ZPC2 OS USER'S MANUAL

Supports all models of Ztar MIDI

Guitar Controllers

12/2/2008

STARR LABS

San Diego, California

MINI-Z Jack Panel

ON
OFF

VOL

SUS

MIDI OUT **MIDI IN**

MIDI Cable (all 5 wires connected)

PB-1 Phantom Power Adapter

CONTROLLER   DC   SYNTH
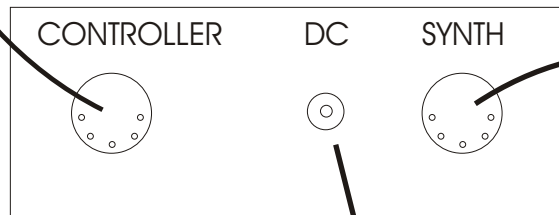
MIDI Cable to Synth

AC/DC Adapter

MiniZ and Z-LuteConnections

BASIC CONNECTIONS

MIDI IN

MIDI Synthesizer

MIDI OUT

PB-1 Phantom Power Adapter
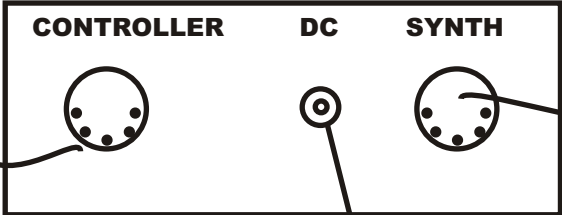
CONTROLLER   DC   SYNTH

AC/DC Adapter
9VDC 500mA

Z7S Rear Panel

POWER

OUT /
POWER   IN   USB   USB<>MIDI

STRING TRIGGER GAIN ADJUST

6   5   4   3   2   1

VOLUME

SUSTAIN

PB-! Phantom Power Adapter

CONTROLLER   DC   SYNTH

9VDC Wall
Adapter

To Synth
MIDI IN
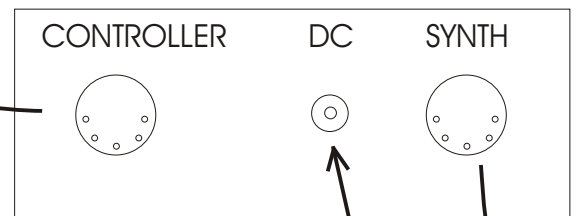
Power Connections:

The Z7S can be powered by either
A) "phantom" power through the MIDI Output cable or
B) USB from a host computer.

To connect to a MIDI system, attach a MIDI cable [make sure the cable has all five
wires connected from end-to-end] from the MIDI Out port on the Z7S to the "Controller"
port on the PB-1 Phantom Power Adapter. Press the power switch in the MIDI direction to
power up.

To connect to a USB system, attach a standard USB A/B cable from the USB port on the Z7S
the USB port on your host computer. Flip the power switch in the USB direction to
power up.

String Trigger Gain Adjustments:

You may adjust the gain for each of the String Triggers to achieve a response that is best
suited to your playing style. A single-turn trimpot is provided inside the Z7S for each
String Trigger which may be accessed through the adjustment slot in the rear panel. A clockwise
adjustment provides more gain.

· **Battery Pack connections, charging**

If you have a MIDI connector on your battery Pack:

Connect the Battery pack to the "Controller Jack on the PB1 Power Adapter. Plug the charger in to the DC power input on the PB1. The functions of the LED indicators are described on the back of the charger.

If you have a DC plug on the end of your Battery pack, simply plug the battery into the charger and turn it on.

BASIC CONNECTIONS

MIDI OUT

Phantom Battery Pack

Note:
Power the AirPower Receiver from
a) AC/9VDC wall adapter
b) [2]AA batteries
c) USB port

USB

Personal Computer

USB A/MiniB Cable

MIDI Wireless Receiver

MIDI IN
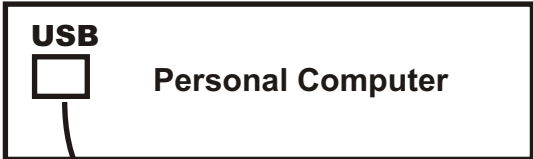
MIDI Synthesizer

MIDI Cable

GETTING STARTED *!!!*

If you're absolutely new to MIDI and want to know more, you can find the MIDI specifications at **www.midi.org/about-midi/tutorial/tutor.shtml**

NOTE: *If your instrument has String Triggers, you will notice that there is a metal strip on the back of the neck. This is not a protective tape and do not remove it!*

Basic layout of the instrument:

1] The Ztar is divided into two main sections, the **Fretboard** and the **Sensors**. The Sensors include the String Triggers and all the Pads, Pots, Pedals and other performance devices on the instrument, everything other than the fingerboard

2] There is a row of Function **"HotKeys"** on the top of the Z7S and MiniZ, and at the side of the Z6 model Ztar. These HotKeys control functions that you are most likely to change quickly while you are playing music.

3] There is also a **Programming/Display** module onboard that you will use to setup up the various functions of the Ztar in detail.

Press EDIT and you will see selections for programming the features of the Ztar.

The Fretboard is programmed in the *Fretboard* (or *Zones)* screen.

The Sensors are assigned functions and MIDI Events in the *Sensors* and *Sensors/Events* screens

The physical touch response for the Sensors and the Fretboard is set up in the *Response* menu screens and the *Curves* screen.

The Ztar can be powered from either a **DC power supply or a USB 2.0 port** on your computer.

If the instrument is equipped with USB, a 3-position power switch is provided :
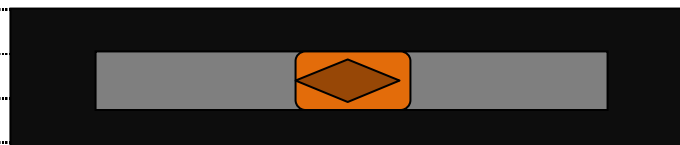
DC <> OFF <> USB

To Power from the AC/DC adapter:

Use a **5-conductor** MIDI cable (all 5 pins must be wired) from the Ztar MIDI Output to the Controller connection on the PB-1 power supply adapter.

Connect the supplied DC wall-supply to the PB-1.

Connect a MIDI cable from the SYNTH jack of the PB-1 to the MIDI IN on your synth or other MIDI system.

Move the 3-position rocker switch to the DC position 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.

DC power is supplied to the instrument from a wall-mount AC/DC power supply that connects to your PB1 *phantom* power adapter. A standard 5-wire MIDI cable is connected from the PB1"Controller" port to your Ztar MIDI Out Port and will power the Ztar as well as route MIDI data to your synth.

If you have a Starr Labs Phantom Battery Supply for use with your onboard MIDI wireless transmitter, connect it to the Ztar input port instead of the MIDI cable.

Connecting to USB Power:

Connect a USB cable from the USB port on the Ztar to the USB 2.0 compliant 500mA USB port on your computer.

Move the 3-position rocker switch to the USB position.

Because of the power requirements of the Sound Card there is a need for a larger power supply to power the system 9VDC @ 1000 mA.

A USB 2.0 port on your computer will power the Ztar but not both the Ztar and a Sound Card.

USB Driver Installation:

The Starr Utilities disc provides both WinXP and Mac USB drivers.

The XP driver is installed by "StarrLabs_Driver_Setup.exe". The installation guide is also on the disc, "Starr USB Installation Guide.pdf".

The Mac driver is "zTar Mac Driver 2.1.pkg"

If the Display lights up and displays the first bank of Song presets, you're up and running.

If the **TRIG** and **G/POLY** LEDs are now lit you're set up like a guitar so start picking! Hold a key and press the **TRIG** button to play the fingerboard tapping-style. Press the **G/Poly** button to play more than one note per string.

BASIC TOOLS

Use the Live Menu, the power-up run-time to select onboard patches or **SONGS**.

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 Zone 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.

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. Hold a fingerboard key and press the TRIG key.

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.

BASIC TERMS

SENSORS
The "Pads" are our general term for the input hardware, the Triggers. Occasionally we refer to a Sensor as a "Pad" 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 similar to the Layers that are often found in MIDI keyboards.

EVENTS
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 assembled with all of their various assignments 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.

HOTKEYS
These are 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.

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.

You can skip this section if you want to jump right into programming the instrument. In general, it's a good idea to look over this manual, just to see what's in your new instrument.

The Ztar hardware is best understood as two separate systems, one that governs the use of the fingerboard; 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. 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 are six Triggers for strumming and picking which 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. A bank of Expression Pads, usually 6 or 12, is available 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.

User Interface

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 to select items depending on the context of the particular menu screen. The menu-system is a tree-like structure. The Ztar has to manage quite a bit of programmable information but every effort has been made to keep the nesting of menus to a minimum and the navigation of the system as simple and intuitive 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 SONG-MENU, or LIVE-mode

The Ztar Operating System has a **LIVE** mode and an **EDIT** mode. Pressing the EDIT key from the SONG-MENU enters the EDIT-Mode 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; however, make sure to exit back to the LIVE mode after completing an edit as you may accidentally re-program 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 a necessity to update the Edit screens and look for programming input.

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 or KITS. You will see both references used. 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. You can use the Zoning system to create some magical performance setups!

Up to 32 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.

Several function keys have been placed on the surface of the Ztar to allow quick changes to the setup of the instrument:.

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.

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 copy your current setup "on the fly" to a 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!: The first time you hit Panic! It sends All NotesOff and Reset All Controllers to each active channel.

The second time you hit Panic! It sends the same messages to all channels.

The third time and every time thereafter that you hit the Panic! we use the brute force approach that sends a Note-off to every note and a Data-zero (or 127) to reset every Continuous Controller for every MIDI channel . This takes about 2 seconds but should definitely clear any stuck messages for any synth,

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.

MUTE-BAR

This is the metallic bar in the tailpiece or plate mounted elsewhere on the instrument that is used to facilitate muting 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 whe 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 vallues 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 SPSPT 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.

- Every function in the Ztar is listed here according to the Menu Screen in which it appears.

[MENU SCREENS are listed in all CAPS. Functions are listed in lower case]

LIVE-SCREEN [Top-level Runtime screen]

"EDIT" button [Enters the top of the menu system, and Exits from all other menus]

SONG-MENU:[Top-level Edit-Screen]
    NAME-EDIT
    WRITE
    UTILITIES
        LIBRARIAN
            Songname
            Save
            Copy
            Delete
            Swap
            Copy-Pad
            INITIALIZE
                Songs
                Response
                Sequences
                Curves
                Triggers
                Chains
                Coldstart
            TUNING
                Map#
                Presets
                EDIT-KEYMAP
                CHORD-GENERATE
                CHORD-EDIT
        BULK-DUMPS
            Send
            Receive
        CLOCKS
            Metronome Enable
            Metronome Channel
            Note#
            TempoPad Enable
            Clock: Internal/ External
            MIDI Clock Output
            BPM Setting
            Time Signature
            MORE>
                Time Signature Editor
            MORE>
                ClockBend

        CURVES
            (8) Force-Velocity Points

SEQUENCES
> **Insert-Event**
> **Delete-Event**

Programming-Lock

MORE>
> **MIDI-IN**
> > **TRIGGERS**
>
> **AREPEGGIATOR**

FRETBOARD:

Zone-Mode;

Boundaries

TUNING/ TRANSPOSITION:
> **Map#**
> **Curve**
> **Velocity**
> **Invert**
> **TUNING**
> **MORE>**
> > **Solo**
> > **Unison**
> > **Transposition**

MIDI
> **Patch/Velocity Send ON/OFF**
> **Channel#: RIGHT/LEFT**
> **SEND Pgm Chg and Volume**
> **Patch#**
> **Channel BankMSB#/ BankLSB#**
> **Channel Volume**

SCAN-MODE
> **AutoSustain: On/Off or Fingerboard-Sustain for Key-Trigger units**
> **Trigger-Capture: On/Off**
> **Zone-Solo (Audition): On/Off**
> **Scan-Mode: Guitar/Polyphonic**
> > **HAMMER-MENU**
> > > **Hammer-On/ Pull-Off Enable**
> > > **Hammer Threshold Level**
> > > **Open String PullOff Enable**
> > > **Hammer-Pick-Delay**
> >
> > **SPECIAL**
> > > **Zone Mode**
> > > **First Pad (for Pad-Zone type)**
> > > **Fingerboard Mask**
> > > **Fingerboard Threshold**

SENSORS

Sensor Mode

Fingerboard String to Strum

6-TRIGGER, Guitar setup Macro

TIMING MENU

EVENTS
> **Event-type**
> **Velocity-Window**
> **MACROS**
> > **CHORD-GENERATOR**
> > **Velocity-Window settings**
>
> **(8) Event-Settings**

OUTPUT SETTINGS
    Curve
    MIDI Port select
    LINKS Enable and 4 Link selections
TRIGGER-FUNCTIONS
    Mode select
    DUAL Mode
        Aftertouch Threshold
        Aftertouch CURVE

RESPONSE
    Gain
    Response Bargraph
    Chase On/Off
    Scan-Time
    Mask-Time
    Threshold
    Chase On/Off
    Trigger-Mask
    MORE>
        Fingerboard :
           Mask
           Threshhold
           Gain
           Curve
           Peak readout 0-255

SHOWALL
    SONGS
    PADS
    EVENTS
    GATES
    LINKS
    CHAINS
    PATCHES

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, Volume and Reset.

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.

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.

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

LIVE-MODE MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZTAR	CHORDS	DRUMS	ORCHESTRA
	LEFTY	JAZZ_COMBO	ROCK_COMBO	STICK TUNING
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8
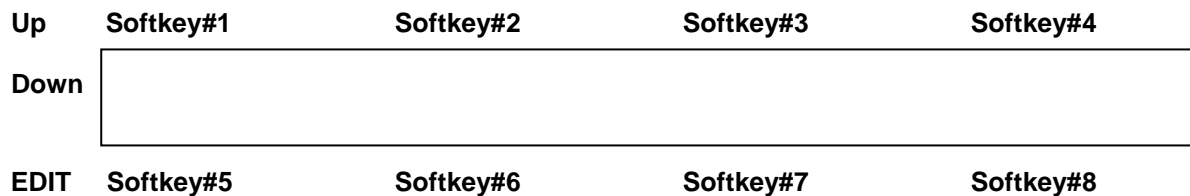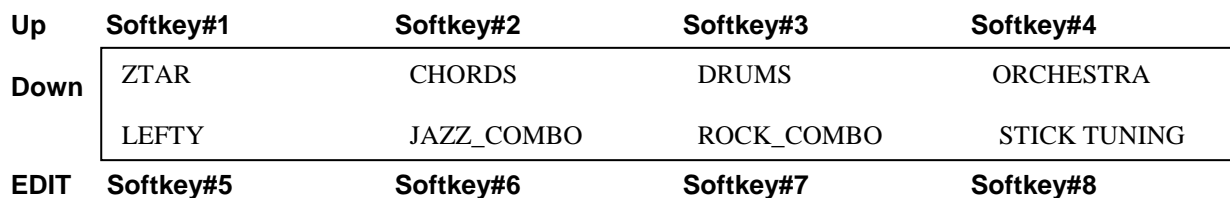
➡️ *Use the Up and Down Keys to scroll banks of Song-Presets. Use the softkeys to select a preset.*

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 newest zTar systems (4.1.08+) currently provide 36 Song locations to store your setups.

The first few songs are provided from the factory as templates for your use and these are saved in flash ROM. All of the Songs that appear in the menu screens are automatically copied into battery-backed RAM so they can be edited and 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 the return to the LIVE mode.
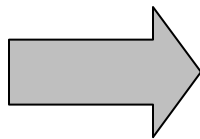
> A **Song (or "Kit")** consists of:
> 1) One or more Fretboard Zones with all of their programmed settings.
> 2) Assignments for the Sensors.
> 3) Physical response settings for the Sensors.
> 4) A Tuning for the fingerboard keys and Open-Strings, and settings for Triggering modes.
> 5) A setup for the metronome.

SONG MENU, the Top-Level EDIT screen

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

The top-level edit screen displays sub-menus for the various programmable features for each Song.

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 Sub-Menus: *these are the main blocks of things to program.*

Press Sotkey#1 to select the Song-number and use the Up/Dn arrow keys to change number

NAME-EDIT: Press SoftKey#2 above 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.

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

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

SENSORS: enters the Sensor menu to set up the Pads/Triggers/Joystick MIDI Performance configuration.

RESPONSE: enters the Response Editor to set up the physical response for all of the Sensors and the Fingerboard.

SHOWALL: Press Softkey#8 to enter the SHOWALL screens for viewing groups of settings at a glance.

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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG:01	GUITAR		
		<--------------CURSOR----------->		
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8
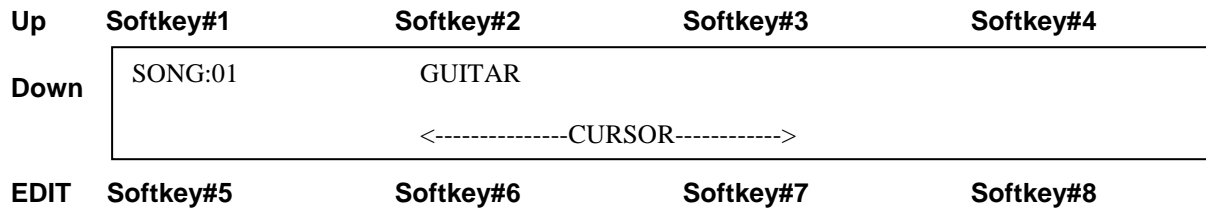
WRITE MENU [available at the Top-level Edit menu]

Press the word "WRITE" at the top of the very first EDIT menu screen. 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.

 Use **Softkey# 8** to select a destination Song location to receive the contents of the SCRATCH buffer, and press the **EXECUTE** soft-key #4 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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	< WRITE SCRATCH KIT>			EXECUTE
	Scratch #01	GUITAR	————————-- >>>	#01 GUITAR
EDIT	**Softkey#5**	**Softkey#6**	**Softkey#7**	**Softkey#8**

FRETBOARD (ZONES) MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1:	KEYS :Fret	LOW: i: 0	HIGH: vi: 24
	TUNING/ TRANS	MIDI	SCAN-MODE	AFTERPRESS
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Every Song-Preset must have at least one active zone.

Keys: (Off/Tap/Fret/Chord/Pad) A Fretboard Zone may be set up in several ways.

Off: The Zone is disabled entirely.

*Tap***:** Notes are played by simply tapping the keys on the fingerboard.

Fret: Notes are played by fretting them in the fingerboard and strumming or picking the Right-Hand Triggers. This is the way a real guitar works.

Chord: Each key in the Zone can play an entire chord. When "*Chord*" is set, six "Keymaps" are active to cover the entire fingerboard.

Refer to the section on the Multi-Harp mode for more details about setting up chords.

Pad: A fingerboard Zone may be created such that the keys in the Zone will perform the settings for the PADS in listed in the SENSORS menu. This allows some extra features, such as sequence playback, to be performed directly from the fingerboard.

Low/High Zone boundaries: The area of a Fretboard Zone is defined by diagonal corner points like a window on a computer screen.

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. Example: "i:0" denotes String#1, Fret#0 (open-string). "iv:6" would denote String#4, Fret #6.

Fretboard cont.-

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.

Scan-mode: This selects the Scan-Mode menu where you can setup how notes are played from the fingerboard.

Afterpress: Selects the Fretboard Afterpressure menu.

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.

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.

As a convenience, after entering a LOW zone boundary, the cursor will advance to the HIGH boundary automatically.

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#).

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1	MAP: 1	TUNINGS	
	Curve:1	VELOC: TOUCH	INVERT: Off	MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

ZONE#: Softkey#1 selects the Zone you wish to edit

MAP #: Each Zone may be assigned a "Keymap" that contains a Note-number for every key on the Fretboard. Ordinarily, the Map would simply reflect a Guitar-tuning, however it could be edited in many ways for any other tuning, (including tunings adjacent frets for other than ½ step relationships.) Also multiple maps may be layered to play Chords from individual keys. Refer to the Multi-Harp instructions for more information on this.

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.

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.

Invert [On/Off]: 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.

MORE> : Selects the Tuning/ Transposition Menu #2

FRETBOARD>TUNING/TRANS menu #2

	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Up				
Down	ZONE# 1	Solo:Off	Unison:Off	Transp: 0
				MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Solo[On/Off]: 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.

Unison[On/Off]: When **ON**, sets all of the keys in the selected zone to the same MIDI note-number or 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-zone responds normally, using the assigned Tuning. When Unison=On, "UniNote#:__" appears at the upper-right to allow setting the fixed pitch for this UnisonZone.

Transpose: Use this parameter to alter the base pitch of this zone by half-steps. With this field selected, use the Data buttons or the joystick to change the value and hear the results of your transposition. "TRANSP" appears when UNISON is **OFF**.

MORE> : Selects the Tuning/ Transposition Menu #1

FRETBOARD>TUNING/TRANS> TUNINGS menu

	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Up				
Down	MAP: 1	TUNING>	PRESETS	EDIT
		CHORDS	GENERATE	EDIT
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

This menu allows several ways for programming the fingerboard notes.

Map[1-8]: The fingerboard uses *keymaps* to store tunings. We provide eight available maps for each Song-preset, although in most cases you will only need one map to hold just a single tuning. Set the Map# here that you wish to edit, or the base-map # if you are creating chords.

Tuning>Presets: Selects the Tuning-Preset screen

Tuning>Edit: Selects the Keymap-Edit screen.

FRETBOARD>TUNING/TRANS> TUNINGS>PRESETS

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down				
	MAP: 1	EDIT Preset:	Preset Off	RT/LEFT
EDIT	E2 /	A2 / D3 /	G3 / B3 /	E4

Map#[1-8] Select the Map#

EDIT Preset: Softkey#2 opens the Keymap-Edit screen which allows programming of individual keys.

Preset [Off/Guitar/LowD/ DADGAD:/ Fourths/ 6-string(bass) / Fifths/ Open E Major/ Open A9/ Octaves]: Press Softkey#3 to scroll through the list of pre-programmed tunings.

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

The Bottom Line shows the Open-String Notes.

To change an open-string tuning:

Press the soft-key nearest the String number you want to change. Soft-keys #6 and #7 each control two string numbers. Alternate between the two strings by pressing the key twice. Alternatively, you can tap the fingerboard string in the TRIGGERS-OFF modes and the menu-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.

A keymap is a table that assigns a MIDI note number to each key on the fretboard

Each Ztar Song preset has 8 keymaps available to it, though for most situations, like playing a guitar tuning, you will only need one keymap.

KEYMAPS

The Chords-Mode in the Ztar uses 6 keymaps on the fretboard. Each key holds a chord with up to 6 notes, and when you strum the String Triggers, each Trigger plays the note from just one of the maps. When you generate a chord, all 6 maps are programmed for the keys you selected.

A Keymap is assigned to a Zone. It is possible to have each map hold a different guitar tuning, and you can then switch tunings by enabling/disabling Zones.

Keymaps are great for programming Drums!

EDIT-KEYMAP Screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	MAP:1	i: 41 / F2	ii: 46 / A2	iii: 51 / D3
	FRET 1	iv: 56 / G#3	v: 60 / C4	vi: 65 / F4
EDIT	**Softkey#5**	**Softkey#6**	**Softkey#7**	**Softkey#8**

You can edit the note-assignments for one keymap at a time.

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. The string numbers are in Roman numerals

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.

Touch a key and you will see the cursor highlight that note on the screen. You can then change the note-number (0-127).

When you have the map created as you like it, press "WRITE" to save the KeyMap back to its current Song-location.

Using the fingerboard as a DJ/VJ tool for triggering a lots o' samples!

fI you want to program 144 unique notes on the fingerboard, you will create a second Zone and set it to a second MIDI channel to reach the notes beyond #128. You can still use just one keymap if you like.

If you want to program the maximum number of notes per Song-preset, you can program all eight Maps with 128 unique Note-numbers. Each keymap is then assigned to a different Zone with a different MIDI channel. Select the different Zones to pull up the different keymaps. One way to select the individual Zones is to assign a group of eight separate keys, each key to eight new Zones, say 9-16, with MIDI channels matching the first eight Zones. While holding one of the new single-key Zones, press the SOLO hotkey and desired Zone and Map will expand to fill the fingerboard. Press SOLO again to revert the fingerboard.

FRETBOARD> 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: Off
	ChPrs	Threshold: 0	Sensitivity: 0	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. By setting the Threshold value to a point above your normal firm key-strike-force you can then press in harder to initiate the aftertouch. If the Threshold is too low, the pressure will be applied when you first hit the key.

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

Curve: the fingerboard afterpressure may have a response curve independent of velocity. By setting up a curve that begins the lowest MIDI-pressure value at the Threshold-force, you can scale the Afterpressure above the MIDI velocity of the Key-strike.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Dn	ZONE#: 1	P&V SEND: N	Channel 1:L	SEND
	Patch: 1	CC#0: 0	CC#32: 0	
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" .

Yamaha DB50 note: When setting a Program Change number, the setting in the Ztar will be one less than the number called out in the Yamaha manual.

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:
set the Sensor Mode = EVENTS
Set the Play-function= ALL
Set Event1 = ControlChange, CC0, 0.
Set Event2 = ControlChange, CC32, 3
Set Event3 = ProgramChange, 21

Refer to SENSOR-MENU for more information.

FRETBOARD SCAN-MODE menu

What is a TRIGGER-MODE?

Simple really. There are just two basic states for the fingerboard notes. They are played by strumming the Triggers like a Guitar or just by tapping the fingerboard itself, like a keyboard. When the Triggers are ON, the front panel LED is lit, and this is 'Picking' 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

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE# 1	SUSTAIN: Off	CAPTURE: Off	SOLO: Off
	SCAN: GUITAR	HAMMERS		SPECIAL
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Scan [Guitar/ Poly]: Toggle to switch Modes.

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.

Hammers: Selects the Hammer-on and PullOff menu screen.

(Auto)Sustain 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.

(Fingerboard)Sustain Mode (KeyTriggers only):
When _dis_-abled and Triggers are ON, fingerboard notes will only sound when the Key-Triggers are held down, much like the playing of a piano keyboard. When enabled, the notes may be sustained normally from the fingerboard.

Capture: When set, this allows you to "capture" a fretted chord with the right-hand Trig-gerPads. You may then release the frets without losing the notes. This function does not perform with StringTriggers installed.

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

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.

In Guitar Mode a hammered note will mute the note below it on that string.

In Poly Mode a hammered note will be added to the notes below it on that string.

You can adjust the force from your fretting hand to hammer, or tap, or mute notes.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZONE 1	HammerOn: Y es	Pull Off: Yes	Open Pull Off: No
	Hammer– Level: 0	Decay: 0		Hammer-Pick-Delay: 0
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Hammer On [Yes/No]: When "Yes" this enables Hammer-ons

Pull-off [Yes/No]: When "Yes" this enables Pull. 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. -cont-

-Hammer/ Plucked-string Decay cont-

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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4	De-cay-
Dn	ZONE# 1	Keys: Tap	1st Pad: TP1		
	FINGERBOARD MASK: 0		THRESHHOLD: 24		
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8	

Hammer-Pick-Delay [0-255]:

When picking fretted notes, most people fret slightly ahead of the pick which can cause double-notes with a fast MIDI fingerboard like the zTar.

The **Pick Delay** is used to set up whether you want to hear the hammered-note or the picked note. This is done by setting a delay-time to allow the pick to be sensed before sending the note. 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.

SENSORS

BASIC CONCEPTS:

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

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

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

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

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

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

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

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

SENSORS MENU

SENSORS screen #1

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

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

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

> **Off:** the Sensor will not output anything.
>
> **Events:** the Sensor will play its own programmed set of up to 8 events.
>
> **Strum-mode:** the Sensor will trigger notes from the fingerboard according to the fingerboard's Scan-Mode. The Ztar's Triggers are normally set to Strum-mode. ***When the TRIG front-panel hotkey is used to turn off the Triggers and put the fingerboard into Tapping Mode, the Triggers will revert to playing their assigned MIDI events.***
>
> **DUAL-mode:** the Sensor will both trigger fingerboard-notes and its own programmed set of events. The Dual-Mode will apply to and Sensor. This can have some interesting effects and allow the simulation of various acoustic instruments. Consider setting up the Breath with the Dual-mode to initiate a note and apply volume-changes, as does a real wind instrument. Or a Pad in Dual-Mode with pitchbend applied to act like a conga-head or tympani.

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

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

Sensors Screen #1 cont. -

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

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

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

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

SENSORS / TIMING menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	TRIG1	HitMode: Touch		TRIGGER-GATE: 100
	Loop: Off	Delay: 0		Gate-Shift: Off
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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

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

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

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

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

Sensors/ Timing cont-

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

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

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

TRIGGER-FUNCTION menu, DUAL-Mode Off

Up	**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 ContinuousControl sensing will only respond to the pick <u>attack</u> of String-Triggers, but will respond to varying pressure on the KeyTriggers.

> **Sensor#:** Use softkey#1 and the Up/Dn keys to select the Sensor for editing purposes.
>
> **STRUM:** Use softkey#3 and the Up/Dn keys to select a fingerboard string that will be triggered by this sensor.
>
> **DUAL:** softkey#4 toggles the DUAL Mode, and displays the Dual-Mode setups on the bottom line when enabled.

Trigger-Function cont-

TRIGGER-FUNCTION menu, DUAL-Mode On

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	TRIG 1	Strum : String 1		Dual: Off
Down				
	DUAL	Aftertouch Threshold:	0	Curve: 1
EDIT	**Softkey#5**	**Softkey#6**	**Softkey#7**	**Softkey#8**

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

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

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

EVENTS menu

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

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

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

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	TRIG1	PlayFunction: Basic	Velocity: 0/ 127	MACRO
Down				
	Evt:1 Note	Channel 10:	35/ B1 PAD	Gate: 100
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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

Sensor Play-Function List:

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

Vel: [0-127/ 0-127]
Each Event has a velocity-range or "window" within which it will respond. The upper and lower limits for this range may be set in this field. By careful setting of these limits a variety of musical effects may be achieved, such as velocity-switching, velocity-shifting, velocity-adding, etc.

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

To set a velocity-window:
Press softkey#3 to toggle between the Lower and Upper Velocity fields.
Use the Up/Dn keys to set the value.

See the section, "VELOCITY CURVES" for more details.

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

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

InputVel_H: The highest velocity that will trigger this event.

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

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

Event-Data/ Note-number/ Velocity-source:
Use softkey#7 to toggle between the Note-number and the Velocity-source fields.
The Note-number reads both as a decimal number and in standard musical notation.
Use the Up/Dn keys to set the values.

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

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

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

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

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

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

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

EVENT TYPES

Standard Event-Type List :

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

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

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

MACRO screen

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

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

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

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

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

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

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

SENSORS/MACROS cont-

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

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

SENSOR PLAY FUNCTIONS, descriptions

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

All [All-Notes]
When the Pad is struck, all of the events programmed into the Pad's 8-Event buffer will
play together as a group according to the response settings for the Pad and the individ-
ual 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 Alt-Mode selected.

AltUp: (Alternating Up)
Events are played starting with Event#1 stepping up to the highest numbered event.
AltDn: (Alternating Down)
Events are played starting with the highest numbered event stepping down to Event#1
AltUpDn: (Alternating Up/Down)
Events are played starting with Event#1 stepping up to the highest numbered event where the direction changes and events are stepped back to Event#1.
AltRnd (Alternating Random)
The order of events is selected randomly.

Slice: Slice mode is enabled to operate with variable-length sequences.
Each hit plays the next time slice of the sequence. The time slice is specified in MIDI clocks in the EVENTS screen. Note that a MIDI clock may be either 1/24 or 1/12 of a beat, depending on the metronome time signature. After the last slice is played, the next hit will restart from the beginning of the sequence.

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

When the Play Function is set to Continuous_Control the list of events in the Events screen changes to show the various CC events that may be programmed to any Sensor. Refer to the previous charts for the list of programmable CC events.

Note: Do not confuse the Continuous Control Play Function with the ControlChange event that's programmed within "All", "Sequential", or the other PlayFunctions. The "CntCtl" PlayFunction will track a pot or pedal for a continuously changing value. The ControlChange Event sends a single one-shot value based on the velocity of a hit.

Continuous Control Events:

Most of the CC events listed in the chart are self-explanatory. A few of them deserve special discussion:

- User-entered ControlChange number allows you to enter any CC number you wish.

- UserUp Control-number for the Up-direction of center-detented effects.

Sensors/ContinuousControl Events cont. -

- UserDown Control-number for center-detented effect
----- Vacant entry
- Clock+: a pot or pedal can increase the rate of the metronome's BPM timer.
- Clock- : a pot or pedal can decrease the rate of the metronome's BPM timer.
- Bend:
- Arpeggiator On/Off: Toggle the Arpeggiator on/off from a footswitch or Pad.

- Sensors/ Play Functions cont -

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

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

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.
Sequencers cont. -

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

*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.*

THE SEQUENCERS

*TIP: 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 as-
signed the Sequence to FIXED, the 8-note buffer. Also, the NOTES_ALL function will
play all of the notes in the buffer together as a chord.

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

    ****

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

SEQUENCER MODES and Operation:

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

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

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

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

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

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

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

> The top line of the display shows the sequence number to record to.
> The bottom line shows the sequence-numbers that are monitored for playback during recording.

Softkey #3 allows you to set the Sequence-number you wish to record. Pressing the Softkey#3 repeatedly will toggle the way the recording Starts:
> ***First-Note****: The sequence will begin when you play the first note.*
> ***PadHit:*** *The sequence will start recording as soon as you hit the Record-Pad*

Sensors/Sequencers cont. -

To set up a Record Pad:

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

SEQUENCERS cont-

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

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

Importing sequences:

*The zTar can import any sequence of MIDI notes or CC commands over its MIDI input
port and store them into any sequence number. The zTar can not import Standard MIDI
Files at this time.*
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 se-
quences so that it may be played back as a "MIDI_Seq" (pad-mode).

1) **Utilities/ MIDI-In:** turn on "Capture". All MIDI events will be captured from all chan-
nels.
2) Set up a Record-Pad by assigning the Sensor-Pad .Any Pad or String Trigger will do.
In the SENSORS/EVENTS menu, set *PlayMode = RecordSeq*. Assign a sequence
number on the top line of the display. You can monitor up to eight playback tracks
(sequences) by assigning the sequence numbers on the bottom line.
In the TIMING menu, set the Hit-Mode for the Sequence-Playback Pad to TIMED.
In the UTILITIES/CLOCKS menu you have the opportunity to set the MIDI Clock source
to INTernal or the MIDI Input Clock setting which is "L"
Make sure the Metronome is turned Off by setting the Output to "None".
Assign a Play-pad to the same number.

SENSORS/OUTPUT menu

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

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

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

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

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

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

Link: Link the activity of this sensor to trigger other sensors' events.
    NotesOn: triggers the linked-sensors from a Note-On message.
    NotesOff: triggers the linked-sensors from a Note-Off message.
    Off: no links enabled

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

SENSOR ASSIGNMENT CHART

Sensor-Name	Setup and Assignment Notes
Trigger1	
Trigger2	
Trigger3	
Trigger4	
Trigger5	
Trigger6	
TriggerPad1	
TriggerPad2	
TriggerPad3	
TriggerPad4	
TriggerPad5	
TriggerPad6	
Pad1	
Pad2	
Pad3	
Pad4	
Pad5	
Pad6	
Pad7	

Pad8	
Pad9	
Pad10	
Pad11	
Pad12	
JoystickUp	
JoystickDown	
JoystickLeft	
JoystickRight	
VolumePed	
SustainPed	
VolumeKnob	
Mod Wheel	
Breath	
Ribbon	
Neck Strip	
Pot1	
Pot2	
Pot3	
Pot4	
Pot5	
Pot6	

| | |
| | |

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	TRIG1	GAIN: 100%	THRESHOLD: 24	
Down				
	0% …………………………………………………… 100%			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 for each Sensor (Pad) globally and will apply to every SONG configuration. The response for the same Sensor may then 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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	TRIG1	SCAN: 0	MASK: 0	THRESHOLD: 8
Down				
	CHASE: On		Trigger Mask: 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.

Trigger Mask: Ignore this diagnostic routine.

RESPONSE menu, Screen #3

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	FINGERBOARD	MASK: 0	THRESHOLD: 0	GAIN: 100
Down				
	PEAK: nnn	CURVE: No		MORE>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

This screen provides fingerboard response adjustments.

Mask: Remove double-triggering by raising the number from 0.

Threshold: Set the minimum level at which the fingerboard will respond.

Gain [0-200%]: Add gain (100+) if the fingerboard should be more sensitive for your touch, or reduce the gain if it is too 'hot' (100-).

Peak[0-255]: This displays the force-value of the last raw keypress.

Curve [1-16]: Set the Fingerboard response curve here. *This curve applies to all zones.*

RESPONSE menu, Screen #3

UTILITIES MENU

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

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

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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONGNAME	SAVE	COPY	DELETE
		SWAP	COPY-PAD	INITIALIZE
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG: 01	GUITAR		
		<<< ——— CURSOR ——— >>>		
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

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.

LIBRARIAN\ SAVE

To SAVE a song:

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	WRITE SCRATCH KIT >			EXECUTE
	Scratch #01	GUITAR	——— >>	#03 GUITAR 3
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Press softkey#8 and use the arrow Up/Dn keys to set the destination Song-location. Press EXECUTE when you're ready. The Scratch Kit buffer will be written to the destination location.

The words *"Song Saved!* Will appear briefly.

LIBRARIAN\ COPY

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	<UTILITY/ LIBRARIAN/COPY>			EXECUTE
	##01 GUITAR		———->>	##003 GUITAR 3
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

Softkey5 to select the Source-Song,
Softkey #8 to select the Destination Song,
Up/Dn keys of joystick to set the values, and
EXECUTE to complete the operation.
The words *'Song Saved!'* will appear briefly.

DELETE and **SWAP** work in a similar fashion.

COPY-PAD

COPY-PAD works in a similar fashion that allows you to copy the settings for an individual Sensor to any other Sensor. Use the softkeys to select the Source and Destination Sensors fields, the Up/Dn arrows and joystick to set the numbers, and EXECUTE to complete the operation.

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	< COPY PAD PARAMETERS >			EXECUTE
	Song 01	Pad P1 ———- >>>>	Pad P2	
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

LIBRARIAN\ INITIALIZE menu

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	INITIALIZE>	SONGS	RESPONSE	SEQUENCES
	COLDSTART	CURVES	TRIGGERS	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.

TRIGGERS: Clears all assignments that map MIDI Input Notes to trigger 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	Channel: 1		
	TRIGGERS	Trigger: Note-On	Follow: Off	Capture: 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[Left/ Right]: Use softkey#1 and the UpDn keys to select MIDI Input Port Left or Right.

Channel [1-16]: set the MIDI channel 1-16

Trigger[On/ Off/ Both]: Available trigger-types are **Note-On, Note-Off, Both**. Set to **None** to disable the function. Any one of these settings can fire a Ztar sensor-pad.

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).

1) **Utilities/ MIDI-In:** turn on "Capture". All MIDI events will be captured from all channels.
2) Set up a Record-Pad by assigning the Sensor-Pad .Any Pad or String Trigger will do. In the SENSORS/EVENTS menu, set *PlayMode = RecordSeq.* Assign a sequence number on the top line of the display. You can monitor up to eight playback tracks (sequences) by assigning the sequence numbers on the bottom line.
In the TIMING menu, set the Hit-Mode for the Sequence-Playback Pad to TIMED.
In the UTILITIES/CLOCKS menu you have the opportunity to set the MIDI Clock source to INTernal or the MIDI Input Clock setting which is "L"
Make sure the Metronome is turned Off by setting the Output to "None".
Assign a Play-pad to the same number.

UTILITIES\ MIDI-IN\ TRIGGERS menu

TRIGGERS:
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.

"C1 -— > P2 "
This means that the incoming MIDI note C1 is assigned to trigger the sensor "PAD2"

	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	L C1 -— > P2	C#1 -— > off	D1 -— > off	D#1 -— > off
	E1 -— > off	F1 -— > off	F#1 -— > off	G1 -— > off
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

This is a second entry point to the Tuning menu. Please refer to the section explaining the FRETBOARD menus for a full description of the TUNING menu. *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.*

BULK-DUMP MENU

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
	BULK	SEND	RECEIVE	
Down				
	SONG ##01	GUITAR		
EDIT	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:

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.
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:

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 pro-gram 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

CLOCKS menu

(2 screens)

The Notes and other events played from the Ztar may be timed in reference to either of two separate clocks:
The onboard milliSecond-timer which represents Absolute time, or
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	METRONOME: L	Channel: 10	NoteL 56: G#3	MORE>
	Tempo Pad: Off	Clock Source: Internal	Clock Outout: L	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 [Int, R, L}: 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.

C lock Out [On, Off]: 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	Time Signature: 4 / 4	PRESETS	BPM: 120	MORE>
	< ■ ■ ■ ■			>
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8
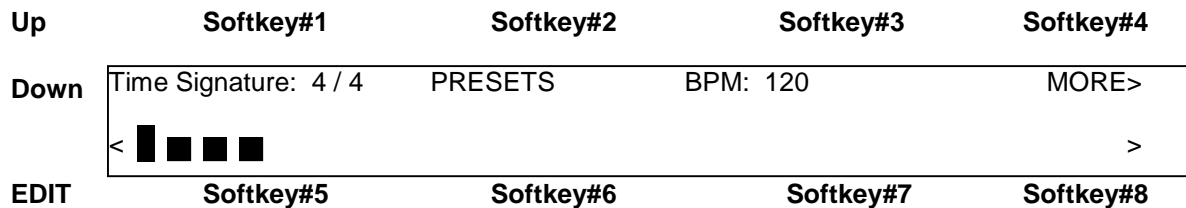
This is the Metronome-Edit screen where you can create custom time-signatures up to 32 beats per measure with multiple accent beats.

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, ¾, 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	[Points1-4] 1-10	15– 30	32-46	48– 62
		[Points 5-8] 64– 78	80– 92	88– 110	95– 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 se-lected 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 re-sponse 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.
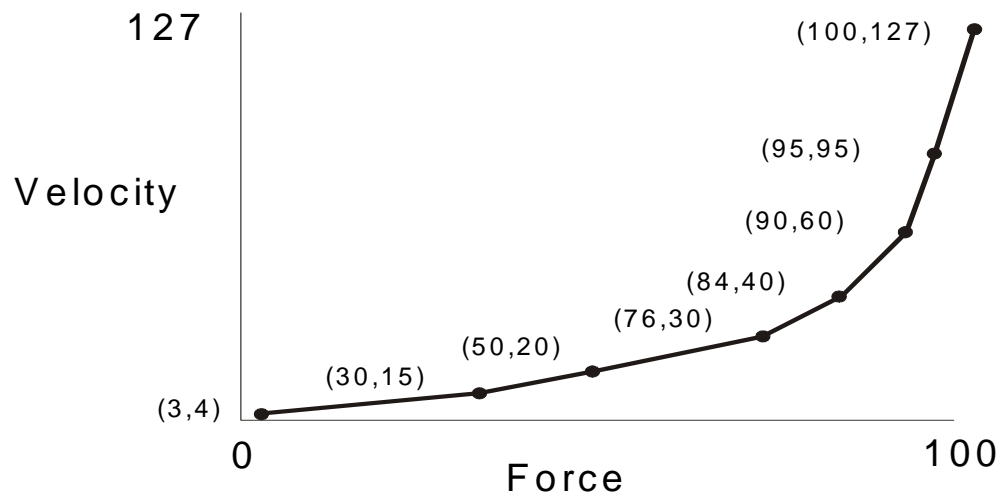
Troubleshooting response problems:

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 Pont#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	ARPEGGIATOR: ON	Channel: 1	PORT: Left	TIME: 1/16
	CLOCK: INTERNAL	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.

Clk: [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.

SEQUENCE EDIT screen

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SEQUENCE: 1	INSERT	DELETE	
	0	:		GATE: 200
EDIT	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 (Kit) setups in your Ztar. Each menu-screen will display 8 Songs .

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	ZTAR	CHORDS	PICKTAP	DRUMS
	ZTAR4	FOURTHS	MY-TUNING	ORGAN
EDIT	Softkey#5	Softkey#6	Softkey#7	Softkey#8

ShowAll cont.-

This is the same as the LIVE screen that powers up in the Ztar.
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
TR5	PgmChg	1: Off	1: Off	1:Off
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 cont.-

ShowAll Events

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down PAD1	10:Pgm Chg	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	900ms	24 clocks	260ms	100 clocks
	Off	Off	Off	Off
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 cont.-

ShowAll Links

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG4 TR1: P3	TR2: P6	TR3: Off	TR4: Off
	TR5: Off	TR6: Off	Pad1: Off	Pad2: 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

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

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 cont.-

Showall Patches

Up	Softkey#1	Softkey#2	Softkey#3	Softkey#4
Down	SONG#2	PatchSelect:1	Vol: 127	SEND
	Ch: 3 – Left	ProgramChange: 92	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.

ShowAll cont.-

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.

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 24th 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 24th fret you will hear nothing. But, if you have a note held somewhere else on the first string, when you release the 24th fret you will hear the lower note. The notes you hear are actually played on the upstroke at the 24th 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 metallic strip is provided on the back of the neck. 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.

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.

Mounting new strings, cont. –

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 adjusment for the Strings

Bear in mind that the closer the string is 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.)

1) 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. Ou may find that a 'half-way' adjustment gives you better dynamics. Some people will turn down the Gain almost entirely.

2) 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.

3) Play the strings again but in the other direction and listen for unwanted ringing. Make any needed adjustments and you're done.

Setting up the KeyTriggers, or the TCA1 Trigger-Pads Option

The **TCA-1** (TriggerCapAssembly-1) is an optional set of Expression Pads that are added to the Ztar top surface in place of the standard hex pickup cover. The TCA-1 is comprised of six narrow rubber pads resting in line with the strings on the fingerboard and the StringTriggers for the picking hand. These six Pads may be programmed to a variety of MIDI event such as Notes, chords, Sequences, Loops, Program changes, EFX level changes, and Continuous Control messages. These pads may also be used to Trigger notes fretted on the fingerboard.

The KeyTriggers and Trigger Pads ("TPads") 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 TCA-1 pads are referred to as "TriggerPads" or "TPads" in the menu system. As a default they are programmed to a set of Drum notes on MIDI Channel 10. With a little practice it's easy to fingerpick a drum pattern on the TriggerPads.

The settings for the TriggerPads can be easily changed to accomplish a variety of MIDI functions. To make these settings go to the SENSORS screen in the menu system and tap one of the TPads. You should see the screen jump to an edit-screen for that TPad. Refer to the discussion regarding the SENSORS menu for details about making the settings.

In general you will be setting three things:
1) the **PlayFunction** shown at the top of the SENSORS screen shows *BASIC, ALL, SEQUENTIAL, CONTINUOUS-CONTROL, ETC.* This sets what type of messages are sent and in what sequence.
2) The **EVENTS** screen shows the settings for up to 8 events such as *Notes, CC changes, Program Changes,* and more. By combining different Events with different PlayFunctions you can achieve a huge variety of performance techniques.
3) The **TIMING** screen is set to
   a. TOUCH if the duration or the Events (notes) is simply as long as the Pad is held down,
   b. TIMED when the Events' duration is set in terms of milliseconds or MIDI clocks (governed by the MIDI clock source such as the internal metronome or external clock) or,
   c. LATCHED which plays the Events and holds them until you hit the Pad again.

The following settings are made for each TriggerPad in the Sensor menus.

Pressing the Tpad triggers the frets, and releasing the Tpad mutes the notes even if you're holding the frets:

In the Sensor>Timing screen set the HIT-MODE :TOUCH.

In the Fretboard>Scan-Mode screen, set **Sustain-Mode** to **OFF.**
When Sustain-Mode is _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.

Pressing the Tpad triggers the fret, and releasing the Fret mutes the note even if you're holding the Tpad:
This is the normal mode of operation, similar to playing a guitar.

In the Sensor>Timing screen set the HIT-MODE :TOUCH.

In the Fretboard>Scsn-Mode menu, Sustain-Mode is **ON**.
This means that the Fingerboard frets can sustain the fretted notes.

Pressing the Tpad plays a fretted note for a fixed duration:

Set the Hit-Mode to TIMED.

In the Sensors>Events screen, for each TriggerPad, set the GATE-time to a number (either msec or MIDI clocks) that sets the note duration.
[to toggle between Milliseconds and MIDI clocks, press the Trigger-Gate softkey]

Set the Hit-Mode to TIMED and **set the TRIGGER-GATE to '0'milliseconds** (not MIDI clocks). This is an interesting 'guitar-like' setup for the Tpads.

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Regarding the sensitivity of the String assembly

Adjustments are made using the six trimpots located inside the guitar, which are accessible through the slot in 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!

Also, these trimpots turn less than one full rotation. If the adjustment simply spins freely without stopping at either end, the pot is broken!

Several factors affect the way the strings respond:

The overall sensitivity of the strings is governed by the settings of the individual sensitivity. 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 pickup.

Crosstalk between the strings may occur when the gain settings are too high. Try to balance these two effects when you're setting the string tension to your touch.

Also there are program settings that affect the String sensitivity.
1) The Gain setting in the RESPONSE menu.
2) The Threshold setting in the RESPONSE menu governs the lowest response of the String.
3) The Curve-number assignment in the SENSORS>OUTPUT menu. The lower the number, the more sensitive the String.
4) The assigned Curve itself may be edited in the UTILITIES>CURVES menu.

Trigger Mutes

A metallic strip is provided at the back of the neck to enhance muting of the String Triggers. Notice that muting does not work as quickly when you are not in contact with the strip.

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 adjusment for the Strings

1) Adjust the String Tension to get the proper feel. Use the front row of Philips-head screws at the bridge to adjust the tension.

    If the screws reach the bottom of their travel and the string is not tight enough, do not tighten the screw any further.

    Instead, loosen the tensioning screw and also loosen the clamping screw behind the tensioning screw.

    Using a pair of pliers, hold the end of the string where it shows behind the bridge, and pull it tight… but not too tight… and tighten the rear clamping screw.

    Now re-tighten the tensioning screw to bring the string to the proper tension.

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

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.

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.
Play the strings again but in the other direction and listen for unwanted ringing. Make   any needed adjustments and you're done.

String Trigger Setups

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.

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.

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 Gain settings that can be set up to capture your lightest and hardest pluck and scale all your picking activity 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.

You've probably noticed the metallic strip on the back of the neck. When you are in contact with the strip with your fretting hand, and the strings with your picking hand, the muting function is greatly enhanced. Try muting the strings when your hand' isn't contacting the metal strip and you'll see the difference.

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:

Settings: [String Tension, Trimpot gain, response curves, String-Trigger software Gain, 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 you 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 will trigger with just by touching it. 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.

Software Gain: In the RESPONSE menu, select each Trigger and set the GAIN from 50%-200%. 100% is best.

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 set Hammer-ons and Pull-offs independently.
You can turn ON POLY mode.

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

<u>Regarding Muting notes</u>

When using the actual String Triggers on the Z-tar, notes are muted by placing a finger on the appropriate String trigger while touching the back of the neck.

In the Strumming-mode fretted notes will be muted when you release the frets.

Sustain-mode, set in the FRETBOARD>SCAN-MODE menu, will allow strummed notes to ring even after the frets were released.

In Guitar/Trigger mode be aware that you can choke a string by lightly placing a finger over it as you strum, as you might when muting one string within a chord on the guitar

 Fretted notes and open-string notes are also muted by softly fretting the appropriate string, similar to a real guitar. *Make sure you are tapping at a value less than the programmed value for "Hammer-Level" found in the Fretboard>Scan-Mide>Hammers menu screen.*

<u>Double-Triggering</u>

If you hear ghost notes when you pick the strings:

Go the Response menu.

Pluck a string Trigger and notice the screen jumps to that Trigger for editing purposes. If not, go to the next screen and select "Chase:On"

Go to the second Response screen and select the field called "MASK". Raise this number to 4,6,8 or until the ghost-notes disappear.

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, the Triggers, 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 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:
Sets the Sensor Mode to STRUM.
Sets the Hit-Mode in the TIMING menu to TOUCH
Sets the linked (Strummed) Fingerboard Strings to the proper alignment.

If you're tapping the fingerboard, you can set the TPads (StringTriggers or any Sensors) to "ReTrigger"-mode, which will re-trigger fretted notes much like the Strum-mode. Then the Fretboard responds to both strumming and tapping!

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,(though you will probably set them all to the same curve). 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.

Set the Sensitivity for the PADS, POTS and other SENSORS

Go the RESPONSE menu. Tap the Pad you want to adjust and the screen should show that Pad's values. If not go the second RESPONSE screen and turn on CHASE.

1) In the first RESPONSE screen you can adjust the GAIN setting.
2) In the second RESPONSE screen you can set the THRESHOLD for your lowest velocity response.
3) In the SENSORS>OUTPUT menu you can set the CURVE#. The higher the number, the 'hotter' the response.
4) In the UTILITIES>CURVES menu you can adjust the assigned Curve itself.

Pots, Pedals, and the Joystick do not deliver to velocity but they do use all the same response settings to deliver a level based on their position. (They are all pots internally.)

If a Pot does not deliver a full scale value (MIDI 127) at the point where you want to see it, set the Pot to a hotter curve by assigning a higher curve number, or adjusting the last point in the Curve that <u>is</u> assigned.

Some fun tricks with the TCA1 TriggerCap

- *More information on the TCA1 setup can be found in the section, " setting up Key Triggers"*

→ **Recording Chords :**

1) Hold a chord on the fingerboard. Press the "REC" hotkey and see the "REC" LED flash. While holding the chord, tap one of the Trigger Pads and the chord will appear there.

   If you only hear one note, go into the SENSORS/ EVENTS screen for that TPad and set the **PlayFunction** from *BASIC* to *ALL*. Now you'll hear the full chord. You can tap the chord with one finger and play a bassline or melody on the fingerboard with the other hand. Set up all six TPads with chords this way.

   You can also turn one of these chords into a sequence:
   1) In the SENSORS/EVENTS menu set the **PlayFunction** to "*SEQUENTIAL*" to make the chord a sequence.
   2) Then, in the SENSORS/EVENTS screen you can change the note-duration from milliseconds to MIDI-clocks so you can adjust the sequence-timing with the onboard metronome. Press the softkey where it says gate-time and see the *asterix(*)* appear after the number to indicate MIDI-CLOCKS.
   3) Then, go to the SENSORS/TIMING screen to set the Hit-Mode to *TIMED* so the TPad will play out its notes using the onboard metronome rather than timing the notes from your touch. Set the BPM where you like it in the UTILITIES/CLOCKS screen.

   These little (up to 8-note) sequences may be also single-stepped by setting the PlayFunction to *ALT-UP, ALT-DN, or ALT-RANDOM.*

   Bend individual strings from the TCA-1

   1) Set up a Ztar Song (preset) such as "6STRING" that has each fingerboard string on a different MIDI channel.
   2) In the SENSORS screen, tap a TPad to select it. Set the MODE to *EVENTS*.
   3) In the EVENTS screen set the **PlayFunction** to "*ContCtl*"
   4) At the bottom of the EVENTS screen set the (only one) Event to *PitchBend-Up* and set the MIDI channel to the channel of the corresponding fingerboard string. If you set up all the TPads to match the fingerboard strings this way you'll be able to hold a chord and bend individual strings by pressing the proper TPads.

accessories cont. -

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.

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· **Battery Pack connections, charging**

If you have a MIDI connector on your battery Pack:

Connect the Battery pack to the "Controller Jack on the PB1 Power Adapter. Plug the charger in to the DC power input on the PB1. The functions of the LED indicators are described on the back of the charger.

If you have a DC plug on the end of your Battery pack, simply plug the battery into the charger and turn it on.

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. The Electric Pianos, a la Rhodes, have a softer attack and won't assault your ears if your timing is off a bit or your tap-velocity is too bright. 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 available for all instruments and you may find that Klose's clarinet studies or a piano method book are more effective that a guitar method because picking isn't an issue here. A decent piece of advice is to put the Ztar in fourths tuning. Normal guitar tuning creates 5 distinct hand positions for playing scales .You'll see that the symmetry of straight fourths 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.

Performance Notes

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.

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.

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.

Hammer-ons/ 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. The Ztar gives you separate control over hammer-ons and pull-offs in the Hammer-menu. 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.

Regarding the Octaves Tuning

The Octaves tuning puts the adjacent strings in a one-octave offset relationship. Each string on the fingerboar d is a duplicate of the others, note for note. Only the octaves vary.

What this means is that it will take two hands to play a full one octave scale. That is, you can not play a full scale in one hand position.

But that can work to your advantage in other ways. Because all of the strings are tuned the same, (but for the octave), your fingering does not change when you move from string to string. With two hands on the fingerboard you can really fly as you move across the strings without having to change you hands' positions.

Try it and you'll discover some awesome arpeggios and scales sitting under your hands that can sweep from the high register to the low register in the blink of an eye!

GLOSSARY

Bulk-Dump/ Sysex: a Song or group of Songs may be transferred between the Ztar and an external computer of 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, "All Together', "One-at-a-time" etc..
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, Picking.

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.

Starr Flexible Bulk Dump Format

Revision History

SysEx Packet Encoding

This bulk dump format follows many of the suggestions in the "MIDI Software Manufacturer's Petition" of 6 June 1992.
The general SysEx packet format is as follows:

```
$F0 $00 $01 $42  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.

Type Encoding

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
```

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.

Assigned Packet Types
8-bit data
$01 EventStation/ZPC kit (pad) data
$02 EventStation/ZPC velocity curve
$03 EventStation/ZPC pad-global data
$04 EventStation/ZPC global system data
$05 EventStation/ZPC variable-length sequence

7-bit data
$20 System Configuration block (all systems)
$21 Ztar/uZone song data
$22 uZone keymap data

$2D ZPC zone data
$2E ZPC keymap (tuning map) data
$2F EventStation/ZPC MIDI input data

D5 ZPC SONG or KIT Dump Format

[The term 'Kit' is used here instead of 'Song' because it more directly implies the notion of hardware setups.]

At present, a dump of "all kits" always includes
  Velocity curves 5 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
  ~~Velocity curves 5 through 16~~
  The chosen kit

~~These must *always* be sent for a bulk-receive, in exactly this sequence. We expect to remove this limitation in a future revision of this software.~~ Packets may now be sent to the EventStation in any sequence for a bulk-receive.

D6 ZPC SONG or KIT Dump Format

At present, a dump of "all kits" always includes
  System Configuration block
  Velocity curves 1 through 16
  Kits 1 through #KITS (for Z6S-DLX, 1 through 18)
    Each kit is sent as pads 1 through MAX.BULK.PAD (1 through 35),
    then Zones 1 through #ZONES (for Z6S-DLX, 1 through 32),
    then Kit tuning maps 1 through TUNING.MAPS.PER.KIT (for Z6S-DLX, 1 through 8)
  Response data, pads 1 through #INPUTS (for Z6S-DLX, 1 through 48)
  Global tuning maps 1 through #TUNEMAPS, if used. (not used on Z6S-DLX)
  System globals
  MIDI Trigger data, ports A and B
  All recorded sequences

A dump of one kit always includes
  The chosen kit

Packets may be sent to the ZPC/EventStation in any sequence for a bulk-receive.

PACKET TYPE $01: Kit data layout
Legacy format (compatible with the memory layout of October 1999)

Each "kit" is sent in a packet of type $01, thus:
```
    $F0 $00 $01 $42   $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 maximum possible kit size is 2730 bytes (allowing a total of 12 kits per 32K page). The current~~
~~kit size is 2625 bytes. The proposed revision will increase kit size to 2700 bytes.~~

Current format (compatible with the memory layout of October 1999)

Each "kit" is sent in 36 packets of 75 bytes each, using type $01:
```
    $F0 $00 $01 $42   $01   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 legacy format described 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 below. The final segment is identical in format to the "Pad 34" block:

Kit data format

The RAM layout of the kit data is as follows:

Kit Data "Pad 0"   75 bytes

Name   9 bytes (ASCII)

Reserved   21 bytes (reserved for longer kit names)

String tuning   6 bytes

String Curve Number 6 bytes

Ribbon Fingerboard Mode   1 byte

Reserved   25 bytes

String Decay Rate   1 byte

Hammer-on Threshold 1 byte

Hammer-pick delay   1 byte

Fbd.aftertouch curve number   1 byte

Fbd.aftertouch threshold   1 byte

Fbd.aftertouch sensitivity   1 byte

Kit Checksum 1 byte

Pad Blocks   **32 pads of 75 bytes each = 2400 bytes**

Pad Mode	1 byte	pad mode

$00 = Off	$07 = Alt-U/D
$01 = Basic	$08 = Alt-Random
$02 = All	$09 = Slice
$03 = Sequential	$0A = Cont.Ctl.
$04 = Note-Shift	$0B = Ribbon Bi
$05 = Alt-Up	$0C = Ribbon Pot
$06 = Alt-Down	$0D = Sequence Play

$0E = Seq. Re-Play
$0F = Stop Rec & Play
$10 = Record start/stop
$11 = Record Next

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 looping.	1 byte	Most modes: number of loops; 0=loop forever; 1=no

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	(**obsolete**) variable-length sequence number; 0=none

Now replaced by Data bytes 1 & 2, below.

Vel. Curve #	1 byte	velocity curve number for this pad; 0-15.
Pedal # or 0 if none	1 byte	In HiHat modes, pad # 1-32 of associated pedal,

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)

For sequence modes (pad modes $0D-$11), Data bytes 1
& 2 are replaced with the variable-length sequence
number, a 16-bit value; 0=none.

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.
Note that the first event's gate time is also used as the
String mode gate time for ZPC.

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 *(all pads except metronome)*	
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   1 byte

Pad Flags 2   1 byte   bit flags as follows:
                                              $01 = ribbon centered-up mode enable
                                              $02 = ribbon centered-down mode enable
                                              $04 = ribbon hold-last enable
                                              $08 = ribbon quantized enable
                                              $10 = ribbon physical center enable
                                              $20 = reserved; should be zero
                                              $40 = reserved; should be zero
                                              $80 = reserved; should be zero

Pad String Number & Options   1 byte

Dual-mode afterpressure curve   1 byte

Dual-mode afterpressure threshold   1 byte

Metronome "Pad 33"   75 bytes

Pad Mode   1 byte   0 = disabled; $18 = metronome (**subject to change**)

Flags   1 byte

                                     $10 = MIDI A output enable
                                     $20 = MIDI B output enable

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

ZPC only: Reserved   10 bytes

Eventstation only: Patch Table   2 patches of 5 bytes each = 10 bytes
    patches 1 and 2
    Channel   1 byte   value = `00bacccc`
                                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

<u>PAD 34 AND 35 BLOCKS ARE ONLY USED FOR EVENTSTATION, NOT USED IN ZPC</u>

"Pad 34" Block   75 bytes   Patches 3 - 17

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

"Pad 35" Block   75 bytes   Patches 18 - 32

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

PACKET TYPE $02: Velocity Curve layout
Each velocity curve is sent in a packet of type $02, thus:

```
$F0 $00 $01 $42  $02  number  length  ...data...  cksum $F7
```

number   is the RAM curve number , 1-16.
`data`   is the curve data, sent in 8/7 bit packed format.

The curve data is ~~twelve~~ 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

PACKET TYPE $03: Pad-global (response) data layout

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

```
$F0 $00 $01 $42  $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 **in ZPC)**	1 byte	low raw pad value, scaled to force=0 **(not used**
Raw Value High **used in ZPC)**	1 byte	high raw pad value, scaled to force=$FF **(not**
Threshold	1 byte	raw a/d threshold
Scan Time	1 byte	
Mask Time	1 byte	
Reference Supr	1 byte	suppression value for reference pad **(not used in ZPC)**
Global Supr	1 byte	suppression value for all pads **(not used in ZPC)**
Reject Pad #	1 byte	**(not used in ZPC)**
Reserved	6 bytes	

PACKET TYPE $04: System Global data layout (TBD)
Global system data is sent in a packet of type $04, thus:
```
    $F0 $00 $01 $42  $04  number  length  ...data...  cksum $F7
```
number   is unused (currently sent as zero)
data   is the global pad data, sent in 8/7 bit packed format.

Chain Blocks	8 chains of 8 bytes each = 64 bytes
Chain Kit #s	8 bytes each is a kit number 1-32, or 0 for none
Fingerboard Mask Time	1 byte
Fingerboard Threshold	1 byte

PACKET TYPE $05: Variable-Length Sequence data layout

Each variable-length sequence is sent in a packet of type $05, thus:
```
    $F0 $00 $01 $42  $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)

PACKET TYPE $20: System Configuration Block data layout

The system configuration block is sent in a packet of type $20, thus:
```
    $F0 $00 $01 $42  $20  number  length  ...data...  cksum $F7
```
number   is unused (currently sent as zero)
data   is the configuration data, sent as 7-bit data.

Note that this block is only <u>sent</u> by the instrument, on a bulk send. It will not be accepted on a bulk receive.

Product Information Block, 11 bytes

Product ID	1 byte ID code
	0 = undefined
	1 = EventStation
	$59 = D6-based ZPC
	others TBD
Variant	1 byte product ID subcode
Feature Flags	1 byte
	$01=string triggers
	$02=aftertouch fingerboard
Reserved	2 bytes

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

Hardware Information Block, 5 bytes

CPU board number	1 byte	5=D5, 6=D6
Hardware Flags	1 byte	currently none defined
Joystick Pot	1 byte	5, 10, or 100 (K ohms of joystick pot)
Reserved	2 bytes	

System Configuration Block, 16 bytes

Number of Kits/Songs	2 bytes	(14-bit MIDI value)
Number of ROM kits	1 byte	
Kit/Song Length	2 bytes	(14-bit MIDI value) Total kit length, including globals, pads, zones, tuning map
Number of strings	1 byte	(ZPC, Ztar)
Frets per string	1 byte	(ZPC, Ztar)
Number of zones	1 byte	(ZPC, Ztar)
# of MIDI output ports	1 byte	
# of MIDI input ports	1 byte	
Reserved	6 bytes	

Sensor/Input Configuration Block, 24 bytes

# of Triggers	1 byte	typically 6
# of Specials #1	1 byte	
# of MuxA pads	1 byte	reserved for legacy systems, typically 0 in ZPC
# of MuxB pads	1 byte	in ZPC systems, total number of sensor inputs
# of MuxC pads	1 byte	reserved for legacy systems, typically 0 in ZPC
# of MuxD pads	1 byte	reserved for legacy systems, typically 0 in ZPC
# of Specials #2	1 byte	
# of Triggerpads	1 byte	number of Tpads, typically 6 if installed (ZPC)
# of Specials #3	1 byte	
# of Joystick Poles	1 byte	four per joystick; typically 4
# of Pedals	1 byte	typically 2 (volume & sustain)
# of Sliders	1 byte	typically 1
# of Extras after Sliders	1 byte	typically 1
# of Specials #4	1 byte	
# of Ribbons	1 byte	
# of Hotpads	1 byte	
# of Stro7 Sliders	1 byte	
# of Stro7 Joystick Poles	1 byte	
# of Specials #5	1 byte	
# of Aux Pots #1	1 byte	
# of Aux Pots #2	1 byte	
# of Metronomes	1 byte	typically 1
# of Pseudo-Pads	1 byte	
Reserved	1 byte	

Kit Configuration Block, 16 bytes

Kit Header Size	2 bytes (14-bit MIDI value)	length of "pad 0"
Kit Pad Block Size	2 bytes (14-bit MIDI value)	length of Pad Block
Kit Zone Block Size	2 bytes (14-bit MIDI value)	length of Zone Block
Kit Tuning Map Size	2 bytes (14-bit MIDI value)	**not currently implemented**
Reserved	8 bytes	

Bulk Dump Configuration, 24 bytes

Packet type $01
  Max Pad Number   1 byte   Highest pad number in bulk dump

Packet type $02
  Total Number of Curves   1 byte
  Number of ROM Curves   1 byte
  # of Points per Curve   1 byte

Packet type $03
  Pad Global Size   2 bytes (14-bit MIDI value) length of globals per pad

Packet type $04
  System Globals Size   2 bytes (14-bit MIDI value) length of system global data

Packet type $05
  Max # of Sequences   2 bytes (14-bit MIDI value)
  Max # Events per Sequence 2 bytes (14-bit MIDI value) **not currently implemented**
  # Bytes per Event   1 byte

Packet type $22,$2E
  # of Tuning Maps   2 bytes (14-bit MIDI value) ZPC: number of maps per kit
  # of Rows   1 byte   ZPC: number of strings
  # of Columns   1 byte   ZPC: number of frets plus 1 for open string
  # Bytes per Key   1 byte   1 for ZPC, 2 for Microzone
  Prefix Bytes per keymap   1 byte   0 for ZPC
  Suffix Bytes per keymap   1 byte   0 for ZPC

Packet type $2F
  MIDI input map size   2 bytes (14-bit MIDI value)
  Prefix Bytes per MIDImap 1 byte   8 for ZPC

  Reserved   1 byte

Reserved, 32 bytes

PACKET TYPE $21: Ztar/MicroZone song data

NOT USED HERE

PACKET TYPE $22: MicroZone keymap data

NOT USED HERE

ZPC ONLY: PACKET TYPE $2D: Zone data layout

Each zone is sent in a separate packet, using type $2D:
```
$F0 $00 $01 $42  $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 `0n0fffff` fffff=low fret boundary, n=zone
disable if set

High Fret boundary   1 byte `000fffff`

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 `0ttttttt`
     hex 00, 0C, 18, 24, 30 are octaves
     For fingerboard-pad mode, this is the pad number (0..127) to hit/release

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 & Fbd Mode   1 byte `0fffvvvv`
     vvvv=velocity curve number for this zone; 0-15
     fff=key function for this zone, three-bit value as follows:
       0=fret (fret a note on the string)
       1=trigger the string
       2=mute the string
       3=hotkey (perform hotkey function per ROM map)
       4=pad (hit/release a sensor per Transposition/Note parameter,above)
       5-7 reserved for future use

MIDI Port Select & Flags 2   1 byte `0tbapsss`
     t=pick enable **(D5 only)**
     t=pulloff disabled in hammer mode, 1=disabled **(D6 only)**
     b=MIDI B port enable
     a=MIDI A port enable
     p=afterpressure mode, 1=poly, 0=channel
     sss=restrict to trigger 1..6, 0=no restriction **(D5 only)**

Tuning Map & Chording   1 byte `0c-ttttt`
            c=chording mode enable **(D6 only)**
            ttttt=tuning map to use for this zone, 0-31.
            - bits unknown; reserved for future use

ZPC ONLY: PACKET TYPE $2E: Key-note map (tuning map) data layout

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`

For one tuning map per kit (legacy behavior, obsolete):
`number`   High 7 bits is zero
                Low 7 bits is the kit number, 1-32
For global tuning maps:
`number`   High 7 bits is zero
                Low 7 bits is the map number, 1-32
For per-kit tuning maps:
`number`   High 7 bits is the kit number, 1-32.
                Low 7 bits is the map number in the kit, 1-8.
`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

PACKET TYPE $2F: MIDI Input Block data layout

Each MIDI input block is sent in a packet of type $2F, thus:
        `$F0 $00 $01 $42   $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