

WANDLA by **Ferrum**

user's manual



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Thank you for choosing WANDLA!

Just prepare to be converted by the real thing.

WANDLA is Ferrum's flagship D/A Converter. With WANDLA, we are making a statement to the current and next generation of music lovers, because it represents tomorrow's standard of high end digital-to-analog conversion. Think of WANDLA like a Formula 1 racing car. Like the F1 constructor's team building the best racing car, Ferrum created the best engine for The Converter. We transformed our ARM chip, making it capable of doing the work of five chips, and took the ESS Sabre DAC chip to the next level with our new current to voltage converter. With its power technology coming from both OOR and HYPSONS, you may rest assured you are getting the absolute best we can build. By adding a unique set of digital filters, you now can fine-tune your DAC to your specific sonic needs. WANDLA will sound great right out of the box, but please feel free to experiment with the various digital filter settings. Many hours of musical bliss are right in front of you. Enjoy!

WANDLA by **Ferrum**

User Manual Ver. 1.1 / Firmware v1.1.1 August 2023



1. IMPORTANT SAFETY INFO

WARNING: To reduce the risk of fire, electric shock or enclosure discoloration, be sure that the apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed near or on the apparatus.

Read and follow all the instructions before connecting or operating the component. Keep this manual so you can refer to these safety instructions. Heed all warnings and safety information in these instructions.

Do not allow any objects to get into the enclosure. If the unit is exposed to moisture, or a foreign object gets into the enclosure, immediately disconnect the power cord.

Take the unit to a qualified service person for inspection and necessary repairs.

Unplug this product from the power supply before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

Do not place the unit on a bed, sofa, rug, carpet, or similar surface that could block the heatsink airflow.

If the component is placed in a bookcase or cabinet, there must be ventilation of the cabinet to allow proper cooling.

Keep the WANDLA away from radiators, kettles, heat registers, stoves, or any other appliance that produces heat.

Connect the WANDLA only to a power source that meets its requirements (voltage and amps). We recommend using Ferrum power supplies.

The safest and only method of isolating the device from the power supply is to disconnect the DC plug.

Ensure that the DC plug remains accessible at all times.

Unplug the WANDLA during lightning storms or when unused for long periods of time.

Do not route the DC cord where it will be crushed, pinched, bent at severe angles, exposed to heat, or damaged in any way. Pay particular attention to the DC cord at the plug and where it exits the back of the unit.

Immediately unplug and stop using the WANDLA and have it inspected and/or serviced by a qualified service agency if:

- the power cord or plugs have been damaged,
- objects have fallen or liquid has been spilled into the unit,
- the unit has been exposed to rain,
- the unit shows signs of improper operation,
- the unit has been dropped or damaged in any way,
- when the product exhibits a distinct change in performance.

This indicates a need for service.

When replacement parts are required after the warranty period, be sure the service technician has used replacement parts specified by the manufacturer or have the same specification as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards. Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

In households with small children, an adult should provide supervision until the child is capable of following all the rules essential for the safe operation of the unit.

2. BOX CONTENT

- WANDLA DAC
- AC/DC power adapter
- USB cable
- power cord
- remote
- quick guide

3. DEVICE FEATURES

- Ultra-low THD analog section with very well tuned I/V converter for ESS9038PRO
- Hybrid internal power supply (low noise, ultra fast, etc.); power rails are separated i.e. channels are separated
- Digitally controlled analog attenuators for volume control; selectable: analog or digital
- Preamp function (analog and digital input selector, volume control, balance, trim for every input etc.)
- Digital filters (upsampler) inside ARM chip designed by HQ Player creator
- Wide range of inputs including I2S and ARC
- Smart controlling over CEC (TV), IR remote, touchscreen, trigger
- Ambient sensor to adjust brightness of logo and screen to lightning conditions
- Line outputs only (XLR and RCA)

4. WANDLA OVERVIEW

4.1 Front Panel

- A. Ferrum logo
- B. Touch screen
- C. IR receiver and ambient light sensor
- D. Volume knob



4.2 Back Panel

- A. analogue output (XLR)
- B. analogue output (RCA)
- C. analogue input (RCA)
- D. AES/EBU input (XLR)
- E. S/PDIF optical input (TOSLINK)
- F. S/PDIF coaxial input (RCA)
- G. USB input (Type-C)
- H. ARC input
- I. I2S input
- J. trigger output (3.5 mm TRRS jack)
- K. Ferrum Power Link DC input (can be used with HYPPOS)
- L. 5.5/2.5 mm DC power input (can be used with other PSUs)



5. CONNECTING THE WANDLA

Note: Please connect all signal cables before connecting DC cable/switching on the WANDLA.

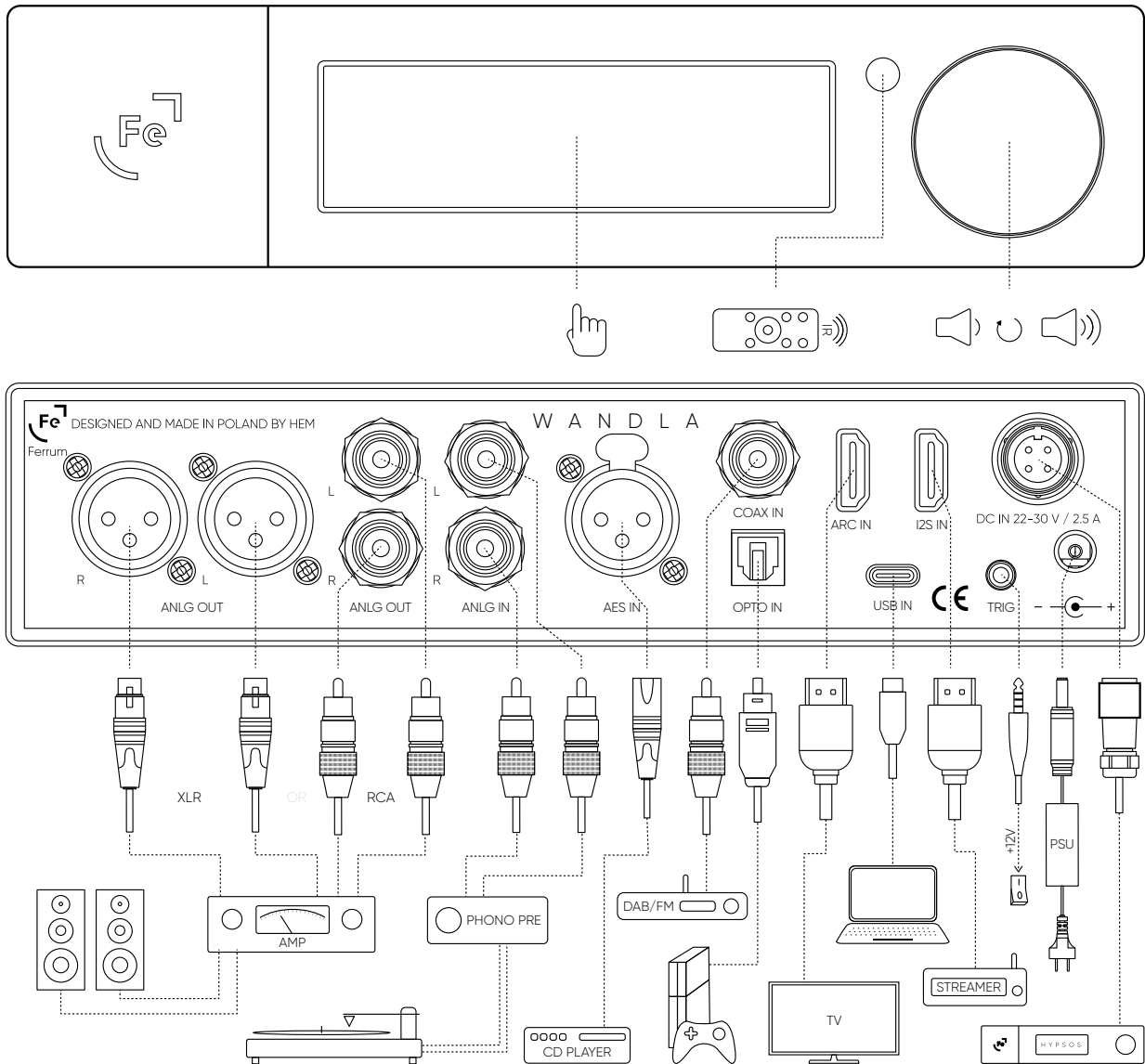



Figure 3

6. GETTING STARTED

After taking the device out of the box and connecting any audio devices in the system (signal cables), connect WANDLA to the power supply.

To turn on the WANDLA touch the screen anywhere. Then tap the  icon that appears on the screen. Alternatively, you can use the remote control to turn on the converter.

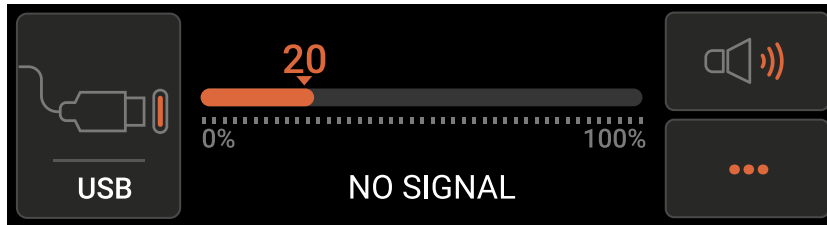


Figure 4

Touch the Input (see Figure 5) button to select the desired input, then adjust the volume using the knob located on the front panel, remote control or directly on the touch display.

See the next paragraph for more information on how to use the touch screen or how to change WANDLA settings.

To put WANDLA in standby mode touch Menu button  and then select ON/Standby icon 

To turn WANDLA on, touch anywhere on the screen or rotate the knob in any direction - the ON/Standby icon will appear on the screen. Touch this icon and the converter will turn on.

7. SCREEN AND MENU STRUCTURE

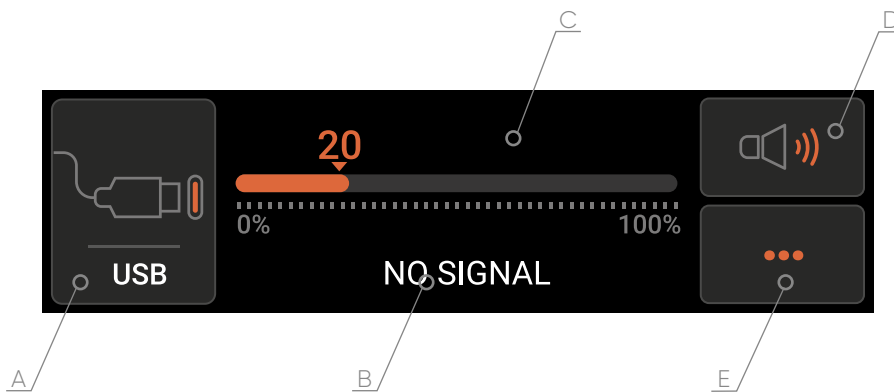


Figure 5

7.1 Main Screen

A. Input button

When the Input button is touched, a list of all inputs available in WANDLA will appear. Swipe left and right to scroll through the list and activate the desired input with a tap. To go back to the main screen use the Back button.

B. Data format

Display information about the currently playing file, such as sample rate, bit depth and file format.



C. Volume bar

Displays current volume level. It can act also as volume control - simply touch and swipe to left or right to change volume level.

D. Mute

When activated it will mute all outputs.

E. Menu

This button gives access to the functions of the device and the Standby button.

7.2 Buttons



Return to the previous screen.



Close/cancel



Confirmation



Tooltip/info



Back to main screen



Left/right arrows - changes selected value



Slider - changes selected value

7.3 Menu Structure

7.3.1 STANDBY



This button turns on or puts WANDLA in standby mode.

7.3.2 AUDIO



Contains audio settings.

7.3.2.1 Volume Control

Allows you to set preferred volume regulation type refers to volume and trim.

- Analog - digitally controlled resistor ladder
- Digital - last stage of DAC processing (will not work with analogue input)



7.3.2.2 Upsampling

You can choose interpolation filter type for upsampling slow (44.1 kHz - 192 kHz) PCM signals. Fast (352.8 kHz - 768 kHz) signals are not upsampled. There are two realizations of interpolation filters:

HQ – made by HQ Player's creator, always upsamples signals to 352.8 kHz or 384 kHz. Processing is done in SERCE.

ESS – built-in ESS Sabre32 DAC filters, upsamples signals 8 times. Processing is done in DAC chip.

We will add more filters in future releases.

- HQ Gauss
- HQ Apod.
- ESS Lin-Ph
- ESS Min-Ph
- ESS Apod.

7.3.2.3 Bypass

Bypasses volume regulator for all inputs to use it with external preamp. After activation converter will work at full volume.

Please use the Bypass function with caution! A sudden jump in volume may damage your hearing and/or the speakers!

It is best to reduce the input signal at the source to a minimum before the Bypass function is activated.

Note: Ferrum refuses every liability for damage to equipment due to using Bypass function.

7.3.2.4 Theater Bypass

Bypasses volume regulator for analog input only to use it with AVR source and its volume control.

7.3.2.5 Output Balance

This function allows you to change channel balance. It is set to "C" (centre) but you can change balance in 1dB increments up to 15dB.

7.3.2.6 Digital Input Trim

You can trim the level of all digital inputs up to -12 dB. It is realized on selected volume regulator (analogue or digital).

7.3.2.7 Analog Input Gain

Here you can trim or gain signal (+/-12 dB) of analogue input. It is realized on analogue volume regulator.



7.3.2.8 I2S Input Format

You can choose frame format of the I2S input. Possible values are:

- STD 32 bits - standard I2S: word clock advanced by 1 bit and low level for left channel.
- MSB 32 bits - MSB/left-justified: no word clock advancement and high level for left channel.

7.3.2.9 I2S Input DSD Pin

You can choose pin of I2S connector used to indicate DSD format. Please read the manual of your source device to find out which pin of I2S connector is used to indicate DSD format.

- None
- Pin 13
- Pin 14
- Pin 15
- Pin 16

7.3.3 VISUALS



Contains visual settings.

7.3.3.1 Display Brightness

Brightness of display in percent. It is relative to ambient brightness level or absolute when the ambient sensor is disabled.

7.3.3.2 Logo Brightness

Brightness of Ferrum logo in percent. It is relative to ambient brightness level or absolute when the ambient sensor is disabled.

7.3.3.3 Logo Stb Brightness

Brightness of the Ferrum logo in standby. It does not depend on the ambient sensor.

7.3.3.4 Ambient Sensitivity

Sensitivity of the ambient sensor used to change brightness of display and logo. Automatic brightness control can be also disabled.

7.3.3.5 Screensaver

If you don't do anything for the selected time the screen will turn off. This feature can be disabled.

7.3.3.6 Home Return Time

If you don't do anything for the selected time the screen will return to Home Screen. This feature can be disabled.

7.3.4 CONTROL



Contains other settings

7.3.4.1 Trigger Direction

In this settings you can set direction of trigger:

- Input - external device can turn on/off the WANDLA using trigger socket
- Output - WANDLA can turn on/off external device using trigger connection

Note: Use TRS jack for trigger connection. Using TS jack might damage trigger I/O.

As of firmware version 1.1.1, a console is available that can be used in home automation systems to control basic Wandla parameters and respond to changes in these parameters. For more information, see the documentation posted at our website: <https://ferrum.audio/support/>

7.3.5 ABOUT



7.3.5.1 Contact

Contains contact information to our company.

7.3.5.2 Device

It contains information about the currently installed firmware, serial numbers of the motherboard and SERCE module.

Note: The serial number of the converter is located on a sticker located on the bottom of the device.

7.3.5.3 Restore

Here you can reset WANDLA to factory settings.

8. MQA



MQA

Authentication Types



The color of the small spot next to the MQA logo indicates if the MQA stream is detected.

The spot glows green to indicate that the unit is decoding and playing an MQA stream or file, and denotes provenance to ensure that the sound is identical to that of the source material.

It glows blue to indicate it is playing an MQA Studio file, which has either been approved in the studio by the artist/producer or has been verified by the copyright owner.

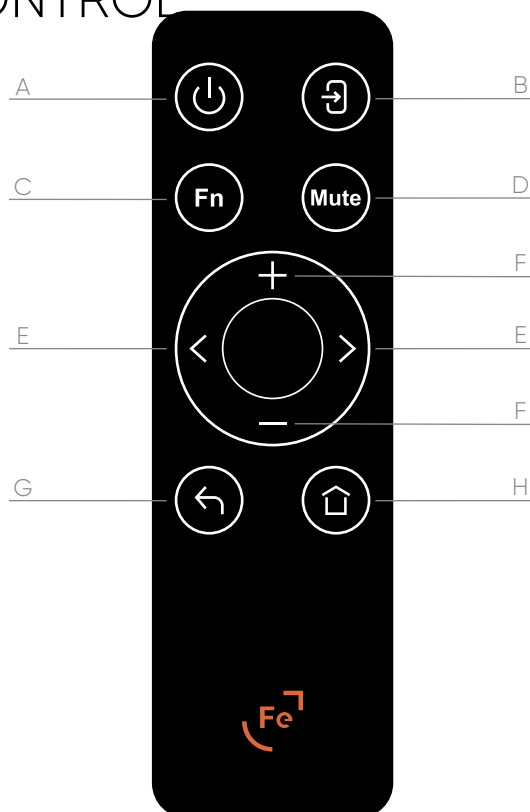
It glows magenta when WANDLA is receiving MQA signal which is unfolded by some upstream decoder or software where the media source is initially handled.

You can find more info about MQA on this website: <https://www.mqa.co.uk/customer/how-it-works>

Note: For proper MQA decoding make sure your source can provide a bit perfect signal to the WANDLA. All digital inputs will accept MQA signal.

MQA and the Sound Wave Device are registered trade marks of MQA Limited © 2016

9. REMOTE CONTROL



A. On/Standby button

B. Input selector button

C. Function button - not used now

D. Mute button

E. Left/right or change value buttons

F. Volume buttons

G. Back button

H. Home screen button

10. USB AUDIO CONTROL PANEL

10.1 Driver and Application Installation

macOS

WANDLA will work driverless in macOS. Set WANDLA as a main audio output device in audio settings in macOS.

Linux

WANDLA will work driverless in Linux. Set WANDLA as a main audio output device in audio settings in Linux.

Windows

WANDLA will be automatically detected as an audio device and will appear in the Audio Settings menu in Windows, however we recommend installing our ASIO driver for the best audio experience.

You can download latest USB driver from our website: <https://ferrum.audio/support/>

After downloading the driver, install it according to the instructions displayed in the installer.

Ferrum USB Audio Control Panel will also be installed along with the driver.

10.2 Control Panel

Ferrum USB Audio Control Panel will allow you to change some settings and get information about the device.

10.2.1 STATUS

Status of the device is shown in this tab. If it is detected you will see WANDLA name and motherboard serial number. Also current sample rate selection is displayed.

Note: The WANDLA serial number is located on a sticker underneath the unit.

10.2.2 FORMAT

It lists the available channels and bit depth.

10.2.3 BUFFER SETTINGS

- The Buffer Size (measured in samples) configures the amount of memory used by the software used for playback to buffer the audio for processing and playback.

It determines the amount of latency or delay for audio to pass from the audio interface through the computer

to headphones/speakers. Lower latency settings will take more system resources at a higher rate than higher latency settings.



- Safe Mode compensates for lengthy processing performed by a playback software in the ASIO callback. If safe mode is turned on, then the driver tolerates that a processing interval extends and overlaps with the next interval. It will extend the output latency.

Note: Ferrum recommends to stay at default settings.

10.2.4 INFO

Some information about the currently connected WANDLA.

10.2.5 ABOUT

Some information about the currently used Ferrum USB Audio Control Panel.

11. FIRMWARE UPDATE

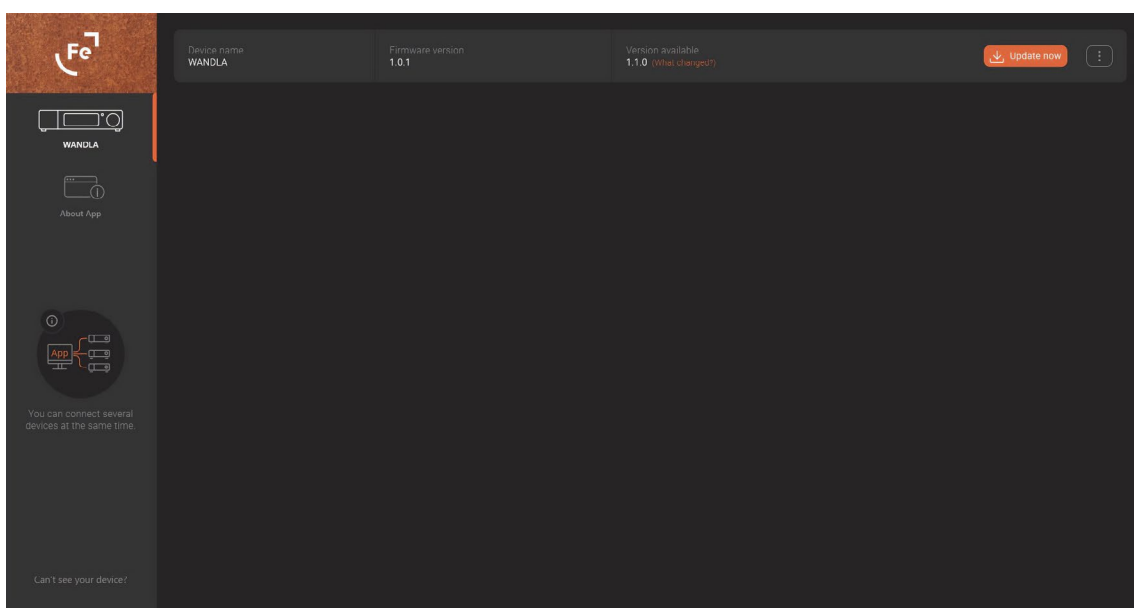
To update the firmware, please download the Ferrum Control application. We highly recommend installing ASIO drivers for better user experience.

Note: For macOS, there is no need to install the ASIO driver. WANDLA works driverless on macOS.

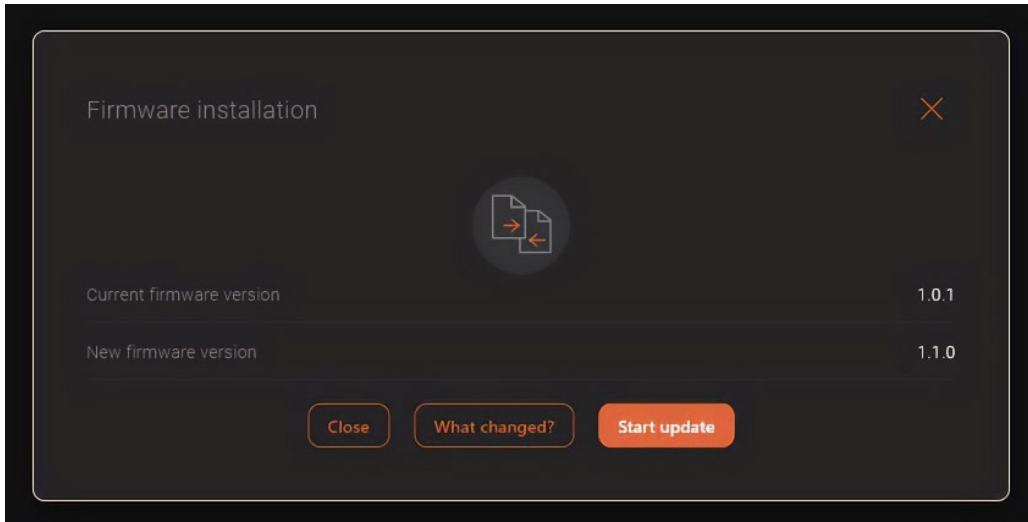
You can download the ASIO driver from our website: <https://ferrum.audio/support/>

The Ferrum Control app is available in the Windows Store and in the AppStore – a direct link is also available on our site: <https://ferrum.audio/support/>

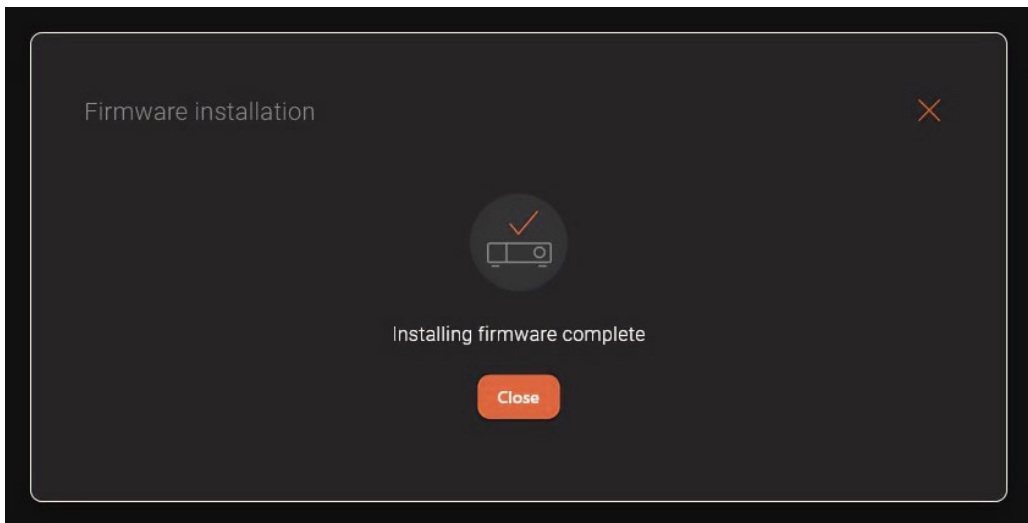
1. Open Ferrum Control app.
2. Connect WANDLA via USB cable to your computer and turn it on.
3. WANDLA will be displayed in the Ferrum Control app.



4. If the "Check for update" button is visible click on it to check if there is new firmware available. Alternatively you will see the "Update now" button. Click on it and then click on the "Start update" button to begin the update procedure.



5. The Ferrum Control application will inform you when the firmware update process is complete. Click on the "Close" button to close the update window.



6. After the update WANDLA will be in the standby mode. To turn it on touch the screen and then touch again on the "ON/Standby" button.

12. TECHNICAL SPECIFICATION

- DAC chip: ESS Sabre ES9038PRO
- DAC resolution: 768 kHz / 32 bit, DSD 256
- Digital inputs:
- AES/EBU (up to PCM 192 kHz/24-bit, DoP 64)
- Optical S/PDIF (up to PCM 96 kHz/24-bit guaranteed; should work up to PCM 192 kHz/24-bit and DoP 64 – depends of user's optical cable and transmitter)
- Coaxial S/PDIF (up to PCM 192 kHz/24-bit, DoP 64)
- USB (up to PCM 768 kHz/32 bit, DSD 256, DoP 256)
- ARC (up to PCM 192 kHz/24-bit), TV input with CEC
- I2S (up to PCM 768 kHz/32-bit, DSD 256, DoP 256), PS Audio® compatible
- MQA decoder and renderer on all digital inputs
- Analog inputs: RCA
- Analog input maximum voltage: $9.5V_{RMS}$, $2-3.5V_{RMS}$ recommended
- Analog input impedance: $47k\Omega$
- Line outputs: balanced XLR; unbalanced RCA
- Volume control: analogue with bypass option / digital for DAC operation only
- Output level: V_{OUT} @ 0 dBFS, 1kHz sine:
 - RCA: $4.65V_{RMS}$
 - XLR: $9.3V_{RMS}$
- Frequency response analog inputs: 10 Hz - 200 kHz +/-0.1dB
- DAC THD: -121dB (0.00009%); THD+N: -115 dB (unweighted)
- Analog input THD: -123 dB @ $2V_{RMS}$ output level
- Dynamic range analog: 127 dB (A-weighted)
- Dynamic range digital: 122 dB (A-weighted)
- Crosstalk: -120 dB for 1kHz, better than -100 dB for 20 Hz - 20 kHz
- Output impedance unbalanced: 22Ω
- Output impedance balanced: 44Ω
- Power consumption: 10 W idle / 15 W max
- Power inputs: 5.5/2.5 mm DC connector center positive; proprietary FPL 4-pin DC connector (FPL); 22-30V_{DC}
- Power adapter: 100-240V_{AC} to 24V_{DC}
- Dimensions (W x D x H): 21.7 cm x 20.6 cm x 5 cm / 8.6" x 8.1" x 2.0"
- Weight: 1.8 kg

13. WARRANTY

Each individual WANDLA undergoes comprehensive quality control and a complete test before shipping.

This headphone amplifier is guaranteed by Ferrum to the owner or holder of the original proof of purchase against defects in workmanship and materials used in manufacture for a period of three years from the date of purchase and in the country of purchase.



If you suspect that your product is faulty, please contact the place of purchase or you contact Ferrum support. Prior to shipping for warranty services the customer or dealer must obtain an RMA number from Ferrum for warranty services. Units sent without an RMA number will not be accepted.

Proof of purchase in the form of a bill of sale or received invoice, which is evidence that this product is within the warranty period, must be presented to obtain warranty service. This warranty is void and inapplicable if the factory applied serial number has been altered or defaced from this product. Faults due to customer misuse, unauthorized modifications or accidents are not covered by this warranty.

In case of need to send the WANDLA for service please pack the product very carefully, preferable in the original packing, to be sure no damage can be done during shipment.

Ferrum is not responsible for accessories, items left in the packaging and the box in which the device has arrived for service. Ferrum reserves the right to use a replacement box if necessary.

14. CONTACT FERRUM

In case of questions, problems or suggestions regarding its form or contents, please contact us via our support system available on our website: <https://ferrum.audio/support/>

15. WARNING

Excessive sound pressure from speakers and headphones can cause hearing loss. In order to use this product safely, avoid prolonged listening at excessive sound pressure levels.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

All interface cables used to connect peripherals must be shielded in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



This product with the CE marking complies with the EMC Directive issued by the Commission of the European Community. Compliance with this directive implies conformity to the following European standards:

- EN55103-1 : Electromagnetic Interference (Emission)
- EN55103-2 : Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environments: E1 (residential), E2 (commercial and light industrial), E4 (controlled EMC environment, ex. TV studio).

16. INFORMATION ON DISPOSAL FOR USERS OF WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (PRIVATE HOUSEHOLDS)

The Wheelie Bin symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment. To properly dispose harmful substances and recycle the product, the user is obliged to return it at the point of collection of electrical and electronic equipment waste. For more information please contact your local authorities, waste disposal units or retailer.