON POLY mode.

You can turn OFF HammerOn/PullOff to the Open-Strings.

### **Mutes**

A brass bar is provided either on the tailpiece between the string clamping screws and the tensioning screws, or elsewhere on the body of the instrument. Its purpose is to provide a consistent means for muting the strings regardless of the prevailing humidity, the moisture on your hands, your diet, type of shoes (if any), and some other factors which are found to affect this type of circuit on other instruments. By contacting the bar as you touch the strings, you can ensure consistent muting. If the presence of the bar is in an awkward location for you and causes unwanted muting effects for your normal hand position call the factory for instructions on how to move the bar to another location. If you are satisfied with the muting without the use of the bar and the bar is messing you up you may disable the brass bar entirely. Call for instructions.

## **Regarding Muting notes**

In Guitar/Trigger mode be aware that you can't muffle a string by lightly placing a finger over it before you strum as you might when muting one string within a chord on the guitar. On the Z-tar, in this, mode, if a strummed string is fretted it will play the fretted note, otherwise the open string will sound. To mute the string either touch the Trigger or a fretted note with Hammer-Ons turned OFF.

When using the actual String Triggers on the Z-tar, notes are muted either by placing a finger on the appropriate String trigger or touching the brass Muting bar in the tailpiece. Fretted notes are also muted by releasing the fingerboard and open-strings may be muted by fretting the appropriate string on the fingerboard just as is done with the Key-Trigger Z-tars.

## **Breath Controller Setup**

To adjust the sensitivity of the Breath Controller use the little air stop-valve mounted in the airline where it enters the Breath Port on the instrument. This is a bypass valve for the breath-sensor and when it's completely closed the all of your breath-pressure is routed to the sensor. Adjust this until you find the sweet spot that works best with your technique and the particular synth/patch setup.

## **PEDALS**

### **Volume/Expression Pedal**

We're looking for a 50 KOhm 3-terminal pot wired to a 1/4" stereo phono plug with the center tap being the ring terminal. 25 KOhm pots don't quite swing all the way. 100 KOhm pots are fine but no one seems to use them. The Yamaha FC-7 is ideal. Music Industries I think has a not-so-rugged pedal which is electrically about right. Kurzweil re-sells these. Also, I've seen them in Guitar Center at various times. The Roland EV5 has a different pot with different wiring but still works a little. I'd assume the Boss pedal is about the same but I haven't tested it. Also, I think a Korg expression pedal works.

### **Sustain Pedal**

Normally Open momentary footswitch wired to a 1/4" mono plug.

### **Notes regarding the SOLO features**

There is a confusing bit about the two "SOLO" features. The SOLO in the menu-screen is slightly different than the SOLO hotkey. In the menu-screen, it's a feature that lets you try out new voices where you can silence the rest of the channels, so you can hear what you're doing.

The SOLO setting from the Hotkey is rather the opposite. It's intended to work with a multi-zone setup on the fingerboard. When you select a Zone and apply SOLO to it, the Zone is expanded to fill the entire fingerboard so you can play a solo with it. Likewise, if you select several zones and hit the SOLO button, they will all be layered and expanded

to fill the fingerboard. This is a quick way to try out new combinations of sounds.

## **More Performance Notes**

### **Regarding Open-Strings**

Open-strings are available in the Guitar/Trigger Mode (One-Note-per-String/Strumming On). Open string may also be set up as pedal tones in either of the Piano (Triggers Off or Tapping style) modes by assigning the proper notes to the strings in the Sensor menu of the VRX. This makes use of the Chord-Memory feature.

### **To Set the open-string capo in "Trigger"(Guitar)-mode**

- 1) Go into the FRETBOARD menu.
- 2) Set Zone #1 to the entire fingerboard... it quite likely is already set this way.
- 3) Create Zone #2 to include just the Open-strings, numbered "String#1-Fret0 through String#6-Fret0". To do this, set the cursor to the "low"-note field and touch the String1 Trigger Bar. Now set the cursor to the "high"-note field and touch the String6 Trigger Bar.
- 4) Go into the MIDI menu and set the MIDI channel and patch number. Exit back to the "FRETBOARD" menu.
- 5) Select the "KEY/TRANS" menu and set the number of pitch half-steps to transpose (capo) the Open-strings "Zone".
- 6) Exit back to the "live" mode menu.

**To create a Capo effect** which tunes the individual open-strings to a custom tuning (a chord, for example) while leaving the fingerboard in a standard tuning:

Proceed as in the earlier example but create a separate zone for each individual Open-string. Set each 1-note zone to the same MIDI channel, (if you like), and then set the transposition for that zone where you want it to sound.

### **Regarding the joystick**

In accordance with the MIDI spec, the ZTAR joystick outputs the full bend range from 0 to 7F. The actual pitchbend range in musical pitch is set inside the receiving Synth to correspond to the joystick full-scale output.

### **Pull-offs**

Technique-wise, be aware that the fingerboard keys move quickly and that contact is made when the key is fully depressed. This means that when performing pull-offs in Guitar/Trigger mode, the pulled-off note comes out as soon as you raise your finger, note when you've cleared the string as with a real guitar string. For best performance, always keep your fingers as close to the keys as possible to minimize the finger travel. This is good practice for the guitar, too.

### **Fast strumming of chords**

When strumming chords quickly without muting anything, as in a Flamenco-style rasqueado motion, some voice-stealing may occur in your synth as some samples will not send Note-Offs until the sample has fully played out. Without muting anything you'll be issuing lots of Note-ons with possibly no Note-offs. Consequently, when the maximum allowable notes (for a given patch) have been entered into the synth, the older notes will start to drop out to make room for the newer notes.

### **Tune up the Ztar and your synth to a piano or other fixed pitch instrument**

Program the Volume pot or Mod Wheel (if you have one) to Pitchbend and adjust the pitch until you're in tune! That's it!

### **Pedal steel**

Set up the fingerboard in six channels, one per string. Now set the KeyTriggers or TriggerPads to PitchbendUp in this way: KeyTrig#1 bends Strings1 and 2, KeyTrig#2 bends strings 2 and 3, KeyTrig#3 bends strings 1 and 3, and so on. By setting up combinations of strings, which are bent, and setting up the right tuning, you can emulate the pedals of a pedal steel. A simpler approach just bends each string from its corresponding KeyTrigger.



## LEARNING the ZTAR

- a discussion on synths, new controllers, and tapping -

**Just laying your hands on the instrument** creates new, cool sounding stuff but it's hard to organize the random approach into actually learning the instrument, efficiently. . But the same holds true for any instrument and practicing. This really calls for a technique book which we don't yet have but a few paragraphs here can give you the benefit of the cumulative experience of a number of players over since the early 1990's.

Being methodical and focusing effort within some constraints is how you embed the learning. Research claims that new finger patterns become part of muscle memory after one lunar cycle of daily practice. So figure if you repeat an exercise 100 times for 28 days straight you're going to have that bit under your belt thereafter. Here, you're dealing with music synthesizers so every sound is available to you, and if you want to get into realistic emulations of other instruments that opens quite a Pandora's box of possibilities. Realize that you could spend a lifetime on any one sound, trying to become a master at the piano as played on the ztar. Or the violin as played on the ztar, or sax, or trumpet, .....guitar .... (Learning to play guitar on the Ztar seems strange to me) People spend a lifetime with their given acoustic instrument so it's reasonable to expect that an exact emulation would require just as much effort, maybe more. And, at the end of the road with this is the personality of the Ztar itself, which definitely leads to its own style, IMHO.

In every case you're going to try to capture the articulations of another instrument using MIDI and the different features of the ztar. So when learning to emulate the first thing is to get the sound solid in your head. If you listen to a lot of Charlie Parker and want to pull that off, listen until the sound is jammed in your brain, then bring up a sax patch that you can stomach, dial in the reverb or whatever you have to do to make it acceptable, and start doing the things he did to learn his style on his instrument. You'll find this involves lots of practice with scales, arpeggios, and patterns. This takes us to the fun part and is the reason, I think, that the effort you put into learning bebop-sax will help you with learning every other style you approach on the Ztar.

I figure the three new areas of learning with the Ztar are:

1) Articulations, scales, chords and note choices particular to the instrument whose voice you're trying to emulate. This is new to the Ztar and different than learning **every** musical instrument because with the Ztar you're using a common fingering and the task is still possible, a combination of circumstances that may not have existed before. Of course, this is an immense undertaking if you look at the whole of it.

2) Using the polyphony of the individual strings, multiple frets being played simultaneously on each string. This is a different way to look at your note choices and is most of the reason why #1 is possible.

3) The physical touch of the Ztar fingerboard. This is very keyboard like in the way that notes turn on and off. This merits some direct practice to get the feel of it. I'd suggest using a metronome and working through piano exercises. Or, if you want to consider the effects of statement#1, get an exercise book for the instrument you're trying to emulate and learn the natural phrasing while you're building finger strength. In general, the Ztar is physically less challenging than a guitar, so if you've acquired some proficiency on the guitar you can certainly do this. The Ztar is a bit like power steering though, and the task becomes one of learning to control note-timing.

You've got to get the notes comfortably under your fingers no matter what you're playing and while you do indeed want to end up playing music I think you have to do some calisthenics to build the muscle memory. Same as any instrument. Again, every style and every sound will dictate it's own exercises but there is a reasonable place to start.

Start with a piano sound you can listen to for at least an hour. Every synth should have at least one of those. I'm thinking tapping style here and the goal is two hands on the fingerboard. Best to start with just one hand. If that's all you ever intend to do then you can probably stick with standard guitar tuning. If you go to two hands you'll probably be happier if you switch to straight fourths tuning. Less to learn.

Now finger a major scale in a comfortable position on the fingerboard. Stay in one hand position and work that mother across all the strings at an even tempo without any fluffs. Don't bump the tempo until your solid on this. There are 1M scale studies that repeat different interval sequences and eventually you'd like to master all of it, which is what Parker did... Coltrane practiced Slonimsky's scale and intervals studies... but bear in mind that you may not want to become a virtuoso and if you do it won't happen overnight. You'll have to eventually work through every type of scale (there are 100's but 5 or 6 will cover a lot of ground) in every fingering position. There are (5) on a guitar fingerboard but in fourths tuning you'll see that the symmetry kind of blends them all together and reduces the number of variants by 2/3.

So, not to be overwhelmed or over-worked, pick a scale or fragment that works with a piece of music you're into and practice it evenly for 100 repetitions.

### **Teaching the picking hand to fret :**

This is cool because you're starting fresh. It's just like learning the piano. Find the same major scale you had before and move it up the neck 12 frets. Start slowly. Do-re-mi-fa-so-la-ti-f\*ing-do. Serious. Again. Deliberately. Feel you uncoordinated picking hand trying to find the notes. Again. Slowly. Feel the spots where your strokes are weak. Isolate them and repeat them "do-re-do-re-do-re..." say 100 times, until the attack is consistent. Try to get the effect of a playing card stuck in the spokes of your bicycle.

Don't forget to practice pentatonic scales and blues scales, which you can burn on, with a little practice. They're easy as they may be played with two fretting fingers per string

One thing that helps timing for the top hand is to finger the scale with the bottom hand that already knows how to do this. Place your top hand 12 frets up the neck and grab the same scale. Because on the Ztar you'll be using the same fingers on either hand to play the same notes of a pattern, you can use the bottom hand to lead the timing and

the top hand will follow. This is pretty easy for the brain. Piano players learn this but their fingerings are different for each hand when they play unison scales or patterns (a little ztar advantage:) without overdoing it, if you can put in 15 minutes/day working up finger strength and technique you'll get better faster on the instrument, any instrument.

Learning scales, in patterns not just from one end to the other will apply to jamming in most all styles. Practicing arpeggios is even better for learning the fingerboard, IMHO. There are idiosyncrasies to every style of music that you'll want to isolate and practice to nail. For instance, boogie-piano has that rolling left-hand bass. You'd want to isolate that and work it through a tune until you're comfortable. This is a stock lick for a guitarist or bassist but tapping it is the new thing you're learning here. Go slow to make sure the attacks come always in the right spots. You'll find tapping with the bottom hand will be easier if you can support the instrument so that it's stable without relying too much on your thumb to hold the neck in place. This will keep your hand from getting fatigued.

Once the bassline is solid you can add a chord or lick with the top hand. First, just add it once in the right spot. Bap! Now here it comes again. Bap! Go slow until you can add it at every bar in the same spot or wherever you want it. I got this from Stanley Jordan. This is a brain problem more than a hand problem. Careful repetition at an even tempo is the way. Another easy way to get into two hands playing is to finger a simple chord or interval, say a root-5 or 3-b7, and tap it with the top hand in tempo. Keep it going steadily until it's locked and start to play a bassline with the bottom hand. This reduces the task for the untrained hand to one of just keeping tempo without having to think too much about its fingerings. How pianists get fully independent hands is a two-brained thing that must be genetics but I understand practice helps. Drummers are even worse. This comes from growing up patting your head and rubbing your tummy too much.

I think the thing that gives the ztar some character is the Poly mode and using that you can develop a lot of voicings that wouldn't hear anywhere else. Using chords with two notes per string, say two or three strings, you can work up chord scales that are thick and easy to pull off. Another approach is to just get into a given tune. Practice the parts of it and see how isolated bits fall into sub-patterns of scales and arpeggios. Expand the lick to work up your own studies from this, which will help you to improvise on that tune.

Here's another fun thing to do that will give you a great view of the fingerboard. Play a scale on just one string with both hands. Try to explore this for a practice session without changing strings. (Avoid temptation!) An interesting and enjoyable aid to this exercise is the OCTAVES preset in the Ztar that keeps the note names the same for every fret for all of the strings but by changing octaves you can get some interesting variety happening. Actually, this creates an entirely new instrument that someone someday will master. This puts 7 octaves on the 6-string fingerboard so there's a lot to explore.

### **Three fingers or Four?**

I think the two techniques have different uses. If you stay within a hand position on the fretboard four fingers becomes pretty useful. Obviously when chording the fourth finger is going to help reach extra notes.

In fourths tuning three fingers can cover most major and minor diatonic scales in one hand position. You'll notice that when you practice three fingers after a while you get into a groove, the three-finger motor that Emmett Chapman talks about. Your wrist sort of rocks back and forth in a steady motion as you work scales from string to string. You can pop down the right fingers to get the notes while your wrist keeps going.

This works great as you move out of a hand position and travel up and down the neck. You start to think of note-patterns in 3-note chunks on a section of a string and you can just move your hand up and down a string or from string to string to grab a 3-note pattern. You can develop ridiculous speed this way as you start to drop the three fingers almost simultaneously. By using only 3 fingers you don't have to worry about "do I use finger3 or finger4?" It lends to a more automatic motion.

Try taking a 6-note pattern, 3 notes on two adjacent strings in one hand position. Play it a couple of times then pick it up and drop it one octave up, (2 strings up and 2 frets up when tuned in fourths). You can spot the little pattern all over the fingerboard this way and the symmetry is really easy on the brain.

With 3, I think chromatics are tougher and although a whole-tone scale in fourths falls out in 3 "like butter" the 5-fret stretch may be uncomfortable. But if you keep your wrist moving you just slide up or down to get the notes.

Pentatonics, which are, I would say, 2-finger scales, fall out of the 3-finger patterns easily. Also, it's more likely that you'll get firm even attacks without relying on your little baby lightweight pinky finger, which is more of an issue on a Stick than the Ztar.

The four-finger approach may lead you to understand that most scales, chords, and key modulations can be played within a single 5-fret hand position when tuned in fourths, which may be easier when balanced against two hands re-positioning up and down the fingerboard. Three and four note patterns on a chromatic scale in one hand position are a good aid to getting comfortable in this.

I think in all, it doesn't make too much difference but both techniques are definitely worth practicing to find which best suits your style.

## **Ztar neck dis-assembly instructions**

- 1) Remove guitar back
- 2) Plug the fingerboard into the multi-colored flat cable.
- 3) Plug the NeckSensor strip into the 3-pin cable connector. Polarity is not important.
- 4) Slide neck into neck pocket while pulling cables through from inside the guitar.
- 5) Look through neck holes in guitar and slide neck in to line up the mounting holes.
- 6) Install neck screws- Note: there are two different length screws, (2) short, (1) long.  
The long screw mounts toward the headstock end. Don't mix these up!
- 7) Tuck the cables into the electronics compartment and re-install the back.

## **Ztar troubleshooting**

The instrument will not power-up:

*If the display is **not** lit or only dimly lit:*

Make sure you have a good MIDI cable with wires connecting **all 5 pins** end-to-end. Make sure you have the correct DC adapter and it is working. Our instruments require 9VDC @ 500mA.

Make sure you are plugged into the correct MIDI connector.

Make sure the power switch is ON.

*If you see the display **is** lit, the instrument is getting power.*

The little black squares across the top line are normal.

If no characters appear on the display and you know for certain that your DC wall adapter is a good one, then the onboard CPU is not running or there is a problem in the display. Call the factory in that event.

### **The instrument powers-up but I don't hear any music when I play it.**

Make sure the volume hasn't turned off for the channel you're using. Turn your volume knob a bit to reset the volume. Make sure any pedals or other devices that are programmed for Volume messages are plugged in correctly and are turned up.

Make sure the Ztar and the Synth are set to the same channel(s).

Make sure your synth has a patch/sample assigned to the channel you're using.

If the MIDI monitor light is blinking on your synth then you're sending MIDI from the Ztar.

### **The Keys, Expression Pads, Triggers, or any other velocity-sensing devices on the Ztar do not respond to a light touch.**

And when they do respond it seems the sound is too loud or the velocity is too high.

If you adjust the R20 Trimpot mounted on the CPU card inside of the Ztar you can lower the minimum Sensing level of the instrument to optimize the bottom end of your dynamic range. If the instrument is made somewhat too sensitive it will tend to glitch in response to various 'noise' factors in the environment. If the r20 trimpot is turned all of the way clockwise for maximum sensitivity the instrument will lock up entirely and may fire random notes or other MIDI messages. Just turn the pot back the other way a bit to bring the Ztar back to operation.

### **String Triggers vibrate excessively:**

If the strings are vibrating excessively it sounds like they are loose. Either the clamping screw is not clamping or the tensioning screw is not tensioning. When the strings are tensioned properly you can make sure they are properly seated over the felt damper by the absence of any buzz or hard 'click' when you pick the string. It's natural sound should be fairly deadened offering very little sense of any pitch. You should be able to adjust the tension from 'no tension at all' to something much tighter than any real guitar.

## **The String Triggers seem to respond unevenly.**

Try the trimpot adjustments described in the manual. They really do affect the performance. They are adjusted at the factory to make the strings as sensitive as possible without triggering from simply touching them. Also, be aware of the muting function that is always active on the Strings. If your hand is resting on the strings or the tailpiece screws while you're picking the notes may clip or simply not play. In general, the muting function and fingerpicking styles will be affected by changes in humidity and the dampness of your skin. You may find that picking and muting are sluggish when you first pick up the instrument on a given day but that everything picks up after you play for a bit when your hands have warmed up. Aren't electronics great?!

## **A fingerboard Key seems to be jammed. What can I do?**

Lay the instrument upside-down on your lap. Gently slap the back of the neck to dislodge any crumbs that may have fallen into a key slot. Do **not** spray any solvents or lubricants into the fingerboard or dig around the keys with sharp objects.

The StringTriggers seem to play low-volume notes when I just barely touch them or sometimes play by themselves:

The string trimpots are set too 'hot'. You can tell when you just touch the strings and they play without plucking them. You want them to mute when you touch them lightly. Also if they're too hot you'll hear ghost notes in particular with fingerstyle as the finger and the nail can generate two notes on one stroke.

- 1) Have you tried to adjust the StringTrigger Gain trimpots in the back of the instrument? What happened? Less gain should make the response less 'jumpy'. To some degree this seemed to be a problem with the larger strings.
- 2) The guitar strings we use are .038". The gauge isn't too critical but the very light strings will be a bit less sensitive and very heavy (bass) strings will be sensitive but with some loss of dynamic range.
- 3) If you pick one string and another one rings then the gain on the other one is too high. Turn it down with the trimpot adjustment.

## **With a StringTriggered Ztar how do I get my add-on KeyTrigger option to trigger individual strings like a guitar?**

Your add-on TriggerPads are programmed as Pads 1-6 in the Sensor menu. When you power up the Ztar they will be playing the ChordTrigger function which is the default assignment for all of the Pads. These add-on KeyTriggers will be programmed as Pads#1-6. The StringTriggers are listed in the menu as 'Triggers' and are programmed independently of the Pads. In order to make the add-on TriggerCap respond like Triggers, program them to 'SingleKey' Re-Trigger' which allows any pad or sensor to trigger whatever is fretted for the programmed channel on the fingerboard. So for instance, if the entire fingerboard is set to Channel #1 and you set Pad#1 to Re-Trigger MIDI Channel#1 then whatever you have fretted on the fingerboard will trigger when you touch just the one pad. And if you want to emulate the six StringTriggers instead, you would assign the fingerboard to six channels, one per string as in the '6-String' ROM-

preset, and then assign each of the TriggerPads to Re-Trigger the corresponding channels, 1 through 6. It's best to save this configuration into a User Preset for easy recall later.

**Sometimes while I'm playing the sound will disappear or one sound in a multi-layered patch will disappear. It's really annoying. What can I do?**

Occasional random volume glitches occurred in older ztars. I would've thought yours was too new for this but maybe not. The problem was solved in new units with our current CPU card. We can upgrade your card or you can call the factory for instructions to fix this yourself if you have some electronics experience.

If you're not using a volume pedal, take a bare 1/4" stereo plug and short together the tip and ring of the plug. When you insert this into the volume pedal jack it will appear as if the pedal is installed and is full on.

Another solution is to simply "no assign" the volume pedal if you're not using it; assuming that when this problem occurs, it's channel #1 that disappears because that is the default channel assignment for the volume pedal and volume knob.

Another solution is to assign the offending sensor to Volume Down instead of Volume Up. Then if there is a glitch to a very small value, the volume will go the other direction.

Or, assign it to ModWheel and if there's a glitch you'll get a mysterious vibrato.

In general, only MIDI messages can emanate from the controller. And, the controller can only send what it's programmed to send. So if there's a synth problem and you believe the controller is at fault, look around in the Sensor-menu to see what is assigned to what. Disable or change the assignment to a Sensor you suspect to be the offender. This should isolate the problem.

**Whenever I put the menu-cursor over a screen-value, the number will immediately scroll all the way to the end of the list. Also there seems to be a steady stream of MIDI messages going to my synth. What's up?**

The joystick is stuck one way or the other. Maybe just a little. It may be out of adjustment or defective. Its internal cable connector may have fallen off which is possible if you've been fooling around in there. See if you can move the joystick to make the problem stop. If not, call the factory.

**I tried to program something to the Joystick and soon found that some of the sounds I was using disappeared. I changed to another onboard preset like "6-STRING" but only some of the sounds were working and only part of the fingerboard will play notes. What happened? Is there any way to reset the instrument?**

Some of the presets have the Joystick programmed to do channel crossfades. Crossfade works by changing the volume settings on at least two MIDI channels. If you

shut off the volume to a MIDI channel and then leave the preset that sent the message, you may have no way to turn it back on, without returning to that preset.

- 1) Hit PANIC to clear all CC messages. This is a MIDI 'reset'.
- 2) Notice in the FRETBOARD/MIDI menu the setting, 'P&V Enable'. If you turn this ON for your active zones and save this as a new preset to a USER location, then when you select it, it will automatically reset the Volume for those Zones.
- 2) Use a MIDI monitor program in your PC, like MidiOx (freeware) or Cakewalk to see what you're actually sending.

Also, the defaults in the Ztar are the fingerboard usually to Channel#1 and the Triggers (when they're not triggering the fingerboard) and Pads to Channel #10. Probably you've turned off the volume on Ch#1. Check the MIDI monitor LED on the front of your synth to see if the synth is receiving MIDI.

### **When I hit PANIC! It drives one of my synths crazy! Lots of random notes seem to fly out!**

The Ztar Panic! Function takes the brute force approach and sends a Note-Off to every note on every channel. Then it resets every ContinuousController on every channel. This is over 2000 MIDI messages going out at a pretty good clip and which can overrun the input data buffer of some older synths causing the synth to choke on the data then play out a crush of notes or crash completely. We did this because not all synths support AllNotesOff and other less complete Note-Off broadcast routines might miss some random clinkers. There haven't been enough complaints to warrant changing the software.

### **The instrument is supposed to have the NeckSensor bend control and I can't get it to work. At the risk of being insulting, is it even installed on the instrument? If it is, where are the parameters to turn it on and off and set sensitivity levels?**

The Neckstrip is hard to see sometimes as it's just a very thin strip on the thumb-side of the fingerboard where the side dots appear, and it's just the width of the fingerboard thickness and side-dotted so you might not notice it. You program it in the Sensor-menu as 'NeckStrip'. Just scroll through the list of sensors until you see the name toward the end of the list.

### **My joystick seems to be always on a little. It's bending the pitch and I can't use the screen-editor either.**

- 1) Change the DC power supply, wall-wart.
- 2) Check the MIDI cable to the ztar.
- 3) Make sure the stick is moving freely and doesn't have rough spots in its travel. If it does, remove the cap, or the entire stick (you'll have to open the back to do that) and investigate for the presence of a foreign obstruction.
- 4) The stick may have worn out and we can send out another one or you can return the ax and we'll replace it here.



# SENSOR ASSIGNMENT CHART

SENSOR	EFX1	Channels				EFX2	Channels			
Trigger1										
Trigger 2										
Trigger 3										
Trigger 4										
Trigger 5										
Trigger6										
Pad1										
Pad2										
Pad3										
Pad4										
Pad5										
Pad6										
Pad7										
Pad8										
Pad9										
Pad10										
Pad11										
Pad12										
TriggerPad1										
TriggerPad2										
TriggerPad3										
TriggerPad4										
TriggerPad5										
TriggerPad6										
JoystickUp										
JoystickDn										
JoystickRt										
JoystickLt										
VolumePed										
SustainPed										
VolumeKnob										
Mod Wheel										
Breath										
Ribbon										
Neck Strip										
JoyButton										
Joystick2Up										
Joystick2Dn										
Joystick2Lf										
Joystick2Rt										
JoyButton2										
CtrlKnob2										

# Starr Labs Flexible Bulk Dump Format

[SONGS are referred to as KITS in this document]

Starr Labs MIDI Manufacturer's Number: ID # : 00H 01H 42H

## SysEx Packet Encoding

The general SysEx packet format is as follows:

\$F0 \$00 \$07 \$07 type number length ...data...  
cksum \$F7

SysEx message with manufacturer id= 00H 01H 42H.

In this packet,

type is a 7-bit value indicating packet type, e.g. kit  
number is a 14-bit value (big-endian) indicating object number, e.g., kit number  
length is a 14-bit value (big-endian) indicating the number of "data" bytes which follow,  
data is a variable length field, of either 7-bit or *packed 8-bit* data,  
cksum is the 7-bit sum of all MIDI bytes after the \$F0 SysEx code (*not* including the \$F0 code)

## Data Encoding

When 8-bit data must be sent, the 8/7 bit packed format ("Korg/Lexicon format") is used. Seven consecutive RAM bytes "A-G"

A7 A6 A5 A4 A3 A2 A1 A0  
...  
G7 G6 G5 G4 G3 G2 G1 G0

are packed into eight MIDI bytes -- the most significant (M.S.) bits packed into the first byte, and then the 7 data bytes each with MSB stripped:

0 G7 F7 E7 D7 C7 B7 A7 "M.S. bit" byte  
0 A6 A5 A4 A3 A2 A1 A0  
...  
0 G6 G5 G4 G3 G2 G1 G0

A group of n<7 bytes is transmitted in 1+n bytes. In this case, the unused bits in the "M.S.bit" byte are "don't-cares". When this "packed" data format is used, length is the actual number of MIDI data bytes, i.e., the number of 7-bit bytes transmitted, *not* the number of 8-bit RAM bytes.

The type byte will also indicate the type of data encoding in use. The 7 type bits are interpreted:

0 e e t t t t t

where ee = 00 indicates 8 bit data (in 8/7 packed format);  
01 indicates 7 bit data;  
10 and 11 are reserved for future use.

The five bits 'ttttt' identify the data in the packet, e.g., kit data, curve data, etc. Refer to the individual descriptions of data layouts, below.

## ZPC Bulk Dump Sequence

At present, a dump of "all kits" always includes

Velocity curves 1 through 16  
 Kits 9 through 32  
 Response data, pads 1 through 32  
 System globals  
 MIDI Trigger data, ports A and B  
 All recorded sequences

A dump of one kit always includes

The chosen kit

Packets may now be sent to the Ztar in any sequence for a bulk receive.

### KIT [ SONG] DATA LAYOUT :

Each "kit" is sent in a packet of type \$01, thus:

```

  $F0 $00 $07 $07 $01  number  length  ...data...
cksum $F7

```

number is the kit number, 1-32.

data is the kit data, sent in 8/7 bit packed format.

The RAM layout of the kit data is as follows:

Kit Data "Pad 0"	75 bytes
Name	9 bytes (ASCII)
Future name	21 bytes
String tuning	6 bytes
Future tuning	6 bytes
Reserved 30 bytes	1 byte
Hammer.thresh	1 byte
Hammer.delay	1 byte
Fbd.vcrv	1 byte
Fbd.afterthresh	1 byte
Fbd.aftersens	1 byte
Cksum	1 byte

### Pad Blocks 34 [ or 38, or 40] pads of 75 bytes each = 2400 bytes [ 2700, 2550 ]

(the number of Sensors will vary according to the particular hardware configuration and software version. The actual number of Sensors for the variant will be entered in the System Configuration Block.)

Pad Mode	1 byte	pad mode	[ see PAD-MODE ID# list]
		\$00 = Off	\$07 = Alt-Up
		\$01 = Basic	\$08 = Alt-Down
		\$02 = All	\$09 = Alt-U/D
		\$03 = Sequential	\$0A = Alt-Random
		\$04 = Note-Shift	\$0B = Slice
		\$05 = MIDI-Seq	\$0C = Cont.Ctl.
		\$06 = Record pad	others TBD

Pad Flags	1 byte	bit flags as follows:
		\$01 = squeeze mode (mute when released)
		\$02 = latched mode (mute on 2nd hit)
		\$04 = cymbal mode enable bit
		\$08 = gate shift enable bit
		\$10 = MIDI A output enable
		\$20 = MIDI B output enable
		\$40 = metronome pad (obsolete)
		\$80 = reserved; should be zero

Loop/Slice Count	1 byte	Most modes: number of loops; 0=loop forever; 1=no looping. In Slice mode, this is the slice length in beats.
Delay Time	2 bytes	pad delay time If MSB=0, 15 LSBs are time in msec, 0-9999. If MSB=1, 15 LSBs are time in MIDI clocks, 0-999.
Sequence #	2 bytes	variable-length sequence number for this pad; 0=none
Vel. Curve #	1 byte	velocity curve number for this pad; 0-15.
Pedal # none	1 byte	In HiHat modes, pad # 1-32 of associated pedal, or 0 if none
Event Blocks	8 events of 7 bytes each = 56 bytes	
MIDI op code	1 byte	operation + MIDI channel
Data byte 1	1 byte	1st MIDI data byte (note number for Note-On)
Data byte 2	1 byte	2nd MIDI data byte (velocity for Note-On)
Gate time	2 bytes	gate time If MSB=0, 15 LSBs are time in msec, 0-9999. If MSB=1, 15 LSBs are time in MIDI clocks, 0-999.
Vel. Low Limit	1 byte	lowest hit velocity (after curve), 0-\$7F
Vel. High Limit	1 byte	highest hit velocity (after curve), 0-\$7F
Link Block	10 bytes	<i>(all pads except metronome)</i>
Link Mode	1 byte	link mode 0=Links disabled 1=Notes Off 2=Notes On
Link Pad #s	4 bytes	each is a pad number 1-32, or 0 for no linked pad
Reserved	2 bytes	
Trigger Flags	1 byte,	0dtc0sss d= Dual Mode t=Trigger-Mode c= Chord-Mode 0=not used sss= fingerboard String-number "Strummed" by this Sensor
AfterPressure Curve-number	1 byte,	0000nnnn nnnn= Response-curve# 1-16
AfterPressure Threshold	1 byte,	0000nnnn nnnn= Response-curve# 1-16

## 75 bytes

Pad Mode	1 byte	0 = disabled; xx = metronome enabled
Flags	1 byte	
BPM	2 bytes	beats per minute, 6-600.
Time Signature	2 bytes	time signature "x/y" First byte 'x' is number of beats per measure, 2-32. Second byte 'y' is number of beats per whole note, 4 or 8
MIDI Channel	1 byte	channel number of metronome sounds, 0-15.
MIDI Note	1 byte	note number of metronome sounds, 0-\$7F.
(reserved)	1 byte	
Beat Volumes	32 bytes	MIDI velocity of each of 32 metronome beats
Reserved	24 bytes	
Patch Table	2 patches of 5 bytes each = 10 bytes	<i>patches 1 and 2</i>

Channel	1 byte	value = 00bacc
		where cccc = MIDI channel number, 0-15
		a = MIDI port A output enable
		b = MIDI port B output enable
Program	1 byte	Program Change data byte
CC0	1 byte	CC#0 (bank MSB) data byte
CC32	1 byte	CC#32 (bank LSB) data byte
Volume	1 byte	CC#7 (main volume) data byte

**"Pad 36" Block                      75 bytes                      Patches 3 - 17**

Patch Table    15 patches of 5 bytes each = 75 bytes                      layout as above

**Each "kit" is sent in 36 packets of 75 bytes each, using type \$01:**

```

$F0 $00 $07 $07 $xx number length ...data...
cksum $F7

```

number            High 7 bits is the kit number, 1-32.

High 7 bits = 0 indicates the "pads" 0-34 are being sent as one packet of 2625 bytes, in the format shown above. This is for backward compatibility and is supported for bulk receive only.

Low 7 bits is the "pad" number, 0-35.

"Pad 0" is the kit data block.

"Pad 33" is the metronome block.

"Pad 34" and "Pad 35" are the patch data blocks.

data    is the kit data, sent in 8/7 bit packed format.

The kit data is divided into 36 segments of 75 bytes each, sent separately. The first 35 segments are described above. The final segment is identical in format to the "Pad 34" block:

**"Pad 35" Block                      75 bytes                      Patches 18 - 32**

Patch Table    15 patches of 5 bytes each = 75 bytes                      layout as above

**PAD-MODE ID# list:**

Pad.off	0
Notes.simple	1
Notes.all	2
Notes.sequence	3
Notes.shift	4
Alt.up	5
Alt.dn	6
Alt.updn	7
Alt.rnd	8
Notes.slice	9
Contrctrl	a
Midi.seq	b
Stop&play	c
Rec.pad	d
Recnext.pad	e
Overdub.pad	f
Dubnext.pad	10
Undo.pad	11
Kit.inc	12
Kit.dec	13
Chain.inc	14
Mute.all	15

Ref.pad 16  
 String.trig 17  
 String.dual 18  
 HHpedal1 19  
 HHpedal2 1a  
 Hhat.pad 1b  
 Notes.metr 1c  
 [ Set-loop-start  
 [ Stop(All)Sequences

### Velocity Curve layout

Each velocity curve is sent in a packet of type \$02, thus:

```

  $F0 $00 $07 $07 $02 number length ...data...
cksum $F7

```

number is the RAM curve number , 5-16.

data is the curve data, sent in 8/7 bit packed format.

The curve data is sixteen 8-bit RAM bytes, representing six points on a curve, as follows:

Byte 0	point 1 force value (input value), 0-\$FF.
Byte 1	point 1 MIDI value (output value), 0-\$7F.
Byte 2	point 2 force value
Byte 3	point 2 MIDI value
...	
Byte 10	point 6 force value
Byte 11	point 6 MIDI value
Byte 12	point 7 force value
Byte 13	point 7 MIDI value
Byte 14	point 8 force value
Byte 15	point 8 MIDI value

### Pad-global (response) data layout

Global pad data is sent in a packet of type \$03, thus:

```

  $F0 $00 $07 $07 $03 number length ...data...
cksum $F7

```

number is the pad number, 1-32.

data is the global pad data, sent in 8/7 bit packed format.

Global Pad Block	16 bytes
Jack Type	1 byte
Pad Gain	1 byte
Raw Value Low	1 byte low raw pad value, scaled to force=0
Raw Value High	1 byte high raw pad value, scaled to force=\$FF
Threshold	1 byte raw a/d threshold
Scan Time	1 byte
Mask Time	1 byte
Reference Supr	1 byte suppression value for reference pad
Global Supr	1 byte suppression value for all pads
Reject Pad #	1 byte
Reserved	6 bytes

### Variable-Length Sequence data layout

Each variable-length sequence is sent in a packet of type \$05, thus:

```
$F0 $00 $07 $07 $05 number length ...data...
cksum $F7
```

number is the sequence number, 0-255.

data is the variable length sequence, sent in 8/7 bit packed format.

Note that the length of the sequence is implicitly specified by the length of the packed data.

### Sequence Block Events

Event Blocks	5 bytes each, to fill the given length
Gate time	2 bytes gate time If MSB=0, 15 LSBs are time in msec, 0-9999. If MSB=1, 15 LSBs are time in MIDI clocks, 0-999.
MIDI op code	1 byte operation + MIDI channel
Data byte 1	1 byte 1st MIDI data byte (note number for Note-On)
Data byte 2	1 byte 2nd MIDI data byte (velocity for Note-On)

### MIDI Input Block data layout

Each MIDI input block is sent in a packet of type \$2F, thus:

```
$F0 $00 $07 $07 $2F number length ...data...
cksum $F7
```

number is the port number, 0 = port A, 1 = port B.

data is the MIDI Input Block, sent as 7-bit data.

### MIDI Input Block

MIDI Port Mode	1 byte Encoded as 0xxcfftt, where c = receive capture enable bit (1=on) ff = MIDI-follow mode, 00=disabled 10=follow-chord 01=follow note 11=reserved tt = MIDI-trigger mode, 00=disabled 10=Notes Off 01=Notes On 11=both xx = reserved for future use, should be zero
Receive Channel	1 byte Enabled receive channel, 0-15.
Reserved	6 bytes
MIDI Triggers	128 bytes Pad number 1-32 for each MIDI note, or 0 if none

### System Global data layout (TBD)

Global system data is sent in a packet of type \$04, thus:

```
$F0 $00 $07 $07 $04 number length ...data...
cksum $F7
```

number is ???

data is the global pad data, sent in 8/7 bit packed format.

### Chains

### System Configuration Block data layout ( IN PROGRESS)

The system configuration block is sent in a packet of type \$20, thus:

```
$F0 $00 $07 $07 $20 number length ...data...
cksum $F7
```

number is ???

data is the configuration data, sent as 7-bit data.

## System Configuration Block

Product ID	1 byte	ID code 0 = undefined 1 = EventStation others TBD
Major Version	1 byte	0-99
Minor Version	1 byte	0-99
Release Number	1 byte	0-99
Release Date	3 bytes	year-2000, month, day
Kit/Song length	2 bytes	as a 14-bit number
# of Kits/Songs	2 bytes	
# of Sensors	? bytes	# of strings # of pads others TBD
# of MIDI ports		



## Song data layout

Ztar and "song" (kit) data is sent in a packet of type \$21, thus:

```
$F0 $00 $07 $07 $21 $00 $nn $11 $11 ...data... cksum $F7
```

number is the song number, 1-32 (microZone)

data is the song data, sent in 7-bit format.

## Zone data layout

Each zone is sent in a separate packet, using type \$2D:

```
$F0 $00 $07 $07 $2D number length ...data...
cksum $F7
```

number High 7 bits is the kit number, 1-32.

Low 7 bits is the "zone" number in the kit, 1-32.

data is the zone data, sent in 7 bit format.

### Zone data 15 bytes

Low Fret boundary 1 byte 0n0ffffff ffff=low fret boundary, n=zone disable if set

High Fret boundary 1 byte 000ffffff

Low String boundary 1 byte 00000sss

High String boundary 1 byte 00000sss

Channel & Flags 1 byte 0pvtmmmm

p=patch change & velocity send, 1=enabled, 0=disabled

v=velocity select:: 1=use pressure of keys/triggers for note velocity, 0=use default velocity for channel (below)

t=unison or default tuning: 1=unison, transposition is pitch, 0=default, pitch=string tuning + fret#  
string-fret-note (from tuning map) + transposition (below)

mmmm=MIDI channel for note output & patch/vol change

Transposition/Note 1 byte

hex 00, 0C, 18, 24, 30 are octaves

Default Velocity 1 byte (if v bit = 0)

If v bit = 1 (above), this is velocity inversion flag: 01=on, 00=off

MIDI Patch Information 4 bytes sent only if patch is enabled (p bit =1, above)

Program Change # 1 byte

Main Volume (CC#7) 1 byte

Bank Select CC#0 1 byte

Bank Select CC#32 1 byte

Mode Flags 1 byte 0agthpcs

a=polykey aftertouch flag, 1=enabled

g=poly mode flag, 1=poly 0=guitar

t=piano mode flag, 1=piano 0=trigger

h=hammeron flag

p=openstring pulloff flag

c=trigger capture flag

s=auto sustain mode flag, 1=enabled

Velocity Curve 1 byte 0---vvvv

vvvv=reserved for velocity curve select \*TBD\*

- bits unknown; reserved for future use

MIDI Port Select/ Misc. Zone Parameters      1 byte   0t**b**apsss  
 t=Pick enable; keys in this zone cause trigger  
 b=MIDI B port enable    Note: these bit positions are req'd  
 a=MIDI A port enable  
 p=afterpressure mode  
 sss=restrict Zonet to trigger 1..6, All Zones respond to all Triggers if 0

Key tuning Map for this Zone (Chord-Key-enabled OS only)      1 byte    0--ttttt  
 tttt=tuning map to use for this zone (0..31) (chord-key)  
 - bits unknown; reserved for future use

### Key-note map (tuning map) data layout

A single Tuning Map is stored with each Kit (Song) for non-Chord-Key enabled instruments. Instruments equipped with Chord-Key software have a global bank of Tuning maps that is dumped separately.

The tuning map (also called the key-note map) is sent in a packet of type 2E:

```
$F0 $00 $01 $42 $2E number length ...data... cksum $F7
```

number      is the kit number, 1-32

data      is the key-note map, sent in 7-bit format.

#### Key-note map (ZPC)      150 bytes

Byte 0      MIDI note number for String 1, fret 0 (open string)  
 Byte 1      MIDI note number for String 1, fret 1 (lowest note)  
 ...  
 Byte 24     MIDI note number for String 1, fret 24 (highest note)  
 Byte 25     MIDI note number for String 2, fret 0  
 ...  
 Byte 49     MIDI note number for String 2, fret 24  
 ...  
 ...  
 Byte 124    MIDI note number for String 6, fret 0  
 Byte 149    MIDI note number for String 6, fret 24

## Appendix A: Assigned Packet Types

### 8-bit data

\$01      ZPC kit data  
 \$02      ZPC velocity curve  
 \$03      ZPC pad-global data  
 \$04      ZPC global system data  
 \$05      ZPC variable-length sequence

### 7-bit data

\$20      System Configuration block (all systems)  
 \$21      Ztar song data  
 \$22      keymap data  
  
 \$2D      ZPC zone data  
 \$2E      ZPC keymap data  
 \$2F      ZPC MIDI input data

# **GLOSSARY**

**Bulk-Dump/ Sysex:** a Song or group of Songs may be transferred between the Ztar and an external computer or Sequencer by sending, or 'dumping' its data as a Sysex block.

**CC:** Continuous Control In MIDI language, a "CC" is a Continuous Control command sent to a synth, or other receiver, to do "continuous" functions such as PitchBend, Volume, ModWheel, and all 128 types provided in the MIDI spec.

**Chain:** a list of Songs (Kits). Individual Songs are selected by incrementing through the Chain, often done with a foot switch.

**Continuous Controller:** ContinuousController, or "CC", refers to two inter-connected things. **1)** the MIDI CC command we previously described that is changing things in the synth as you play, and **2)** the physical device you touch when you play, the pedal, knob, slider, wheel, stick, pad, bar, breath, slider, and all of the other pressure and position-sensing Sensors.

**Curves:** Adding or reducing the MIDI Velocity at every level of your force-range changes the way the Ztar responds to your touch. You enter the desired MIDI value for each of 8 force levels as if they were points on a graph, then a curve is then drafted to connect the dots.

**Event:**

A single MIDI-operation such as a Note-On, Program Change, or Continuous Control message. A detailed description of the Event parameters is given in the section "Events".

**Event-type:** the listed name for a MIDI function assigned to a Sensor.

**Field:** a location on a menu-screen where a value is adjusted. Usually a flashing cursor will show when the field is selected.

**Gate, Gate-time:** a preset Note duration.

**Keys:** refers to the fretted keys on the fingerboard.

**MIDI:** Musical Instrument Digital Interface. The software protocol and electrical cable that allows communication between musical devices.

**MIDI clock:** A standard MIDI message that is sent to time sequencers.

**MIDI message:** a MIDI command, A two- or three-byte burst of serial data that the controller (Ztar) sends to the receiving equipment (the synth).

**Note-On / Note-Off:** MIDI commands to begin and end the sounding of a note.

**Octave:** referring to Pitch, a span of 12 chromatic notes (such as from C1 to C2) or a doubling frequency.

**Pad:** Ordinarily a “Pad” refers to a pressure-pad or drum-pad, but the term “Pad” is also used to refer to any input Sensor in the general sense.

**Play-Mode:** sets the relationship of a Sensor to the Fingerboard

**Play-Function:** sets a group-type of functions assigned to a Sensor, such as Note, Chord, SequencePlay, SequenceRecord, SequenceRecord, ContinuousControl, etc.

**Scratch Song:** when you select a Song it is loaded into a RAM buffer where you can edit it without affecting your saved settings. Your live performance is played from the Scratch Song.

**Sequence:** a recorded series of notes or other MIDI events.

**Song:** refers to a full configuration of the instrument including all of the response settings, assignments to the fingerboard and assignments to the sensors, external patch settings, sequence assignments, and metronome settings A “Song” is the Ztar term for an onboard Patch.

**Step-Entry:** Entering a single sequencer event, one step at a time.

**Value:** a number or name that fills a field. Usually user-adjustable.

**Velocity:** MIDI value that corresponds to the force with which a note is played, and that translates to the volume of the note.

### **Assignment structures:**

#### **Sensor Play-Mode:**

SENSORS menu, links a Sensor to the fingerboard or its own events.

#### **Play Function:**

EVENTS menu, sets the type of playback for the events the Sensor will play.

#### **Event-type:**

EVENTS menu, selects the actual events themselves

#### **Hit-Mode:**

TIMING menu, sets the way Note-Offs are determined

#### **Trigger-Function:**

selects the menu where the Play-Mode may be changed and the Dual Mode setup.

#### **Trigger-Mode:**

SCAN-MODE menu, toggles the fingerboard between Tapping and Strumming.

#### **Scan-Mode:**

Same as the Trigger-Mode, also the menu where the Fingerboard is set up.

#### **Sensor: Events-mode includes:**

- 1) a SensorPlay-Function
- 2) Events1-8: Event-type

#### **Notes and other events**

When notes are discussed in relation to programming a Sensor it's usually for simplicity's sake, and you should be aware that the same features will apply to any

event-type, ContinuousControl changes, whatever.

## **INDEX**

Aftertouch, Afterpressure: 13,20,21, 26, 27, 30, 34, 40, 87, 88, 93

Alternating Modes: 41

AutoSustain: 12,21,30, 72, 93

Battery replacement: 68

Bank-Select: 29, 69-70, 93

BPM: 20, 37, 57, 58, 88

Breath Controller: 13, 19, 32, 73

Bulk Dump: 22, 51, 54, 86, **95**

Chains: 41, 62-64

Chords: 5, 33 (Events), 39 (All-Notes), 40, 76-79

    Chord-Generator Macro Screen, 40

Clocks: 6, 13, 20, 33, 37, 57

Continuous Controller: 12, 14, 45, 59, **95**

Copy: 17, 49-50

Curves: SEE Velocity-Curves, Response-Curves

Delete: 20, 49-50, 61

DUAL mode: 13, 32, 34

Edit-mode: 5, 11-13, 15, 22, 29, 32, 33, **35-44**, 61-64, 87, 88, 97

Events:

    Events-menu: 35

    Glossary: 95

Fingerboard: 5-7,11, 21-34 (See ZONES), 42, 53, 59, 68, 72-84, 97

Gate: 6, 12, 33, 37, 57, 62, 64, 88, 91

GateShift: 33

Guitar-Mode: 5-6, **29**, 68, 70 (See Scan-Mode)

Hammer-on/Pull-off: 30, 72, 75

Hit-Mode: 12, **33**, 96

Initialization: 31, 49, 51

Joystick: 15, 19, 68, 75

Keymaps, Key-Note Maps, Tuning Maps: 12, 52-**53**

Keys: definition: 86

Layers: 25, 29, 68, 83

Live-mode: **15**, 22-23

Loop: 33

Macros: 6, 39

Metronome: 12, 37, 58, 88-89 (See CLOCKS)

MIDI: definition, **95**

    Channel/ Note setup for the Fingerboard: 28 (See FRETBOARD\ MIDI|

    Channel/ Note setup for the Sensors: 35 (See SENSORS\ EVENTS)

Output Port 1 and 2 (Left and Right): 28, 45  
MIDI Input: 51

MIDI Clocks: 33, 37, 41, 61  
Mute: 6, 12, 19, 26, **30**, 38, 42, 69, 72

NeckStrip, NeckSensor: 19, 84  
Note-On/ Note-off: 13, 18, 45, 52, 76, 88, 91, **95**  
NoteShift: 40

Octave: 6, 17, 26, 40, 68, 79, 80, 93  
Open-Strings: 6, 21, 53, 70, 73, 75, 94

Pads, TriggerPads; 5, 11, 14, 17-19, 29, 38-43, 48, 49, 56, 62-63, 69, 76, 81-84, 87  
(See SENSORS and RESPONSE)

Panic: 18, 84, 91

Patch: 5, 6, 11-**17**, 18, 20-21, 25, (See FRETBOARD\ MIDI),  
62, 66, 88, 89, 93 (See Sensor PlayFunctions)

Pedals: 5, 14, 19, 59, **73**, 76, 81

Poly-mode: 17, **30**, 42, 72, 79, 93

Power: 5, 22, **69**, 81

Program Changes: 11, 13, 20

Saving presets with Program Changes: 25, 28 (fingerboard ZONE menu)

Sending PgmChg from a Sensor: 35-36 (SENSORS/ EVENTS menu)

ProgramChange storage in the SYSEX block: 89

Response: 7, 12, 21, 23, 26, 27, 35, 40, 46, **59**, 60

Response curves: See CURVES

Save: (See LIBRARIAN), 6, 11, 17, 22, 49, **50**, 55, 67

Scan-Mode: 5, 6, 17, 25, 29, **30**, 32, 93

Sensor: 5, 6, 10-**11**, 12, 14, 16, 18, 19, 21, 29, **32**

Solo: 16, 17, 18, 26, 29, **30**, 68, **73**

Songs: 5, **11**, 13, **16**, 21, 22, 26, 31, 51, 55, 59, 62, 86, 92

Splits: 16

String Triggers: 6, 19

Setups, Maintenance, Troubleshooting : 71-73, 81, 82

Strum mode: **6**-7, 32, 34

Sustain Mode: 30 (See AutoSustain, Fingerboard Sustain)

Swap: 20, 49, 50

Sysex: 55, 56, 86, **95**

Tapping: 5, 7, 12, 16, 17, 19, 29, 68, 75, **77**-79, 96

Terminology: 11, 15

Transpose: 26, 75

Triggers: **5**, 6, 7, 11-17, **19**-20, 23, 25, 29-30, 32, 42, 53, 68, 70-76, 81, 82, 84, 91, 93, 94

Trigger-Function: 17, 21, 32, 34

Trigger Hotkey: 17

Triggers, fromMIDI In: 51,-52

Trigger Gate: 6, 32

Troubleshooting: 60, 81

Tunings, Tuning Maps, Key Maps: 5, 23, 25, 48, **53**, 71, 78, 80, 93, 94

Unison: 20, 25, 26

Utilities: **5**, 7, 20, **48**-61

Velocity: 12-14, 19-21, 27, 33, 35, **96**

Velocity Response curves: See CURVES

fixed response: 26 (See Key/ Transposition Menu)

Volume: 5, 13, 19, 20, 25, 28, 32, 36, 59, 66, 68, 76, 81, 83, 85, 88, 89, 93, 95

Write: 6, 17, 23, 26, 31, 50, 67

Hotkey: 17

Menu: 31

Zones: 5, 6, 11-12, 14, 16-18, 20, 23, 25-30 (ZONE Menu)

Appendix A.

Current buglist:

PANIC! Locks up some units , Echoplex DP