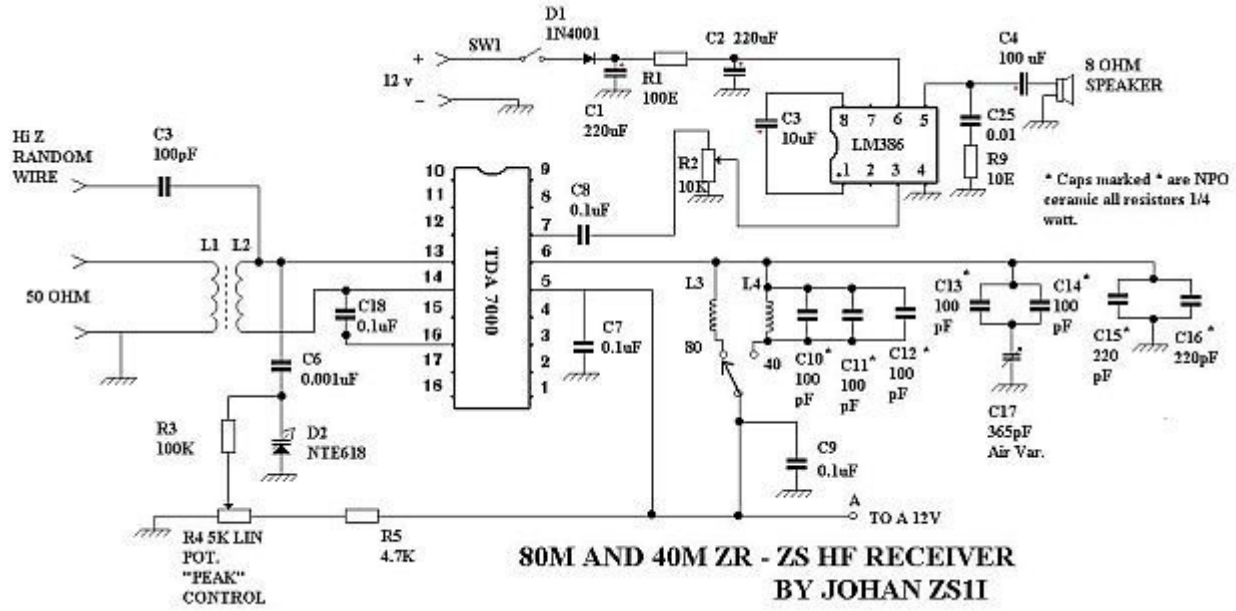

80M / 40M ZR – ZS HF RECEIVER

INTRODUCTION

The 80M / 40M ZR – ZS HF RECEIVER is a general-purpose direct conversion HF receiver. This receiver was designed as a research and development project for radio amateurs as well as non-radio amateurs. This simple but great-performing receiver is safe and easy to build by constructors of any age, a “hands-on” introduction to Amateur Radio. It is proudly developed for the new entrant to amateur radio listening and who is new to home radio construction. This project conforms to the prescribed procedures for Class A1 (ZS) license assessment as required by the Radio Regulations.

You will enjoy the performance of this receiver and you will experience the satisfaction of constructing your own amateur radio “artwork”. I think they call it a sense of achievement!!! I looked at many other direct conversion receiver designs, but chose this one for the mere fact that this receiver combines the “Old” and the “Not so Old” construction technique. **It is not just a matter of “sticking” a few components into the holes and then solder them into place whereafter you apply for your ZS licence.** No, you turn your own coils for the 80m and 40m band and you have the option of altering the receiver to suite your personal needs. Battery powered it covers the popular amateur radio 40 and 80 meter bands. It features are great sensitivity, simplicity and low cost, presentable in appearance and comfortable to use. It can be made at home using common hand tools, while learning about components, soldering, wiring, tuned circuits, antennas and listening to radio communication on the air. A great way to learn about radio and to listen to HF amateur radio communications- with a receiver that you yourself have made!!! **With this project you don’t “buy your ZS Licence”, you truly construct this useful receiver and after completion rightfully and proudly earn the ZS LICENSE.**

Build this project and “transform” that ZR callsign to the sought after ZS callsign.

HOW DOES IT WORK?

We use the TDA7000 FM Receiver chip as a two-band, 80 and 40 meter, CW and SSB receiver. But how can you use a FM chip on CW and SSB? We only use the oscillator and mixer sections as an on-frequency product detector or direct conversion receiver. Performance exceeds existing designs using the NE602 or the later NE612 IC chip. Direct conversion receivers using the NE602 IC chips was quite popular some years ago. Basically a double-balanced mixer with an onboard oscillator and associated regulator components, the NE602 in combination with a 50 or 250 mW audio amplifier makes an excellent direct conversion receiver with only a minimum of support components. Examples of such receivers are: The Neophyte, Ramsey HR-8080 and the Sudden Receiver.

Direct conversion receivers using the NE602 and LM386 do have a couple of drawbacks. Firstly the NE602 or NE612 is quite hard to come by in South Africa and if you do find a source, you will have to fork out a lot of “R” for this IC. Another serious drawback is the lack of dynamic range. Most designs provide for an attenuator pot on the input. The operator must constantly ride the gain. You will also find that the stronger signals drive the NE602 into distortion while the NE602 with an LM386 audio output stage has insufficient volume to drive a speaker to a comfortable listening level. Finally the NE602 has a maximum voltage rating of 8 volts.

Now lets look at the TDA7000. This IC operates at 12 volts. This in combination with an LM386 output stage, has plenty of audio to drive an 8 to 10 cm speaker. Front-end overload is not a problem. The TDA7000 was

designed as a receiver frond end for home telephones, radios and the like. The NE602, on the other hand, was designed as a second IF for cellular phones where it operated in a more steady condition. The TDA7000 is an 18 pin dip with a mixer, an oscillator and two op amps for audio frequency (70 kHz) IF stages, muting, and FM detector stages.

I am not going to go into further detail regarding the functioning of the receiver, as you will soon discover this when constructing the receiver.

CIRCUIT DIAGRAM:

The circuit diagram is shown below.

GENERAL:

Please note the following:

1. Some of the components are imported. (Rand Dollar Exchange rate)
2. Component cost depends on the amount of kits in a batch. (The bigger the batch the cheaper the individual kit)
3. PCB's are made in a minimum quantity of 15 at a commercial vendor. (The more PCB's you order the cheaper an individual board becomes.)

These are just three of the main reasons, which make it difficult to pin a price tag on a kit beforehand. Please contact me via email for current prices.

Finally it is and was never my intention to make any profit from this project. This project conforms to my initial intention to make kits available as Non-Profit Amateur Radio Research and Development Projects.