

ERCO by **Ferrum**

user's manual



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INTRODUCTION

Thank you for choosing ERCO!

While ERCO will bring a refreshing breeze of musical bliss into your life, it is pronounced '*ertso*', which means '*ore*' in Esperanto. Like any precious element, ERCO is the first Ferrum product that we labelled "Desktop High-End". This small box simply deserves to be in a category of its own. ERCO is everything you need to get the most out of your listening experience while working, studying or just relaxing with favorite headphones or powered loudspeakers in a desktop environment. ERCO offers the best DA converter we have ever built, paired with the amplifier technology based on our flagship model OOR and the electrical design of our EISA awarded HYPPOS. Enjoy!

ERCO by Ferrum

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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 ERCO away from radiators, kettles, heat registers, stoves, or any other appliance that produces heat.

Connect the ERCO 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 ERCO 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 ERCO 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

- ERCO desktop DAC
- AC/DC power adapter
- power cord
- USB cable
- quick guide

3. DEVICE FEATURES

Clearing the path for high end audio - Perfect mix of flagship Ferrum technology combined with high grade in house developed Digital to Analog conversion. Choose from three digital and one analog input.

Suited for high end personal audio - Connect your favourite headphones to the balanced 4.4 mm jack or unbalanced 6.35 mm headphone jack outputs or powered loudspeakers on your desktop to the XLR or RCA outputs to perform to their max.

Discrete/IC hybrid design - Ultra-wideband ICs fine tuned for audio use to achieve the best possible analog quality.

Ease of use - Hassle free operation. Only three knobs on the front panel to control the most important settings.

Proprietary Technology - Industry leading technology is applied. All digital ports are optimised for audio, MQA decoding and rendering is optimised for use with internal ARM chip.

Truly Balanced - The signal path is truly balanced from early D/A stage and becomes truly balanced using the RCA inputs.

Enhanced transparency - The whole design remains focussed on a balanced and very transparent sound signature, making listening fatigue something of the past.

Ferrum Power Link - ERCO performs very, very good right out of the box. But ERCO is made to excel above and beyond when used together with HYPPOS. We use what we dubbed our Ferrum Power Link (FPL in short) to connect the two. ERCO then will perform to its maximum, unleashing unheard musicality from the combination with HYPPOS.



4. ERCO OVERVIEW

4.1. Front Panel Overview

- A. Ferrum logo – brightness adjustable
- B. 6.35 mm jack, TRS headphones output
- C. 4.4 mm jack, TRRS headphones output
- D. LED indicator (more about LED indicator in paragraph 6.4)
- E. Rotary input selector and standby switch
- F. Rotary gain selector – allows you to match a gain level to your headphones:
 - for single ended headphones (6.35 mm jack) you can choose (from left to right): -11.8 dB, 0 dB and +11.8 dB;
 - for balanced output (4.4 pin mm jack) you can choose (from left to right): -5.8 dB, +6 dB, +17.8 dB.
- G. Volume knob

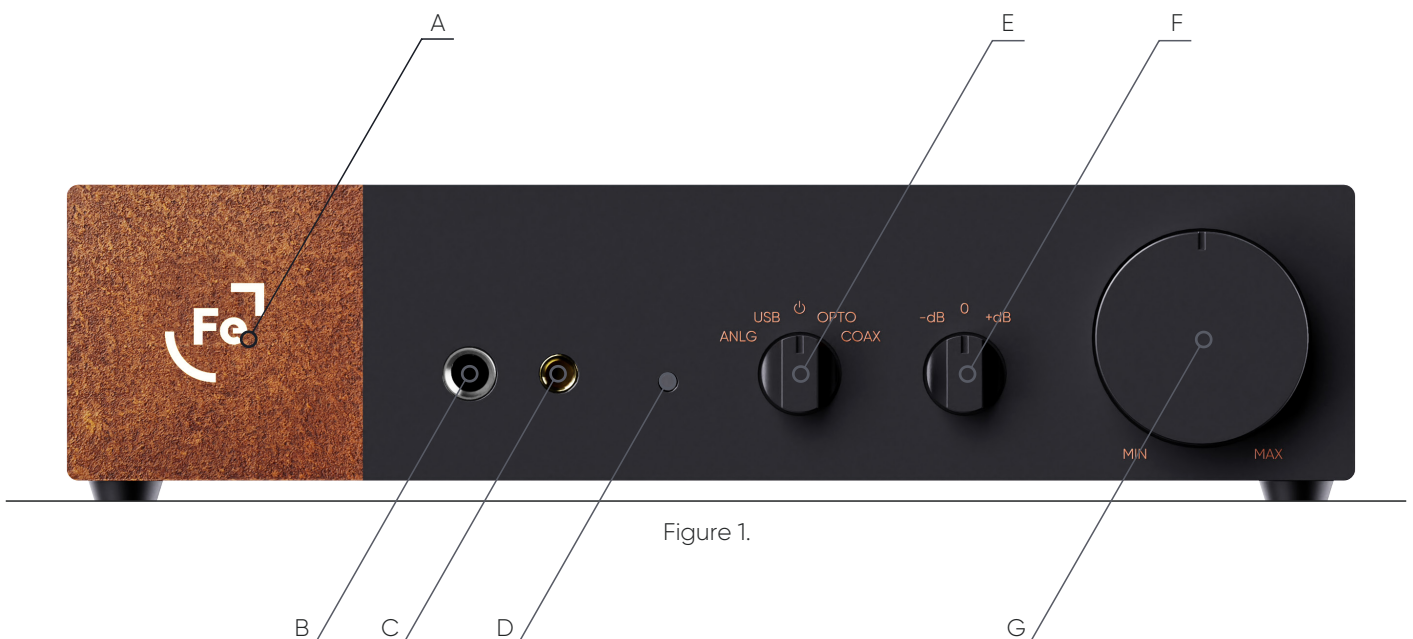


Figure 1.

4.2. Back Panel Overview

- A. XLR analogue output
- B. RCA analogue output
- C. RCA analogue input
- D. Optical S/PDIF (TOSLINK) input
- E. Coaxial S/PDIF input
- F. USB Type-C (data only) input
- G. Bypass rotary switch - allows you to bypass ERCO's internal volume potentiometer. This option is useful when you control volume at the source.

Note: For more information please look at paragraph "6.2 Bypass function".

WARNING! Use with caution! Enabling bypass might cause hearing damage or destroy your speakers.

- H. Logo brightness potentiometer
- I. Trigger output
- J. Ferrum Power Link DC input
- K. The 5.5x2.5 mm DC input can be used with other PSUs



Figure 2.

5. CONNECTING THE ERCO

Note: Please connect all cables before switching on the ERCO.

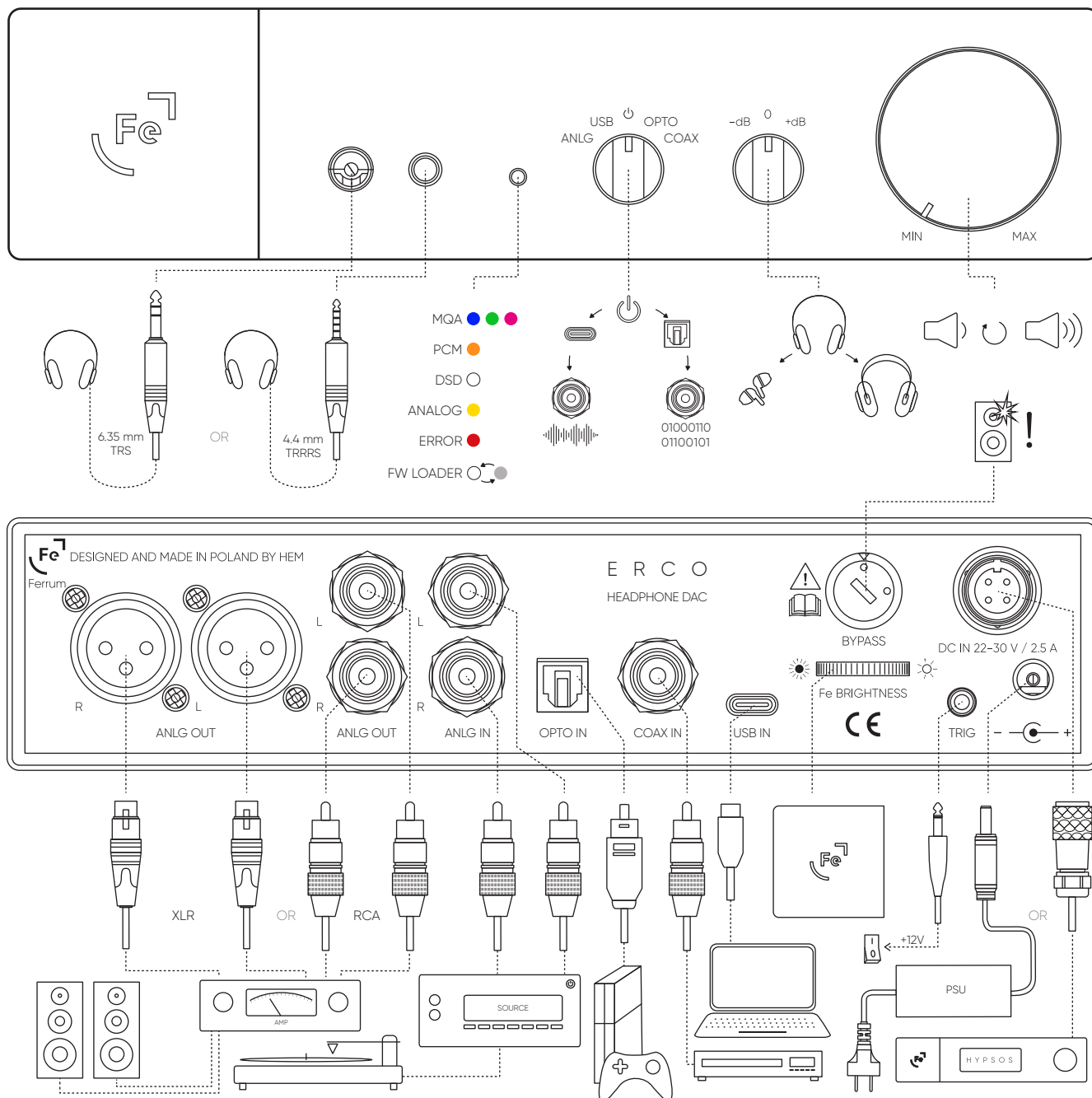


Figure 3.

6. GETTING STARTED

6.1. Using ERCO for the first time

Make sure the signal cables (optionally you can also connect an amplifier, active speakers, etc.) are connected to the ERCO before turning it on.

6.1.1. Setting gain switch for headphones

Set the Gain knob to the first position (-dB) and the Volume knob to about 25%.

Turn on the ERCO using the input selector – select either the Analog, USB, Optical or Coaxial input.

Now while listening to music, gently raise the volume using the Volume knob. If the volume is unsatisfactorily low at about 75% off, move the Volume knob back to 25% and the Gain knob to the second position (0). Repeat the procedure – gently raise the volume to about 75%.

If the volume is still noticeably low, move the Volume knob back to 25% and the Gain knob to the 3rd position (+dB). The idea is to set the optimum volume level with the Gain knob in such a way that you get the widest possible range from the Volume knob. Our recommendation is to find a Gain knob setting such that the optimum volume level is as close to 50% of the Volume knob as possible.

Note: The gain switch is only used to adjust the gain sensitivity for headphones. It does not affect the main outputs (XLR and RCA).

6.1.2. Output priority

ERCO has been designed so that when headphones are connected to any of the headphone outputs, it turns off the main output (RCA and XLR).

The 6.35 mm headphone jack has a higher priority than the 4.4 mm headphone jack – this means that if you connect two headphones to both outputs at the same time, only the headphones connected to the 6.35 mm jack will work.

6.2. Bypass function

The bypass function (Fig. 2G) disables the built-in potentiometer in ERCO. As a result, the signal given at the input of ERCO will be transmitted to the RCA or XLR outputs with all its power. This is useful when it is more convenient for the user to control the volume from the sound source.

The bypass function is disabled at the factory. To activate it you have to switch the rotary switch from position 0 to position 1 – the most convenient way to do it is with a flat screwdriver.

Please use the Bypass function with caution! A sudden jump in volume may damage your hearing and/or the speakers! Bypass function does not work for headphone output.

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.

6.3. Using ERCO with amplifiers or active speakers

The potentiometer built into the ERCO affects the volume of not only the headphones, but also the RCA and XLR outputs (when Bypass is disabled). We recommend disconnecting headphones from the ERCO if they are not used for a longer period of time, and especially if you want to control volume on RCA or XLR outputs (when an amplifier or active speakers are connected). This practice can prevent excessive wear or damage to your headphones.

6.4. LED indicator

The LED indicator (Fig.1D) on the front panel will change its color depending on the selected input or the incoming data stream.

• **Green, Blue & Magenta** – MQA

The LED 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 ERCO is receiving MQA signal which is unfolded by some upstream decoder or software where the media source is initially handled.

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

• **Orange** – PCM

The LED will glow orange when any PCM data stream is detected.

• **White** – DSD

The LED will glow white when DSD or DoP data stream is detected.

• **Yellow** – Analogue input

The LED will glow yellow when analogue input is selected. There is no analogue signal detection so LED will glow as long as analogue input is selected.

• **Flashing white** – Firmware loader mode

The LED will blink white when ERCO is in firmware loader mode.

• **Red** – Error / Fault

The LED will glow red when there is some kind of firmware/software error.



6.5. Trigger

The trigger output (Fig.2l) wakes up the external device. You can use this option to wake up an external device, such as an amplifier, by turning on the ERCO.

To use trigger output you have to use 3.5 mm, 2-pole jack cable.

7. USB AUDIO CONTROL PANEL

7.1. Driver and application installation

macOS

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

Windows

ERCO 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: 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.

Linux / Android

ERCO will work driverless if system supports USB Audio Class 2.0.

7.2. Control Panel settings

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

7.2.1 Status

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

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

7.2.3 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.

7.2.4 Info

Some information about the currently connected ERCO.

7.2.5 About

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

8. FIRMWARE UPDATE

This paragraph will be updated as soon as a new firmware version for ERCO is released. You can download latest manual, firmware and USB driver from our website: ferrum.audio/support

9. TECHNICAL SPECIFICATION

- **Headphone output gain:** balanced -5.8 dB, +6 dB, +17.8 dB; unbalanced -11.8 dB, 0 dB, +11.8 dB
- **Operation:** fully balanced, proprietary IC power amp
- **Power inputs:** 5.5x2.5 mm DC connector center positive; proprietary FPL 4-pin DC connector (FPL)
- **Analog inputs:** RCA (Consumer level; Pro option with future software update)
- **Digital inputs:** USB (up to PCM 384 kHz / 32 bit, DSD x256, DoP x128); S/PDIF optical (up to PCM 192 kHz / 24 bit, DoP x64); S/PDIF coaxial (up to PCM 96 kHz / 24 bit guaranteed, may work up to PCM 192 kHz / 24 bit, DoP x64)
- **DAC chip:** ESS Sabre ES9028PRO
- **PCM sample rates:** 44.1 / 48 / 88.2 / 96 / 176.4 / 192 / 352.8 / 384 kHz
- **DSD sample rates:** 2.8224 / 3.072 / 5.6448 / 6.144 / 11.2896 / 12.288 MHz
- **MQA:** decoder and renderer
- **DAC resolution:** PCM up to 384 kHz / 32 bit; DSD up to x256 (11.2 MHz / 12.2 MHz)
- **Headphone jack outputs:** balanced 4.4 mm (TRRRS); unbalanced 6.35 mm (TRS)
- **Line outputs:** balanced XLR; unbalanced RCA (both Consumer level; Pro with future software update)
- **Volume control:** analogue with bypass option (bypass for line outputs only)
- **Frequency response:** 10 Hz – 30 kHz (+/- 0.05 dB) 10 Hz – >200 kHz (+/- 1 dB)
- **Output power unbalanced:** 300 mW into 300 Ω ; 1.7 W into 50 Ω



- **Output power balanced:** 1.2 W into 300 Ω ; 6.1 W into 50 Ω
- **THD on balanced output:** < 0.00018% / -115 dB, 1 mW into 16 Ω ; < 0.00018% / -115 dB, 100 mW into 16 Ω
- **THD on unbalanced output:** < 0.00032% / -110 dB, 1 mW into 16 Ω ; < 0.00057% / -105 dB, 100 mW into 16 Ω
- **Dynamic range analog:** 130 dB (A-weighted)
- **Dynamic range digital:** 120 dB (A-weighted)
- **Input impedance:** 47 k Ω
- **Output impedance unbalanced:** 22 Ω on pre-amp
- **Output impedance balanced:** 44 Ω on pre-amp
- **Output impedance Headphones:** < 0.3 Ω
- **Power consumption:** idle <15 W
- **Power adapter:** 100–240V AC to 22–30V DC
- **Dimension (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 / 3.97 LBS

10. WARRANTY

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

This headphone amplifier is warranted by Ferrum to the owner against defects in workmanship and materials used in manufacture for a period of three years from the date 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 ERCO 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.

11. 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: ferrum.audio/support



12. 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 B 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).



13. 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.

