

TurboHarp/ELX

electric harmonica

USER'S GUIDE 5.4

ANTAKAMATICS, INC.

Pittsburgh, PA

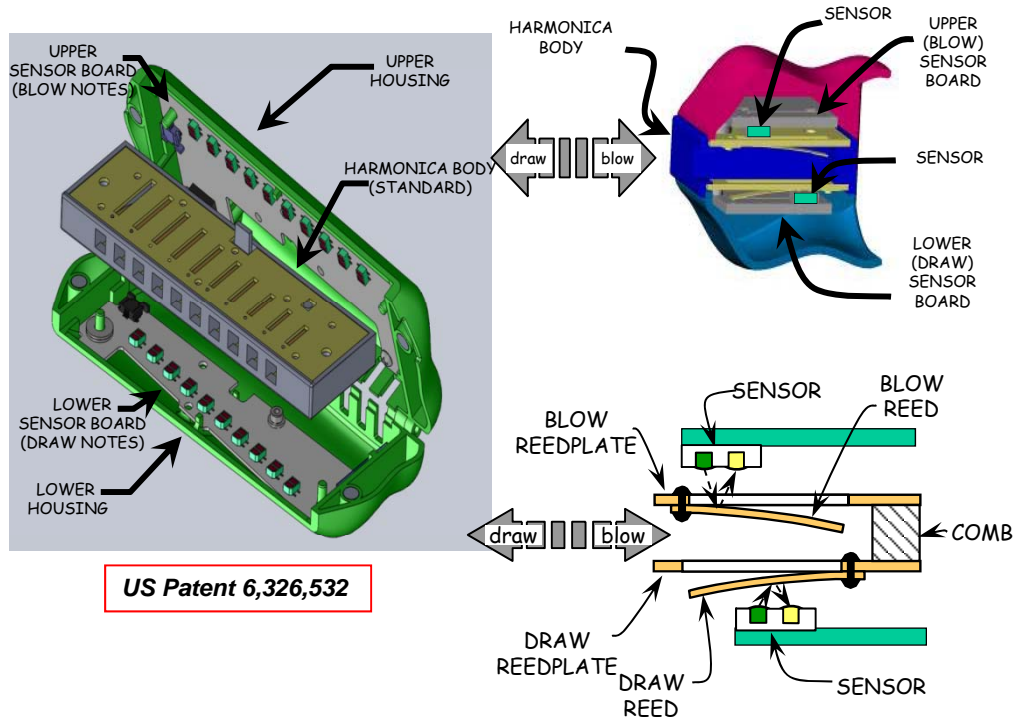


HARMONICAS OF THE FUTURE™

Congratulations and **THANKS** for your purchase of the TurboHarp/ELX, the world's first and only **truly** electronic harmonica. It is the result of over 25 years of blood, sweat and tears. I hope you enjoy it. Please tell your friends!.



Prof. Turbodog



US Patent 6,326,532

The operation of the TurboHarp/ELX is similar to an electric guitar. It transforms the vibration of the reeds of the harmonica to electrical signals that are transmitted to the amplifier, mixer, or effects box. Unlike a guitar, however, which uses electromagnetic pickups, the ELX relies on optical sensors which detect motion by reflection off the reed surface. Each reed has its own sensor, for a total of twenty.



Disclaimers

Although the ELX has gone through many MANY revisions and improvements over the past 15 years, we admit that it is still not perfect. We ask that you please keep the following points in mind:

1. Remember our famous no-questions-asked satisfaction guarantee. If you are not completely satisfied, you are welcome to return it within 30-days without any obligations.
2. The unadulterated output of the ELX is kind of boring... like an electric guitar without an amplifier. We strongly urge you to use some sort of electronics effects (stomp box, guitar pedal, etc.) to get the most out of it.
3. When connected directly to an amplifier, there may be some noticeable “idling noise” or hiss. This is an intrinsic, unavoidable feature of the optical sensors. It is not detectable while playing, and can be mitigated by any electronic noise gate, or multi-effects box, or our own dynamic-noise-reduction belt pack.
4. The loudness (volume) of the reeds might not be perfectly balanced from low to high end. This is partly a result of the key of the harp body, and partly due to our own perception of loudness, which varies with pitch. It is however easy to adjust by incorporating a bit of equalization (EQ) in the chain.
5. These harmonicas may show minor flaws. This is because they are assembled by hand. But the good news is that, like you, no two are exactly alike!
6. We greatly value your feedback and constructive criticism. In particular we encourage your suggestions regarding the choice of effects that might work best with the ELX.
7. We would be even more grateful if you could send us a recording, or upload a video that we can post on our website.
8. If we introduce any improvements within 6 months of your purchase of the harp, we will provide them to you free of charge.

*Sincere thanks for your interest
and encouragement!*



“before you begin”

(if that's even possible)
make sure you have everything

There are several configurations of the ELX. Yours should include some combination of the following components:



OPTIONAL:

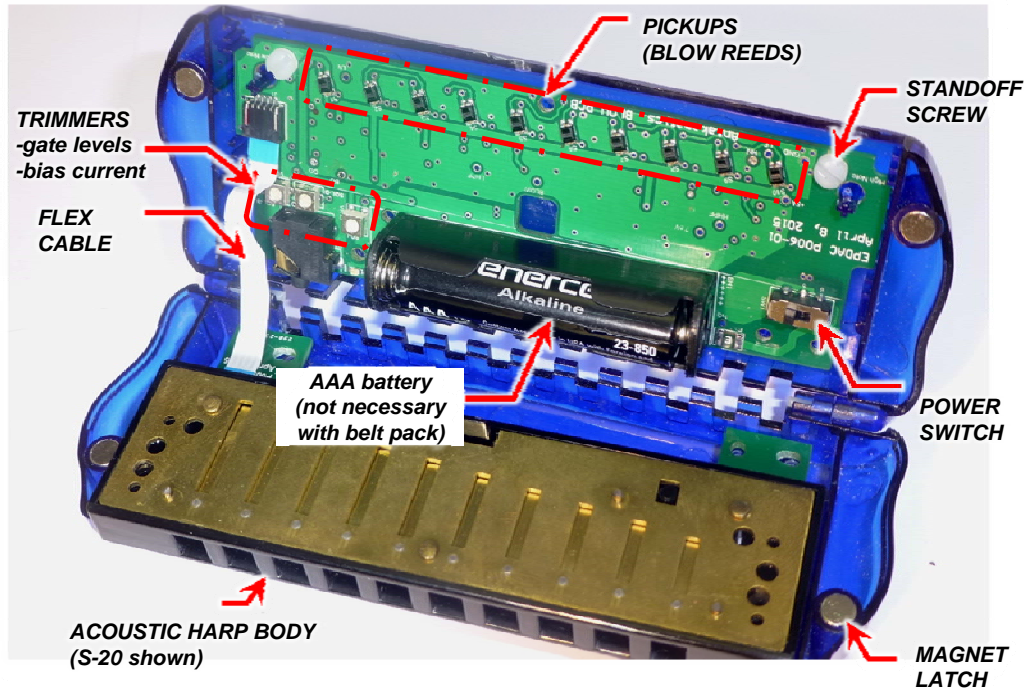
- 25' Extension
- Stereo splitter
- BELT PACK with dynamic noise reduction

TurboHarp/ELX

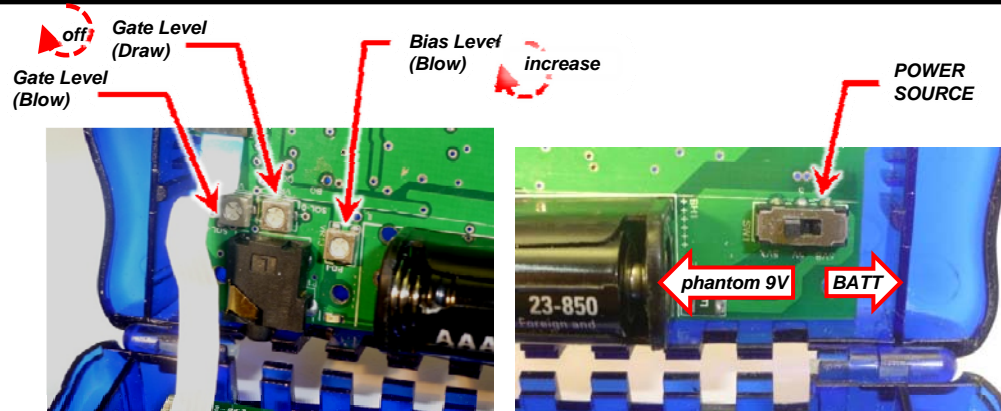


Getting to Know your ELX

Take a moment to familiarize yourself with some of the main components of the ELX harp.



- Acoustic Harp Body – an ordinary Special-20 sized harp, with cover plates removed.
- Light Sensors – convert reed vibration to electrical signal, one per reed
- Magnetic Latch - holds the case closed, allows harp body to be changed quickly.
- Flex Cable – connects the draw board to the blow board.
- Standoff Screw – adjusts distance between sensor and reeds. Should not require adjustment.
- Trimmers – adjust the gain and gate cutoff, see below.



- Gate Level – adjustment for built-in noise gate. Rotate completely clockwise disables the gate.
- Bias Level – adjustment for gain of each sensor board. Draw sensor adjustment on other board.
- Power Source – switch left (towards battery) for remote phantom power; switch right for battery power. (Note: there is no auto-shutoff, so don't forget to turn it off when you're done!)



WIRING DIAGRAM

=monaural=

This is the most simple setup: plug the small end of the coiled 24" cable into the back of the ELX, the other end connects to the extension cable; and then the 1/4" plug on the extension goes to your amplifier. Or if you're sitting right next to your amp or effects box, you can substitute the extension with the 1/8"-1/4" adapter.

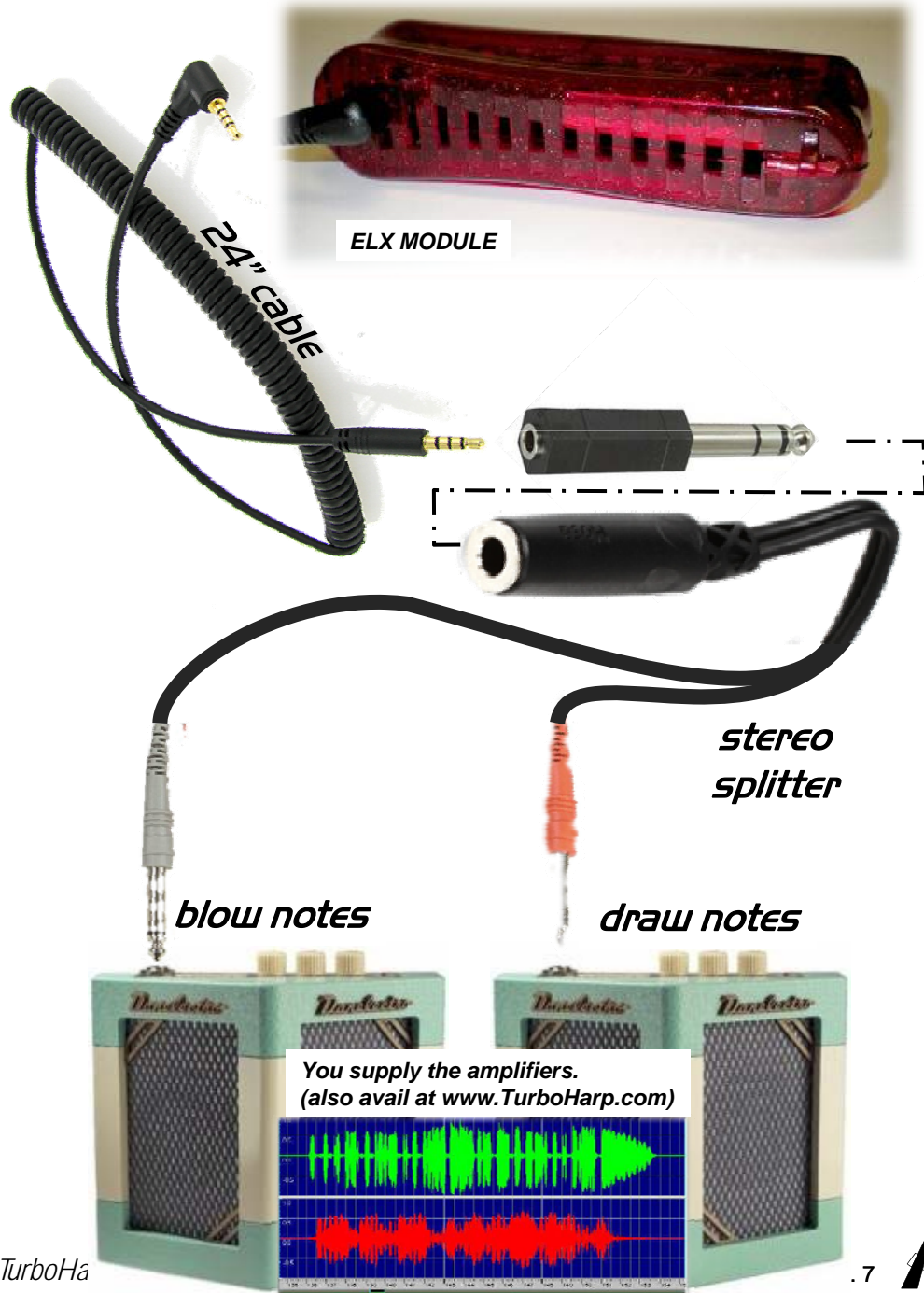
(If you've got a stereo version, you need to add the stereo-mono adapter.)



WIRING DIAGRAM

=stereo=

Simply replace the stereo-mono adapter with the splitter cable and you're good to go. You can then patch the left (blow) and right (draw) channels into separate effects, or a mixer, or directly into two separate amps.



WIRING DIAGRAM =Stereo+Beltpack=

The Stereo option allows you to split the blow and draw notes into separate (right and left) channels.

*belt pack
(optional)*

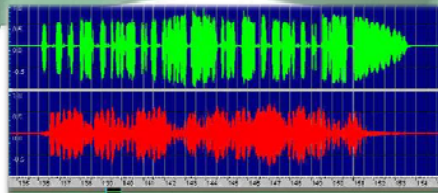


*Stereo patch cord
(comes in different
varieties, see next page)*



blow notes

draw notes



TurboHarp/ELX

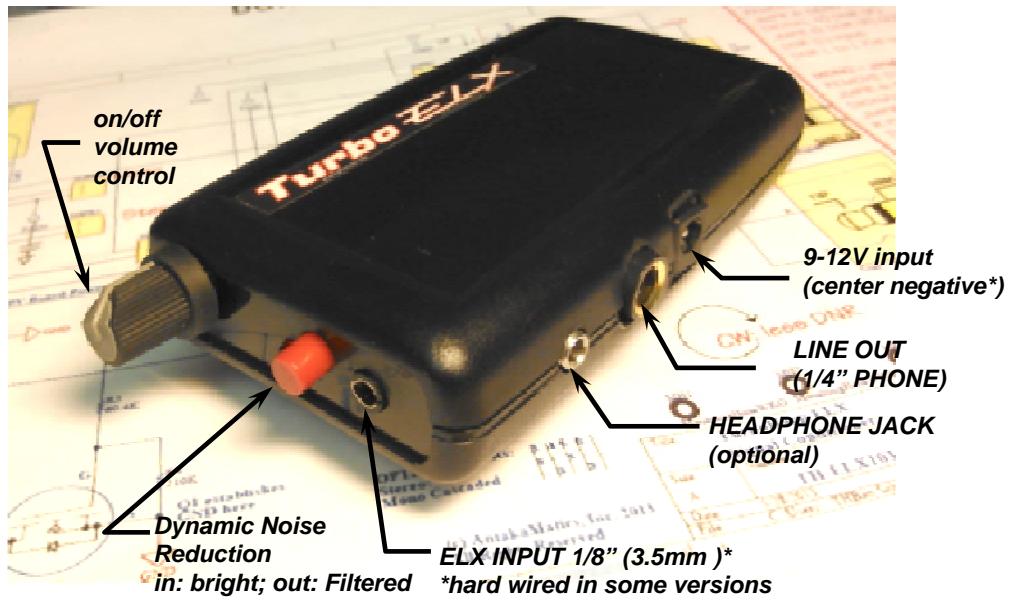
**appearance may vary*

pg. 8



ELX Belt Pack (optional)

The belt pack provides power (including an AC adapter option), volume control, and dynamic noise reduction.



These are still made one at a time by hand so there may some minor imperfections.



WIRING DIAGRAM

=With Belt Pack & Effects Box=



rear of Zoom G1on

- Output: 1/4" connection to amp, sound system, or headphones.
 - Aux in: for MP3 player input
 - USB: for connection to a computer (firmware update only)
 - DC9V: for optional AC adapter (center negative)
- Refer to Zoom G1on User Manual for details about the other optional connections.

Zoom G1on Quick-Start

The G1on is an amazing little multi-effects unit, providing a incredibly versatile set of effects that you can mix and match for a wide variety of patches. The unit also includes a looper that can record phrases up to 30 seconds, and a variety of rhythm patterns.

The manual is actually very good. But it is incomplete. You also need the supplementary guide to all the built-in effects. It can be downloaded for free from our website. (Both in the Support section and on the same page where you ordered your ELX.)

Step 1: Turn the unit on by inserting the 1/4" jack from the harp into the input



Step 3: Read the manual to find out what all these knobs do 😊

Step 2: Cycle through pre-programmed effects (presets) using the left/right pedals.

Because the G1on was designed for the guitar, not all of the factory presents don't sound particularly good with the ELX. So you will need to explore and tweak to achieve the sounds you like. But in the meantime, we pre-programmed the first ten (10) patches that demonstrate some of the cool things you can do, so you get started with the ELX right away.

Pos'n	name	details
A0	Rake	a little vibrato and reverb
A1	Acoustix	acoustic hall effect
A2	Filters	delay and vibrato
A3	Reverse HW	"reverse delay"
A4	BassSim	mono pitch
A5	Guitorgan	Leslie speaker sound ("match 30"+Rt closet)
A6	MS Stack	dirty, Marshall-like "crunch" effect
A7	Jimi	fuzz + vibe/echo
A8	Yellow 12	steel drum sound ("t-scream" + delay)
A9	JeanSplice	reverse delay + slicer
B0	ARP One	carbon delay + "air"(seq filter)



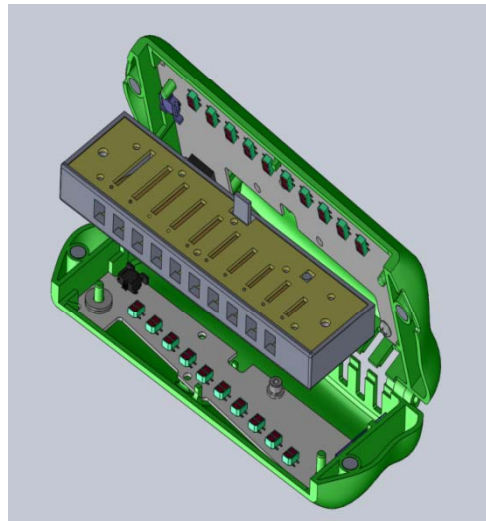
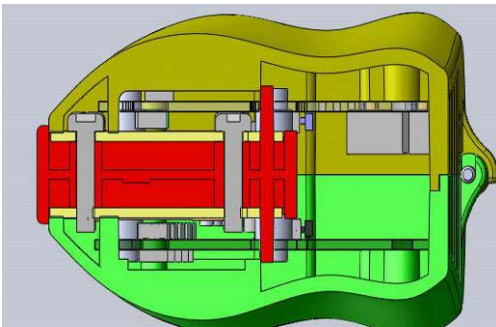
Replacing the Harmonica Body

- *The ELX is designed to accept any Special-20 harmonica body. It can also be used with similarly sized harmonicas, including Marine Band, etc, but may require extra shims to assure a proper fit.*
- *You can also purchase replacement harmonica bodies from TurboHarp at a discount.*

Step 1: Place the assembly in your left hand (for right handed players). Holding the lower lid between thumb and index finger, flip open the upper lid.

Step 2: Remove the harmonica body, noting the orientation: blow reeds on top.)

Step 3: Replace the harmonica body, close lid, and you're good to go!



- *Technical Note: the spacing between the sensor and the reeds is critical to the proper operation of the ELX. This gap has been adjusted at the factory using a "standard" harp body. If, after replacing harp bodies you detect a change in the loudness of any of the reeds, it might indicate incorrect gapping. And if this happens, please contact us for instructions.*



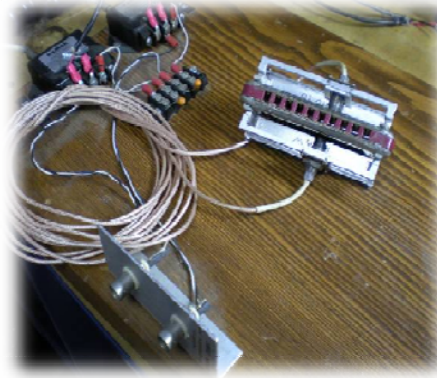
Troubleshooting Guide

No sound	Weak battery	Not meant to insult your intelligence! Sometimes a weak battery is just strong enough to light the little red LED, but too weak to power the sensors.
	If not... then something else is the culprit.	Check for something disconnected or switched off between ELX and speaker: power strip, amp, effects box, mixer. "Divide and conquer."
Loudness uneven amongst reeds	If all blow reeds or all draw reeds affected.	This most commonly occurs with the Stereo setup. If you forget the stereo-mono adapter, you will only get one channel . Otherwise... contact us for instructions.
	If only one or two reeds affected.	Check for corrosion or tarnish on offending reed(s).
Volume seems to drop out when bending low notes	This is not supposed to happen, but if it does, its due to improper offset.	First test by playing the harp with one of the lids slightly pried open (about one fingernail thickness.) If this solves the problem, then one of the boards is too close to the reedplate and the respective standoff screw needs loosened. If it does not solve the problem – call TurboHarp
Hiss when idling	There is normally a small amount of unavoidable hiss due to the "idling" of the optical pickups.	Make sure that dynamic noise reduction button (DNR) is depressed. And/or: introduce a noise gate or an effects unit with built-in gate, such as the RP-55.
whoosh when playing	Typically on high blow notes only. Usually due to moisture on the reed or sensor.	Open harp, and blow away moisture.
Hum/buzz	60 Hz noise could be due to several factors: both electrical AND optical.	If there are fluorescent lights nearby, try switching them off. If the ELX lid is open, it will pick up 60Hz from any light source plugged in the wall; but this will go away once you close the lid. Else: look for bad connection, or cable.
Crackle, pop	This is not a good sign... please contact us.	First make sure there is no nearby source of electrical noise (like an old fluorescent light.) Contact TurboHarp for a replacement.

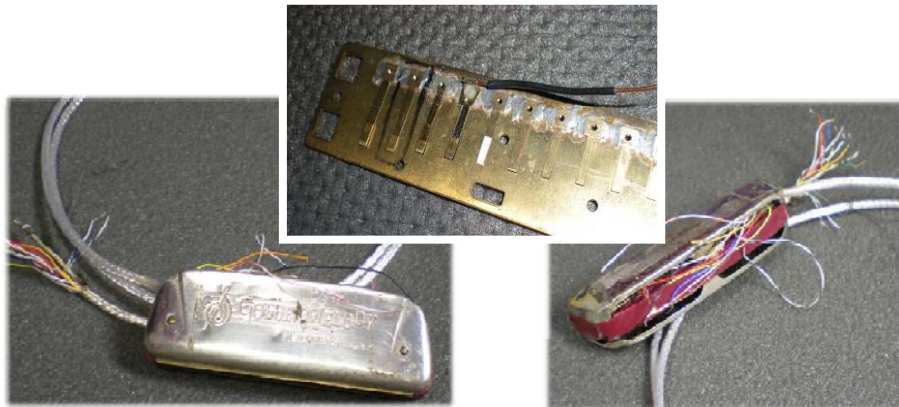


The ELX Story

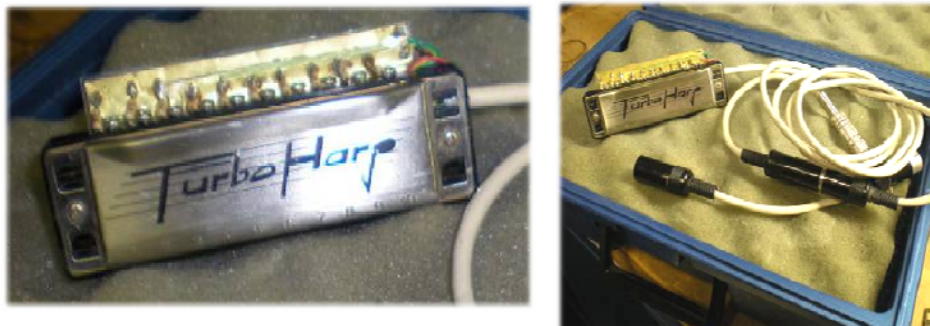
“In the Beginning”
circa 1991 – original
“breadboard” version –
originally intended for
experimentation on physics
of reed dynamics. Two eddy
current proximity sensors
used.



circa 1996: Piezo version: flexible plastic sensors painstakingly bonded to
each reed. Wire attachment was a big problem.



circa 2001: Improved piezo version: wire attachment problem “solved”
kind-of. But still painstaking, and resulted in unacceptable damping. Note
brief venture into using Lee Oskar bodies.

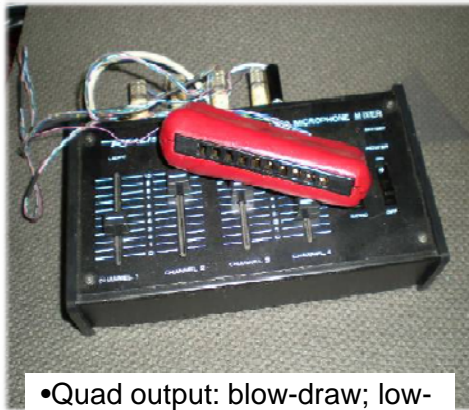


The ELX Story

circa 2003: Attempt at eddy-current proximity sensors integrated into the comb.

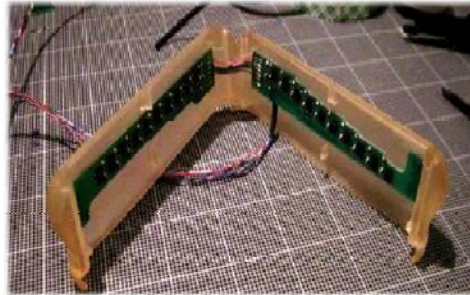


circa 2004: First optical pickup version. 4 channels: low notes blow, low draw, high blow, high draw



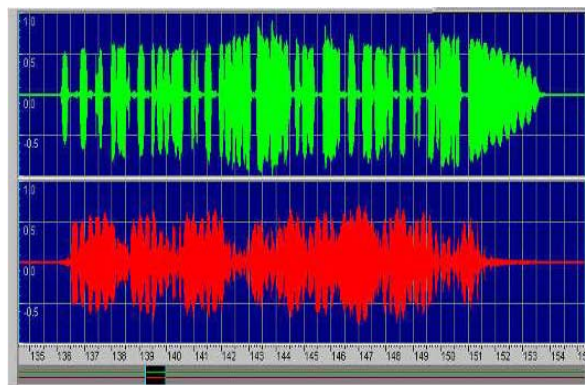
•Quad output: blow-draw; low-high registers

- Optical sensors (pickups) convert reed vibration to electrical signal.
- Used standard harmonica body
- Required disassembly of lids (by 2 allen screws) to swap harmonica bodies.



RIGHT

LEFT



4 channels from harp:

- Low blow
- Low draw
- High blow
- High draw

The ELX Story: Generation-2 Optical circa 2004



- We experimented with many different effects boxes, including Line-6, POD, Pandora Box, Digitech RP50, and RP70, and others.



circa 2003: Demo CD

The TurboHarp/ELX is the world's first truly electronic harmonica. This CD contains sound samples of the first prototype demonstrating the unique abilities of the ELX.

(1) Dr. Harmonica™	0:10
(2) Draw Bender™	0:15
(3) High Scale™	0:20
(4) High Bender™	0:25
(5) "Cherry Pick and Apple Blossom Melody" Demo	0:44
(6) Cherry Pick™	0:48
(7) Out-Jack Churn™	0:30
(8) Out-Jack Churn™	0:30
(9) Out-Jack Churn™	0:30
(10) Out-Jack Churn™	0:31
(11) How Groups Play Arpeggios	0:29
(12) "Sawey"™	0:26
(13) "Rumors are in Color" Signal™	0:26
(14) "Amazing Grace"™	0:28
(15) "Jambalaya" (Covers Chorus)™	0:30
(16) "Yacht of the World" (Covers Chorus)™	0:30
(17) Dr. Harmonica (reprise)	0:26

- * Harmonica only (material and draw noise on right channel)
- ** Harmonica, Drums, melody on right channel
- *** Acoustic *** Digital delay
- **** Musical *** Digital delay
- ***** Acoustic *** Digital delay

ANTAKAMATICS, INC.

3500 FIFTH AVE. STE. 203

PITTSBURGH, PA 15210

412/602-0421

www.turbodemo.org.com

THE **TurboHarp/ELX**

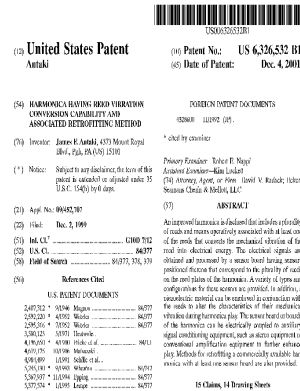
TURBOHARP/ELX - DEMO CD =

Facet Producing



History of the ELX

- circa 1990 – experimental studies on harmonica reed dynamics accidentally results in realization that reed motion when converted to voltage, can then be translated to sound.
- circa 1996 – first piezo electric prototype
- circa 1999 – piezo model is “perfected” however has significant drawbacks. Presented to Hohner, who expressed no interest.
- circa 2002 – eddy current sensor
- circa 2002 – capacitive sensor
- 2003 – patent filed
- 2004 – first prototype using optical sensor using simple passive summer circuit. Worked “ok” but gain was uneven across reeds (very weak for the high reeds) and there was unacceptable hiss.
- 2005 – second optical prototype designed by Tom Dragness including on-board preamplifiers. Sensors changed from Optek to Omron to save cost. This harp was configured as quadraphonic: high register separated from low, draw from blow, patched to mini quad mixer (Nobels.) Drawbacks included complexity, difficulty to replace harp bodies (requiring disassembly of lids), and ongoing problem of hiss.
- 2008 – retained Daedalus to re-design ELX to deal with manufacturability issue and hiss. They redesigned the circuit, and produced 5 prototypes, but not much was changed, except convert from four channel to one (for sake of simplicity, obviating 4-channel mixer.) The manufacturability issue was never addressed.
- 2009-at wits end, Prof Turbodog decides to take matters into his own hands, and redesigns the covers to permit easy exchange of harp bodies. Returns to Daedalus for minor revisions to circuit, particularly replacing sensors which had been discontinued by Omron by Fairchild sensors. Added pot's to each of the reeds to balance gain; Also inverted summation of blow and draw (based on suggestion of Harmonica John) to prevent cancellation when bending notes. Also added on-board connector along with other improvements to improve manufacture, assembly, and adjustment.
- 2011 – retained Novodyne (Burbank, CA) to produce circuit boards.
- 2011, November 7 – first 5 boards arrived. Assembled to 5-sets of rapid-prototype lids to produce the first five “production” ELX's.
- April 2012 – Novodyne loses lease, goes out of business; runs off with our down payment.
- ca June 2012 – we find another supplier of circuit boards, and conduct another round of debugging, and minor revisions.
- August 17, 2012: first set of 100 circuit boards received, full production initiated.
- January 2014: design of the Generation-5 ELX begun.
- ...and the beat goes on...



www.turboharp.com

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