eCorder

Faraday Y-Series

Operating Manual

for

Zaero Operating System 4.1

Revision 1.0

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Chapter 1: Introduction

The eCorder Faraday Y-Series is an all-electronic Alto-sized recorder, designed to take you from standard recorder playing to infinity and beyond. It plays just like a standard recorder, but can be played in any key and any octave, from Sub-Contra-Bass to Garklein. It features MIDI, for use with any other hardware or software synthesizer or effects. Further extending the capabilities of the acoustic recorder, it has extra holes and sensors to play an extra octave higher and lower, and is equipped with an accelerometer to sense up/down and left/right tilting (which can be flexibly mapped to almost any parameter) as well as three additional configurable buttons / pads. It features a high-bandwidth pressure sensor for the breath, capacitive finger sensors for the same no-force feel and action as an acoustic recorder, including flattement.

For the **Y2**: A built-in ultra-low-latency (sub-millisecond) physical-modelling synthesizer provides realistically accurate emulation of the acoustic recorder as well as Virtual Analog Classic Subtractive Waveforms.

Specifications and Features Summary

- Standard and Extended Recorder Fingerings and Blowing .
- Touch-Sensitive Tone Holes.
- Standard and USB MIDI Output.
- **Y2:** Built-in Synthesizer and Audio Output.
- Any Key, Any Octave.
- Accelerometer.
- Configurable Trigger/Pad Buttons.
- Flattement/Finger Shading.

Notes and Cautions:

When powering on, make sure none of the Tone-Holes are being touched or near anything, as this can affect the initial calibration.

Note that the eCorder uses an e-Paper display, which persists the image even without power, so that if for some reason the eCorder gets unexpectedly shut-down (e.g. the Battery runs out or the Battery is not present and the USB power is cut, then the Display will continue showing the page it had been on, which can be confusing. To remedy, simply restore power and turn it back on.

Y2 Caution: Always start with the volume at a low setting especially when using Headphones.

Chapter 2: Parts and Functions

Power Switch and Indicator LEDs

Power Switch

The power switch is the orange button on the side, between the two Indicator LEDs. To power on: Press it briefly. Note: Please make sure none of the Tone-Holes are being covered or near anything when turning it on. To turn it off, press it again until the Power LED flashes Magenta.
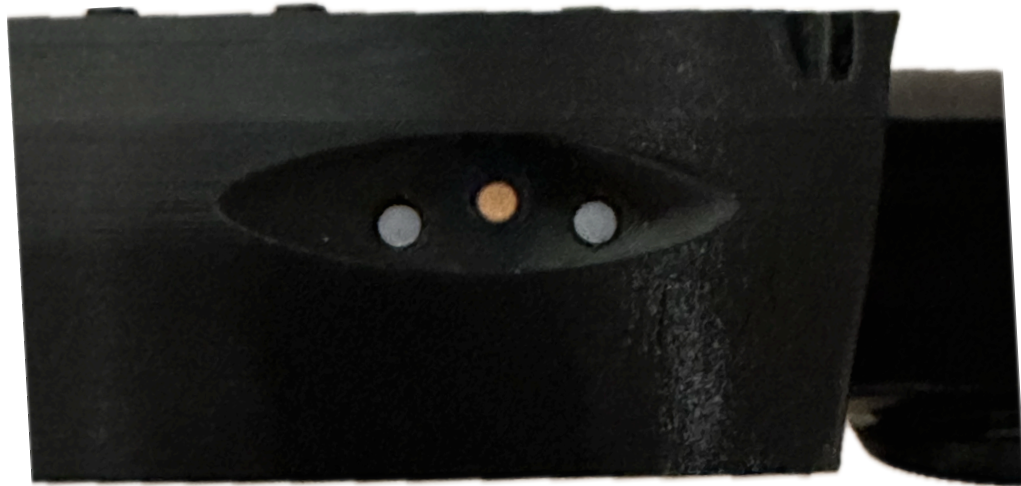
Indicator LEDs

The **Power LED (**on the Left, closest to the mouthpiece) shows the Power State and the Operating Mode:

Off: Off

White: Standard "Zaero Operating System (OS)" Mode

Magenta: 'Bootloader' mode (e.g. when updating firmware). Note that it will briefly turn Magenta during power-down.

The **USB Battery LED** (on the Right, closest to the Bell) shows the USB and Battery state:

Off: No USB cable plugged in.

Green: USB cable plugged in and battery fully charged or not present

Cyan: USB cable plugged in and Battery charging

Short Red Flash while attempting to power on: Too-Low Battery.

Top Panel

The Top Panel consists of 10 buttons and an e-Paper display.

Scroll Buttons:
These two buttons scroll
the list (either Patch Banks
or Parameters).

Bottom Soft-Buttons:
These 4 buttons change depending on
the display mode. See 'Operation' Chapter
for full details.

Patch-Select / Edit Buttons:
These 4 buttons behave as follows:
"Patch Select" Mode:
Select the corresponding Patch from the
currently selected Bank.
"Edit" Mode:

   + and **-**: Change the current parameter

   > Go to the current sub-parameter page

Sensors-Active LED: Illuminates when any Tone-
Hole Sensor is active. If it's illuminated when
nothing is being touched, do a 'Recalibration'

Volume Wheel and Connectors

On the side opposite the Power Switch, there's a Thumb-Toggle-Wheel:

Y1: Adjusts a Slider value between 0 and 127 that can be sent out as a MIDI controller
Y2: Adjusts the Output Volume

Note that the current value is displayed in the Upper-Right corner, next to the Battery Charge Indicator Icon. Pressing the Toggle-Wheel 'in' will set the value to the midpoint (63).
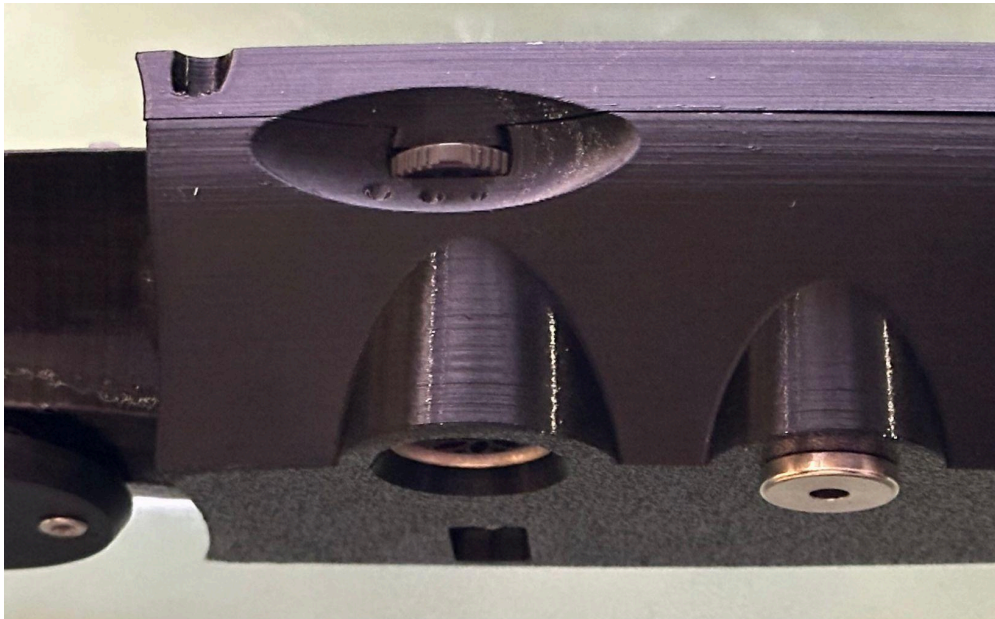
On the bottom can be found the Jack for the USB cable, the 5-Pin MIDI Jack, and for the Y2, the 3.5mm Stereo Audio Jack (can be used with Headphones or as a Line-Out) **Caution: Always start with the volume at a low setting especially when using Headphones.**

Chapter 3: Operation

When first powered up, the eCorder is in the "Patch Select" mode. It will also return to Patch Select mode at the completion of the various editing and configuration operations, such as Saving or pressing 'Back'

"Patch Select" Mode:

Page Layout

  Title Bar: Shows the Current Key, Octave, Reference Pitch [**Y2 only**], Volume/Slider value, and Battery Level. Please note that the Number near the Battery Icon is for the Volume/Slider, and not the Battery Charge, which is indicated by the fullness inside the Battery Icon.

  Left Column: Scrollable List with the 6 Banks.

  Right Column: Shows the names and selected-state of the 4 Patches in the currently selected Bank. If the Patch is currently loaded, then it will have a solid Black triangle to the right of it.

  Bottom Soft Buttons: Shows the functionality of the 4 bottom soft-buttons.

Button Operation

The **Scroll Buttons** (the ones closest to the Mouthpiece) change the currently displayed Bank (note that pressing them does **not** change the currently loaded program).
The Currently Loaded Program will be indicated with a filled Black Triangle next to the corresponding Patch Select button.

The **Patch Select Buttons** change the Currently Loaded Program. Simply press the Patch Select Button corresponding to the Patch you wish to load.

The **Bottom Soft Buttons** behave as follows:
- ☐ **Edit**: Enter "*Patch Edit" Mode* for the current Patch.
- ☐ **Current**: scroll the Bank list till the currently selected Patch is visible.
- ☐ **Recal**: Recalibrate the Breath and Touch Sensors. Note: It will also clear and redraw the Display.
- ☐ **Settings**: Enter "*Settings" Mode*, For editing various parameters such as Key, Octave, Thumb Mode, Flattement, etc.

"Settings" Mode:

Page Layout

>Title Bar: Displays 'Settings:' or the current Sub-Settings page.
>Left Column: Scrollable list with Parameters and Sub-Settings Links.
>Right Column: Shows the functionality of the Edit Buttons.
>Bottom Soft Buttons: Shows the functionality of the 4 bottom soft-buttons.

Button Operation

The **Scroll Buttons** (the ones closest to the Mouthpiece) change the currently selected Parameter or Sub-Setting Link.

The **Edit Buttons** act as follows:

>+: Increment the currently selected Parameter.
>-: Decrement the currently selected Parameter.
>>: Go to the currently selected Sub-Parameter page.

The Bottom Soft Buttons do the following:

- ☐ **Save**: Save the currently-modified Settings and return to Patch Select mode.
- ☐ **Reload**: revert any changes made.
- ☐ **Back**: Return to Patch Select mode or the previous Sub-Settings page. Note: any changes made are still in effect until the next power cycle (NB: Key and Octave and for the **Y2**: Temperament and Tuning are saved and restored after power cycling).

"Settings" Parameters

Key: the current 'key' (the note that will sound when all holes are covered).
Octave: overall octave: ½ Foot, 1 Foot, 2 Foot, 4 Foot, or 8 Foot.
Y2: *Temperament*: Equal, Quarter-Comma Meantone, or Custom.
Y2: *Tuning Adj Cents*: Fine-tune the pitch by up to + or - 100 cents.
      NB: the 'Reference Pitch' in Pach Select mode will reflect this tuning adjustment.
Flattement: On or Off: enable or disable Finger Shading / Flattement.
Left Pinky: On or Off: enable or disable the Left Pinky additional Tone Holes (Currently plus or minus 1 semitone).
Accel: On or Off: enable or disable the Accelerometer.
Thumb Mode:
      Ext. Off: no additional high or low octaves.
      Ext. Low Only: moving the Thumb closer to the Mouthpiece will lower it by 1 octave.
      Ext. High Only: moving or flattening the thumb towards the Bell will raise it by 1 octave.
      Full Extended: both the extra low and extra high modes are supported.
      Always Covered: act as if the thumb hole is always covered.
Add. Fingerings: Sub-Settings Link. Pressing the '>' Edit Button will enter this Sub-Settings page.
Breath Response: Adjust the 'shape' of the breath response curve.
Breath Sensitvty: Adjust the Breath Sensitivity, 0-100. 20 is the default.
Thumb Threshs: Sub-Settings Link to **Thumb Threshs** page.
Basic Threshs: Sub-Settings Link to **Basic Threshs** page.
Flatt Threshs: Sub-Settings Link to **Flatt Threshs** page.
Volume Limit: set the Max level the Volume / Slider can be set to.
Version: shows the current Firmware version.

Sub-Settings Parameters

Add. Fingerings
E5/B5: 0p 1   On/Off.
A5/E5: 0p 2   On/Off.
Ab4/Eb4: 2 4   On/Off.
A4/E4: 2 5   On/Off.

Thumb Threshs
Thumb Hole 0: the 'main' part of Hole 0   0-1000, default is 200.
Thumb Pinch: the small top part exposed when pinching: 0-1000, default 80.
Thumb Hysteresis: how much the pinch sensor threshold has to change to change.
Thumb High: Threshold for the Extra High Octave.
Thumb Low: Threshold for the Extra Low Octave.
Left Pinky Upper: Threshold for the optional Left Pinky top sensor.
Left Pinky Lower: Threshold for the optional Left Pinky bottom sensor.

Basic Threshs   (sensor thresholds when Flattement is not enabled)
Hole 1 - 7h and Hole E (the extra low hole at the bottom): Thresholds.

Flatt Threshs   (sensor thresholds when Flattement is enabled)
Hole 1 - 7h and Hole E (the extra low hole at the bottom): Thresholds.

"Patch Edit" Mode:

Page Layout
> Title Bar: Displays *Edit:* or the current Sub-Settings page + Patch Name.
> Left Column: Scrollable list with Parameters and Sub-Settings Links.
> Right Column: Shows the functionality of the Edit Buttons.
> Bottom Soft Buttons: Shows the functionality of the 4 bottom soft-buttons.

Button Operation

The **Scroll Buttons** (the ones closest to the Mouthpiece) change the currently selected Parameter or Sub-Setting Link.

The **Edit Buttons** act as follows:
> +: Increment the currently selected Parameter.
> -: Decrement the currently selected Parameter.
> >: Go to the currently selected Sub-Parameter page.

The **Bottom Soft Buttons** do the following:
- ☐ **Save**: Brings up the Patch Save dialog. The Patch can either be saved in the same location ("Replace" or saved to a new location ("Save As"). For "Save As", the "Select Patch" dialog will be displayed. Use the Scroll Buttons and Patch Select Buttons to choose the new location, or Cancel to return to the Edit page.
- ☐ **Reload**: reload the initial Patch settings.
- ☐ **Back**: Return to Patch Select mode or the previous Sub-Settings page. Note: any changes made are still in effect until the next power cycle or until the Patch is reloaded. (NB: Key and Octave and for the **Y2**: Temperament and Tuning are saved and restored after power cycling).

"Patch Edit" Parameters

Key: the current 'key' (the note that will sound when all holes are covered).
Octave: overall octave: ½ Foot, 1 Foot, 2 Foot, 4 Foot, or 8 Foot.
Y2: *Temperament*: Equal, Quarter-Comma Meantone, or Custom.
Y2: *Pitch*: The "Reference" Pitch in Hertz for the Patch, typically 440 Hz or 415 Hz.
MIDI: Sub-Edit Link to **MIDI Params** page.
Rename Patch: Enter the Rename Patch page.

MIDI Parameters

MIDI Chan: which MIDI channel to send on.
        Note that channels 13-16 are reserved for the Editor App and should not be used.
Send Prog Change: On/Off. Send a MIDI program change when Patch is loaded
MIDI Prog: Which MIDI program number to send, 0-127
PitchBend Range: How many Semitones (Plus or Minus) to scale the MIDI Pitchbend value
        By default, most Synths use +/- 2, but +/- 24 can work well for Pitchbend Legato.
PB Legato: On/Off: Whether to use Pitchbend for Legato transitions.
        Some Synths will play Legato transitions more smoothly, especially using +/- 24
Fixed On Vel: On/Off: Whether to send a fixed value for the Note On Velocity
On Vel: Velocity Value to use when Fixed On Vel is enabled.
Controllers: Sub-Edit Link to Controllers parameter page.

Controllers Parameters

   The Continuous Controller part of the MIDI configuration can send up to 4 MIDI
Controllers plus Channel Pressure. The first CC "Slot" is the High-Speed one and is typically
used for the Breath Signal. The remaining 3 Slots can be used for other things such as an
Accelerometer Signal or Volume/Slider Signal.

CC Out HS Sig: "Signal Source" for the High-Speed (HS) MIDI Continuous Controller
CC Out HS CC: MIDI CC number for the HS Continuous Controller
CC Out 2 Sig: "Signal Source" for the #2 MIDI Continuous Controller
CC Out 2 CC: MIDI CC number for the #2 MIDI Continuous Controller
CC Out 3 Sig: "Signal Source" for the #3 MIDI Continuous Controller
CC Out 3 CC: MIDI CC number for the #3 MIDI Continuous Controller
CC Out 4 Sig: "Signal Source" for the #2 MIDI Continuous Controller
CC Out 4 CC: MIDI CC number for the #4 MIDI Continuous Controller
Chan Press Sig: "Signal Source" for MIDI Channel Pressure

Internal "Signals"

   The eCorder generates a number of internal "Signals", such as Breath, Accelerometer, etc. that can be used to control different aspects of the sound or MIDI CC values.

Breath
Filtered Breath
Accel Left/Right
Accel Up/Down
Flattement
Pitch
*Slider/Volume [**Y2**]*
Generated Signal #1   These are internally computed signals based on other signals.
Generated Signal #2
Generated Signal #3
Generated Signal #4