Among the inmense spam of modern integrated circuits, now has come to life a new version of the old ZN 414 (developed by Ferranti) which in 1973 and following years was so well known to radio receiver constructors. This new integrated is the MK 484, a three pin chip with the looking of a single transistor but with nothing more than three radio frequency stages, an automatic gain control, detector, and a high input rating up to 4 meghoms.

If you add to all this that the MK 484 needs only 1,5 volts as a driving voltage, you will understand how attractive is this integrated to build your own radio receiver. I certainly could not resist to experiment with this chip and develop my personal circuit combining its' characteristics with an LM 386 IC audio amplifier.

1) I have made up my project in two modules; one is the MK 484 receiver itself and the other is the audio amplifier. The output of the receiver module is to introduce the LM 386 audio amplifier through a 0,1 uF capacitor after being adjusted by a 5 Kohms potentiometer. The set has two different power sources; one with 1,5 volts for the receiver and another one with 4,5 volts to the amplifier.

2) This receiver can be operated directly with a high impedance earphone, a crystal or ceramic earphone, connected directly to its audio output.

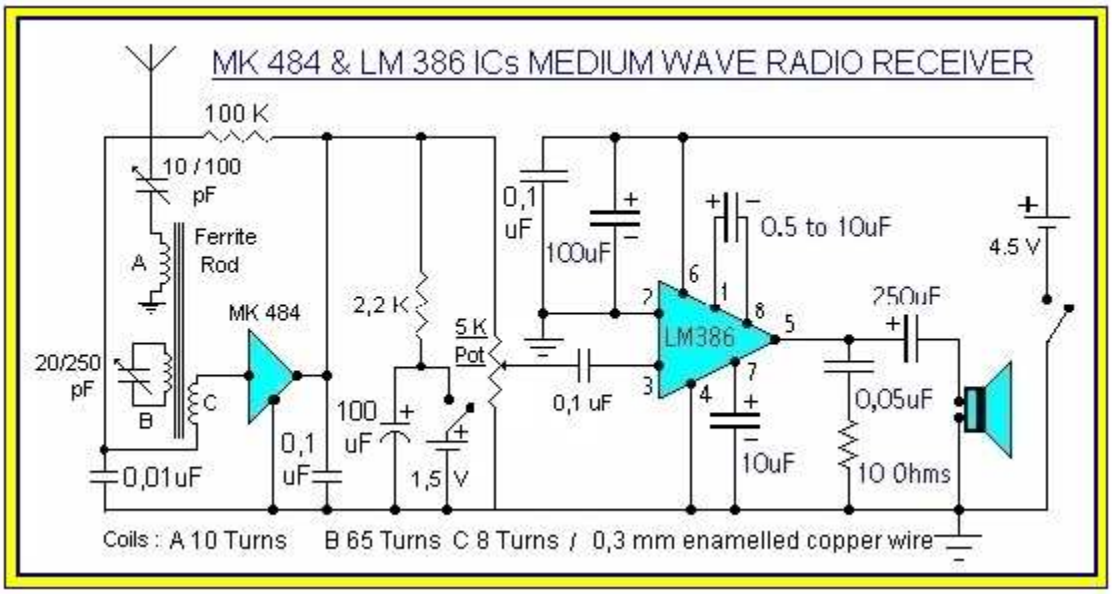
3) We have used a special battery for the MK484 IC due to the fact that the current drawn from the battery is only about 300 microampers (0,003 miliampers), what assures an extremely long life for this battery if you consider that the set will function till its voltage drops to 1.1 volts.

4) This receiver operates normally with its ferrite antenna and also is provided with a special coil to allow receiving signals from a exterior antenna. This coil has 10 turns of enamelled 0.3 mm diammeter copper wire.

THE SCHEMATICS FOR OUR MK 484 IC RECEIVER

You will find in the Web some schematics for radio receivers built with the MK484

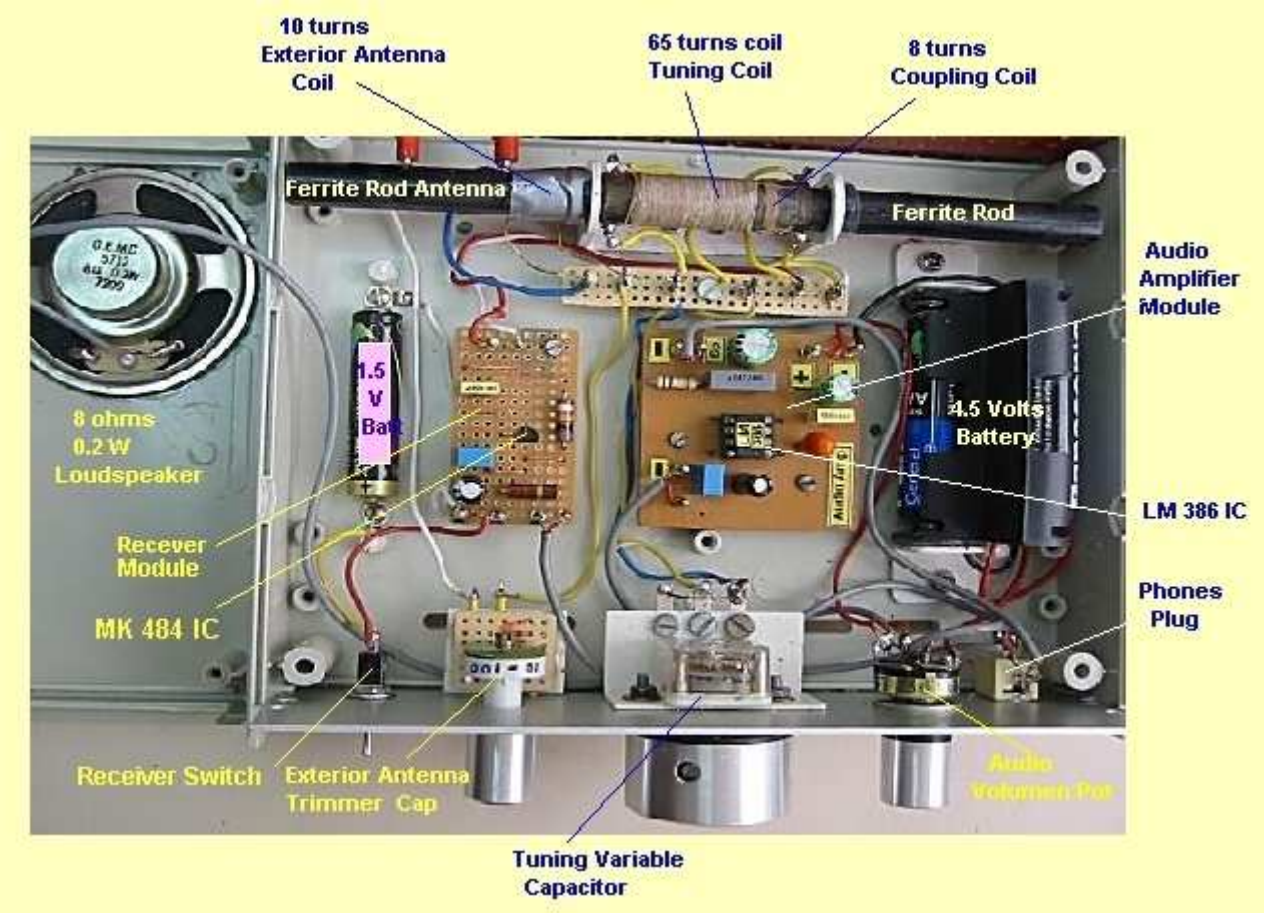
IC. In general all them have a resonant circuit make up of a ferrite rod antenna coil coupled in parallel with a variable capacitor. This resonant circuit is plugged directly to the input of the MK484 IC. I have tested some of these circuits and found that instead of the automatic gain control (AGC), when you have a powerful broadcast station near your home, it is difficult to tune other stations of weaker signals...though some improvement can be reached with the ferrite rod directional effect.



We have developed a better circuit using a second coil to the ferrite rod with only a few turns (8 turns) and plugging this coil to the input of the MK484 IC. With this method we reach a greater selectivity and sensitivity and though a powerful transmitter can overshadow other broadcast stations near to its' frequency, the signal of that transmitter disappears when other stations are correctly tuned.

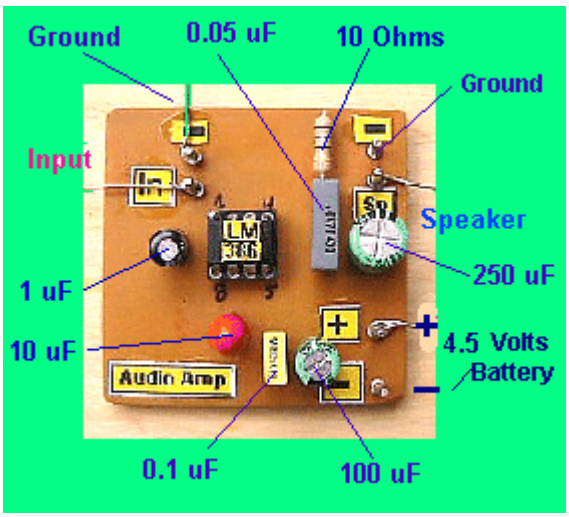
A more improvement is the addition of a third coil, also on the ferrite rod, to facilitate the use of an exterior antenna, what opens up an interesting set of experiments for exploring how we can tune far distant stations. Please see the details and values of the components that integrate this receiver in the schematics.

The Middle Wave Receiver Component Description



THE AUDIO AMPLIFIER

This receiver can be operated directly with a high impedance earphone, a crystal or ceramic earphone, but adding to its output. An audio amplifier makes the set a complete radio receiver able to drive any 8 ohms 0.2 watts speaker.



So you have enough audio power to fill your room. Though if you prefer listening with phones it is possible to add a plug for inserting any low magnetic phone. The schematics of the audio amplifier is the same as you can find in our pages built with the LM 386 IC (please see 'Pedro Projects' in our homepage). The only difference is that this audio amplifier is driven with a 4,5 volts battery or three 1.5 volts cells in series connection.

We prefer an independent battery to the audio amplifier to eliminate the risk of an

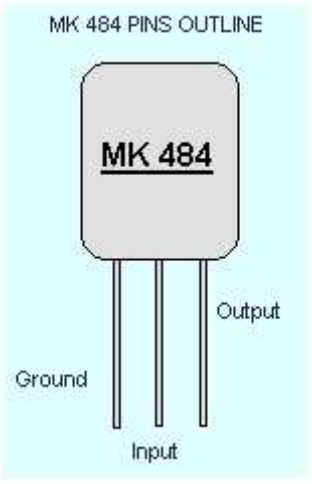
over voltage to the MK484 IC in case of a connection error. Please remember that this integrated does not support voltages over 1.8 volts. The quality of this audio amplifier meets the standards of any commercial radio receiver.

MK 484 IC MAIN DATA AND PINS OUTLINE

This integrated circuit is quite easy to manage. Its main characteristic is its' low feeding voltage; only 1.5 volts. Nevertheless you can drive this integrated circuit from 1.1 to 1.8 volts, but not more than 1.8 volts; higher voltages will destroy the circuit.

In our project, and to avoid the risk of over voltages, we have used a separate battery to feed the chip. It is a cell of 1.5 volts with its corresponding switch. The audio amplifier has another independent battery of 4.5 volt that sources enough power to drive an 8 ohms 0.2 W loudspeaker.

We have used a special battery for the MK484 IC due to the fact that the current drawn from the battery is only about 300 microampers (0,003 miliampers), assures an extremely long life for this battery if you consider that the set will function till its' voltage drops to 1.1 volts.



Other attractive characteristics are its' 0.8 to 1.5 output voltage enough to drive an audio amplifier, and its frequency covering range, from 150 KHz up to 3 MHz, as well as the input resistance of 4 Meghoms. With all these you could construct a receiver for the long wave range, the medium wave, and even for the lower short wave band.

ANTENNA

This receiver operates normally with its ferrite antenna and also is provided with a special coil to allow receive signal from a exterior antenna. This coil has 10 turns of enamelled 0.3 mm diammeter copper wire.

The tuning coil has 65 turns of Litz

wire. If you are inspired by this project let me recommend you to use Litz wire instead of enameled copper wire. The coils quality is superior using Litz wire and in consequence the selectivity and sensitivity of the receiver.

Ferrite rod length and diameter are also quite important. Get for your receiver the longest rod you could, and the bigger diameters if posible.

The dimensions above given for the ferrite antenna and coils are not to be followed slavelessly. Some experimentation on behalf of the constructor will provide the best results!

I wish you the best results with your project if you decide to build a receiver with this interesting and simple integrated circuit, the MK484 IC !

. . . your friend Pedro

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