KITS
EDUCATIONAL ELECTRONIC

# AVT 732
## Whisper detector
## High sensitive wire bug

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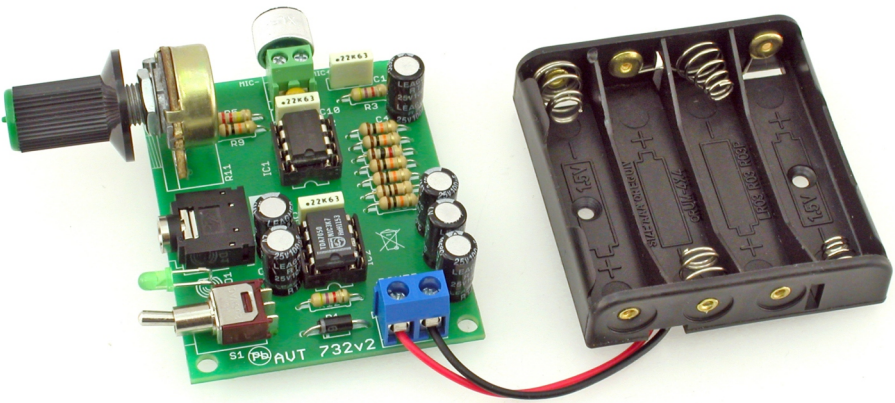


The kit makes an incredible impression on the user. Low-pitched whispers or sounds, normally undetected by human hearing get amplified several-fold. The sound effects the user gets are unforgettable.
The kit is ideal for a variety of experiments related to amplifying different sounds. It may be of some use to people with hearing problems. It will probably turn out to be indispensable as a monitor of infant sleep. We hope it will also be highly appreciated by nature lovers.

## Specifications

- built-in microphone
- headset or loudspeaker output
- smooth gain regulation
- frequency characteristics shaping
- battery-fed power supply
- power supply: 3-6V DC

## Functional description

The M1 electret microphone signal drives the U1A non-inverting amplifier. The gain set by the R5 and R6 resistors is constant and amounts to 23x (27dB). The pre-amplified signal is delivered to the inverting amplifier with the U1B IC. The negative value gain is determined by the ratio of the PR1 potentiometer and R2 resistances. It can be adjusted within the 0...1 range. The circuit is powered by single voltage while the R7, R8 and C5 components constitute a floating ground circuit. The C9, R2, C6 power supply filtering components as well as R1and C4 are necessary at high gain and they protect the circuit from self-oscillating caused by signals penetrating through power lines. The popular U2 TDA 7050 power amplifier is used. It works in the typical application mode as a 2-channel amplifier with gain fixed at 20x (26dB).



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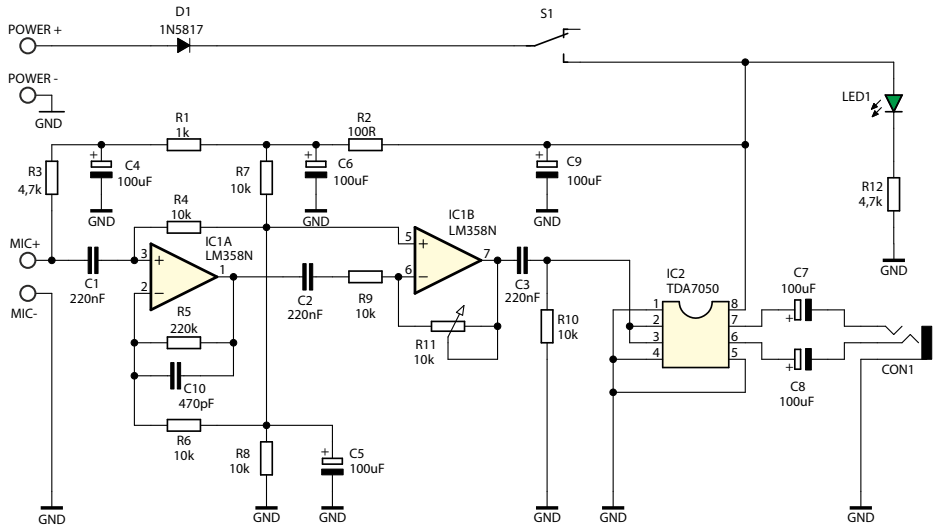
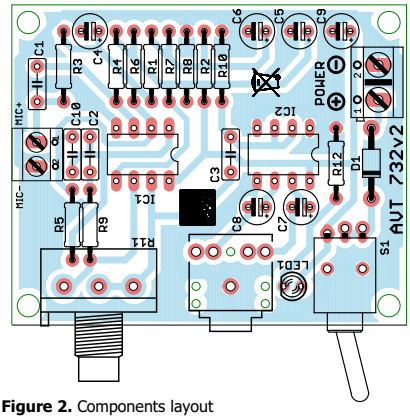



**Figure 1.** Schematic diagram

## Assembly and test

The circuit schematic and the PCB layout is shown in figures 1 and 2. Start off by soldering the printed circuit elements in order from smallest to largest. During assembly a lot attention should be paid to the correct polarity of the components when soldering them in namely, the electrolytic capacitors, transistors and diodes. The pin 1 mark on the socket and IC must correspond to the component layout printed on the PCB. The electret microphone can be connected by short links of wire leads. This can also be done with the help of a long cable. In each case the correct polarity of the parts used must be observed (see the schematic and PCB). The negative terminal inside the microphone is connected to the metal can. After assembling the circuit it must be thoroughly checked that the components used have not been reversely soldered, that they are in their correct places and that the solder pads do not touch each other as this might lead to short circuits. After checking the correctness of assembly both the headset and the circuit can be plugged in. Once properly assembled, the amplifier will work instantly. Before using the circuit the potentiometer knob should be set at low volume (by turning it anti-clockwise) and then it should be gradually turned clockwise in order to increase volume. Too high gain will cause the circuit to oscillate (in the headset-to-microphone path) and screech unbearably. The circuit should operate when powered by the two AA or AAA batteries or even by a single 3V Li-Ion battery. It can also be powered from four batteries or from the 4.5...6V plug-type power supply.



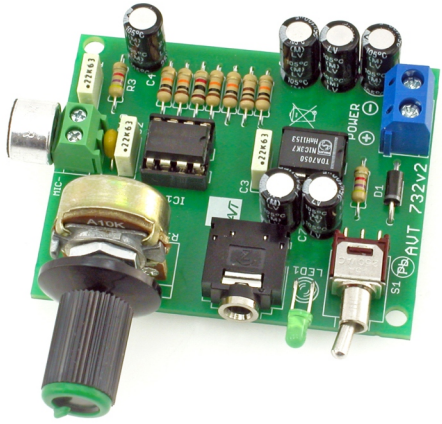



**Figure 2.** Components layout

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# Component list

**Resistors:**

R1:.....1kΩ (brown-black-red-gold)
R2:.....100Ω (brown-black-brown-gold)
R3, R12:.....4,7kΩ (yellow-purple-red-gold)
R5:.....220kΩ (red-red-yellow-gold)
R4, R6-R10:.....10kΩ (brown-black-orange-gold)
R11:.....rotary potentiometer 100kΩ

**Capacitors:**

C1-C3:.....220nF (also marked as 224)
C10:.....470pF (also marked as 471)
C4-C9:.....100µF !

**Semiconductors:**

D1:.....1N5817 or similar !
IC1:.....LM358 with 8-pin IC socket !
IC2:.....TDA7050 with 8-pin IC socket !
LED1:.....LED diode !

**Others:**

S1:.....switch
CON1:.....stereo headphone jack
POWER, MIC: ..2-pin terminal block connector

While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

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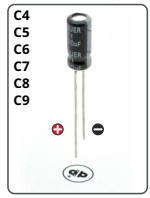
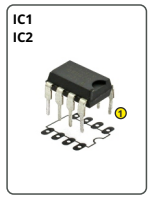




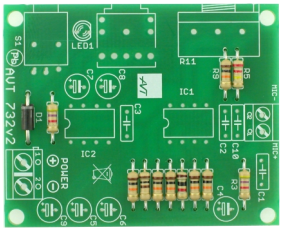


**ATTENTION:** The supply voltage should never exceed 6V

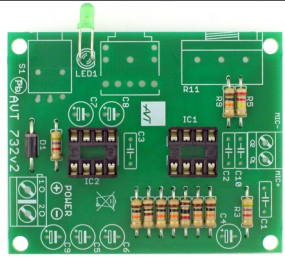
Start off by soldering the printed circuit elements in order from smallest to largest. The unit assembled flawlessly, using the supplied components will operate immediately after switching on the power supply.

# Assembly in 4 steps

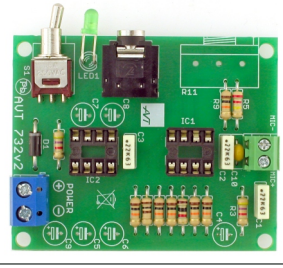
**1** Solder resistors R1-R12 and diode D1



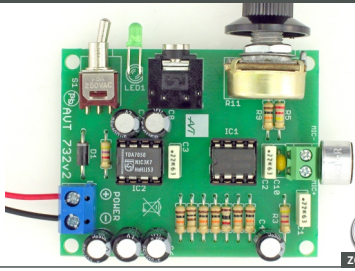

**2** Solder IC socket and LED diode




**3** Solder capacitors C1-C3, C10, switch, headphone jack and connectors




**4** Solder connectors and capacitors C4-C9, potentiometer and insert chip into socket

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## Notes

Thank you for purchasing AVT product. Please take your time to read carefully the important information below concering use of this product.

Educational Electronics Kits are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they cannot be used as a part of life support systems, or systems that for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

• Battery or wall-adaptor are safe devices. They do not require special attention unless main voltage is connected to an output e.g. a relay.
• If the kit is used to switch currents greater than 24V it is necessary to have the installation and performed by a trained professional authorized for such work. The kit may only be used in such application if it was installed in a safe to touch enclosure.
• Never exceed the limits or ratings listed in the 'Specifications' section at the this user guide.
• If the kit is used in schools or educational facilities or similar institutions the operation must be supervised by trained and authorized staff.
• The product itself and all parts thereof (including packing material) are not suitable toys for childern! (choking hazard, risk of electric shock, ...)

Failures in modern electronic component are very rare as 95% of non-working kits are due to poor soldering or components placed in the wrong location or orientation so please check your work carefully.

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