

Resistors

R1, R17, R211K
R2, R1647 ohm
R310K
R4, R14, R204.7K
R5, R18..... 2.2K
R6, R15..... 10 ohm
R71.5K
R81.8K
R91M (one mega-ohms)
R10..... 100 ohm
R11, R12390 ohm - 2W
R13..... 18K
R19..... 22K

** All 0.25w1% carbon film except R11 and R12 (these are 2w and 1% metal film or better)*

Capacitors

C1..... 10uF-16v electrolytic
C2, C318pF ceramic
C4, C5, C7, C8, C9, C14100nF (or Code 104) ceramic
C18, C20, C21, C23, C26100nF (or Code 104) ceramic
C6, C12100uF-16v (or Code 107) Tantalum
C105pF (or 4.7 pF) ceramic-high quality
C11..... 2.2uF-16v (or Code 225) Tantalum
C13, C17, C25470uF-16v electrolytic
C15, C164700uF-16v electrolytic
C19, C221000uF-16v electrolytic
C242200uF-25v electrolytic

** Ceramic capacitors voltage isn't important.*

**you can Use a capacitor with higher voltage but don't use capacitors with lower voltage at all.*

** If you use more than 24 volt battery, C24 should be 35 volts.*

Transistors

T1..... BS170 original
T2IRF840 or STW11NK100Z (MOSFET)
T3BC337

IC

U1..... ATmega328P-PU (microcontroller) Type 28 pin

U2..... LF357N, not fake (LF357H metal, LF157, LF257)

U3..... L7805CV, high quality of 5V regulator

U4..... L7812CV12 volts 1.5 A, high-quality regulator + small and strong heat sink

Other parts

X..... 20MHz crystal 20 MHz (20.000 or 20.0000 or 20.000000)

D1, D21N4148 diode

D31N5819 diode

*LCD..... 16*2 character LCD with backlit*

SP..... small 8 ohm speaker, 0.2 W or more piezoelectric speaker or headphones.

BAT..... Battery 18 to 24 V, 2-4 amps

LOOP..... 350uH - 1 ohm - Spider-loop search (proposed)

S5 high quality push button mounted box (normal cut and pressed mode Contact)

PCB..... 7.3 x 7.9 cm fiber - rather than fiberglass

Socket 8-pin and 28-pin (narrow) system for IC 1 and 2

Small and strong regulator heat sink for 7812

High quality stereo Shield cable or coaxial cable for connecting to the circuit loop (like rg58)

Key for switching circuit

Wire and 3-pin connector and pin header military and...

Explained about some parts

** The cost of circuit part of the device (regardless of the battery and loop and box and frame) is about 10\$! All parts are made of the best and usual parts that find in all of the common electronic markets.*

** Resistors 11 and 12: These resistors should be 1% metal film that is even better than that of carbon. Therefore, the resistance between 380 and 400 ohm 2 W if be 1 percent can answer better than the 390 ohm 5% that is currently on the market.*

Nota bene that the exact number is not important, but thermal stability of resistors is very important therefore using any resistor 1% in the range are better than 5% that it is exactly 390 ohms. But if you do not have access to 1 percent using from 5 percent is okay.

** IC 2: Op-Amp relay the signals to the circuit selected from more than 10 No. Op-Amp and the common good in all tests on the market and selected the best score.*

Fortunately, in the case of the fake IC cannot hurt, it just does not work as well as the original.

** Loop*

A Loop search criterion in the initial testing was of a spider with a capacity of about 350uh and about 1 ohm resistance.

However, due to the possibility of adjusting the pulse width and delay and integration in this circuit, there's actually possible to use a wide range of loops. However, it's recommended to make a stronger pitch of the loop spider or flat like this, to answering the separation and iron reject.

For proper functioning of the separation and iron reject, automatic Delay of loop must be about 20 and if the delay be much higher than 20 the separation not working properly.

Shielding the loop with graphite spray can be useful but not the right answer with aluminum foil and metal detectors range will be low certainly, unless a very thin coating of aluminum was used as a metal itself almost by metal detectors cannot sense!

Cable of loop is also very important .Recommended loop cable to connect the circuit of the brain that is high quality stereo Shield and the Shield on. The anti-noise microphone cable tests MAX brand to have a good result.

connect the cables to the circuit in this case is that the brain stereo shield the cables were connected at the beginning and end of the point-to-point cable shield 2LOOP attach some 1LOOP Contact field.

In fact, this method cannot use the Shield. It also tests a good answer, and given that it may be appropriate stereo cable shield away, was the method used.

The exterior loop into the cable shields up.

Delay is the essential to note that much of the lower number, as well as cable loops will find a sign of higher quality! However, should this test was whether to close its metal cable or cables shaking, the reaction was shown or not? If the cable does not fit! As well as cables with aluminum foil are often not appropriate. If you use a 3-pin connectors and plug type military's recommendations. Of course, of course, should not be near metal connector plug and use loop or loops Metal Detecting will have a negative impact on performance. It may that plastic connectors has a better answer.

** Battery: This circuit voltage between 15 and 24V works very well. But if the voltage is less than 15 volts, the other was not properly functioning and high-voltage circuit 24 can also lead to damage to the circuit.*

The best choice for battery is 18V and 2-4A lit-ion.

The circuit power consumption by adjusting the frequency (200) and pulse width (150) is 100 Am measured and the amount of time the battery will directly depend into this settings.

Installation of primary circuit

Pay attention to that the main power circuit voltage is 12 V. capacitors are selected accordingly, was recommended before the initial launch and circuit insertion capacitors 16 V, 12 V voltage accuracy check up. Otherwise, there will be the possibility of damage to the capacitor.

At the same time pay attention to me whatsoever without placing micro-circuit do not even have a clear one resistor. There is some resistor in the circuit or in the case of placing the wrong Micro will burn! After all the correct insertion resistors must take great care.

Note that the measured voltage to DC voltage in the range between negative Multimeter and batteries or just the shield to the field where the event was:

*** Voltage 12V:**

jumpers between the capacitors 15 and 16 and also point out that the fiber 1LOOP voltage is specified(12v).The maximum error rate for this voltage is 0.2 volts is available between 11.80 to 12.20 volts Ok.

The tests were conducted with 10 regulators, 12 volts, the voltage V are all between 12.10 to 12.20, and in this case there is no problem. However, if the measured voltage exceeds 12V switching regulator that error should be up! If he has no need to verify the wiring circuit voltage was examined. Note too that if more than 13 volts, the voltage of 12 micro IC will be certainly a risk of injury!

*** Voltage of 9.5 volts**

The voltage of the common voltage resistors 13 and 14 is an important voltage. The voltage error rate should be approximately equal to the voltage 12.For example, how much voltage 12 is more than 12 real, 9.5 V, need to do so. The voltage range between 9.30 to 9.70 volts acceptable to be. If the voltage 12 is ok and this voltage has problem, you just check up status and health of R13 and R14.

*** 5V voltage:**

The voltage at the micro and the ADC and LCD had a major impact, and so have a maximum error of 0.1 volts true. So between 4.90 to 5.10 volts is acceptable. Otherwise 5V regulator should be replaced up!

How to connect and function keys.

The device have only 5 push button for all settings on the box and available for operator and these 5 keys had shown to be a wiring to the circuit. The wiring is very simple. This means that one wire of each key point in the S connector and a wire connected to the GND Contact other key shared goal. So we have 5 wires to 5 key and sixth wires or ground GND is connected in common to other 5key every. In fact, one of every five key's heads back together and eventually connects to GND.

OK: the key, to enter or exit the menu, or OK values, which should be in the middle of the 4 remaining keys.

Left: to reduce the value of the menu, or decrease the sensitivity in the exploration well.

The key must be installed on the left side OK key.

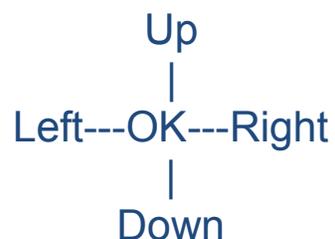
UP: To navigate between the options menu, or Debug mode during exploration well.

The key should be at the top OK.

Right: For large values in the settings menu or hypersensitivity is in exploration mode. The key should be at right OK.

Down: Down between menu options or automatic balancing in exploration mode. The key should be OK at the bottom OK.

Therefore, the ideal placement of the keys on the box, shown below.



GOOD LUCK