



Handy Dandy Little Circuits #28

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Super Mike

History

● Back in the olden days , over 20 years ago , an article appeared in the Popular Electronic magazine titled "Shotgun Microphone" which detailed its construction and its superior sensitivity due to its unusual use of tubes cut to half wave length of different frequencies and its ability to detect distant sounds.

Before discarding the publication I cut out the article for future reference and eventually it got buried among the large amount of accumulated files but to my dismay never surfaced when I did a search for it .

I always wanted to experiment with this project but never found the time , but I did remember the details of the "Shotgun" construction and now I undertook to investigate and build this part of the project .

As for the amplifier , well ! forget it . I was now on my own and had to design a brand new concept for its application , the details of which is described further on .

The Microphone

● Below is the mechanical details of the construction of the Shotgun as I remember it . The original Shotgun as described in the article used 36 aluminin tubes of 3/8" diameter each from one inch in length to 36 inches .

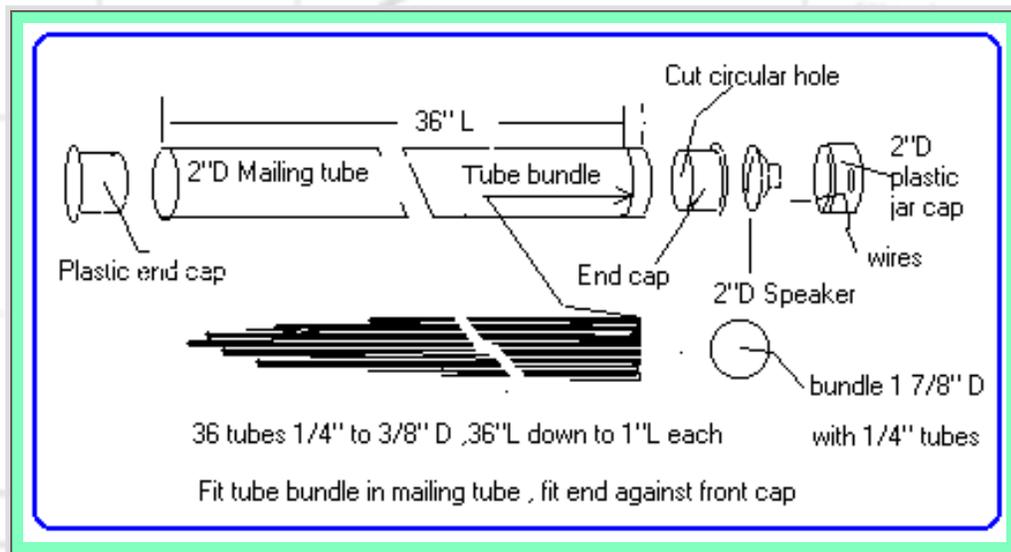
I was not about to spend a fortune to invest into a project that may not work , so , instead of aluminium I went in search of large drinking straws of at least 1/4 " dia. and bought a box which contained enough for the project .

With great patience and a roll of Scotch tape I proceeded to tape straws end to end to make tubes each cut to the length required from 1 " to 36 " plus one more 1 " length to complete a simetrical diameter when bundled together with tape .

The total diameter of the bundle was measure to be 1 7/8 ' dia. and too fragile to be of any use as is . It then occurred to me to use a cardboard mailing tube of 2 " dia . 38 " in length which I found at a local mailing supply store .

Using a two inch wide wrapping of thin foam as a filler around the tubes bundle I inserted the bundle into the tube for a snug fit with the end of the longest tube even with one end of the mailing tube . The mailing tube came with two plastic end caps , one cap is use to cover the front of the mailing tube when not in used , in the face of the other cap I cut a hole large enough for the sound to acces a 2" good quality miniature speaker wich was cemented to the cap as shown in the drawing , a twelve inches length of dual lead wire was soldered to the the speaker . I used a plastic cap from a small glass jar that fit the back end of the speaker , drilled a small hole on the edge of the cap and inserted the wire

through it then cemented the speaker to the tube cap then the jar cap to the edges of the speaker to form a sealed unit that can be inserted into and removed easily into the mailing tubes .



Super Mike Amplifier

Designed by L . Gendron (Aug , 2001)

As a reference you may wish to open up a [new window](#) to view the circuit while reading the description. **Resize as required .**

Circuit Description

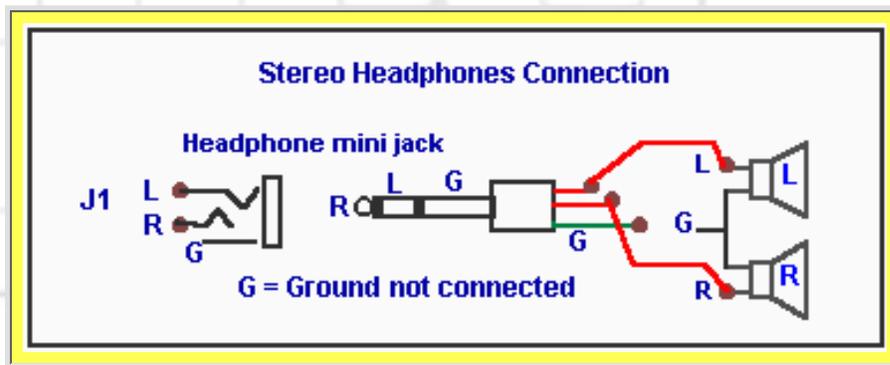
• Modern long range microphones amplifiers are a work of art incorporating miniature circuitry and digital filters which are beyond the average hobbyist like me and I had to make do with common parts available in my junk box and easily accessible to all . After much experimentation I came up with a fairly basic circuit , simple in concept and easy to put together .

Odd as it may sound ,to start with I chosed a small speaker because of its limitations . Because of its low response to higher frequency I had a built-in filter against high frequency noise . The speaker has a very low impedance output and Q1 is used as a comon emitter which will readily couple the speaker to Q2 high impedance input for high gain amplification .

But Q1 does a lot more , it is also used as the stage which provides automatic gain control (AGC) and first stage filtering as follows ;

RV1and R2 provide feed back from the emitter of Q2 along with C2 to bias the base of Q1 , setting RV1 adjusts the limit of amplication of Q1. As C2 is fully charged this feed back voltage will discharge C2 to ground at a rate determined by RV1 setting . Any additional feedback voltage above C2 voltage level will be discharged through C2 to ground thus maintaining Q1 gain level .

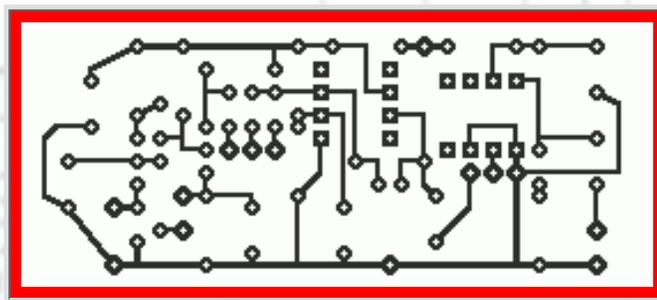
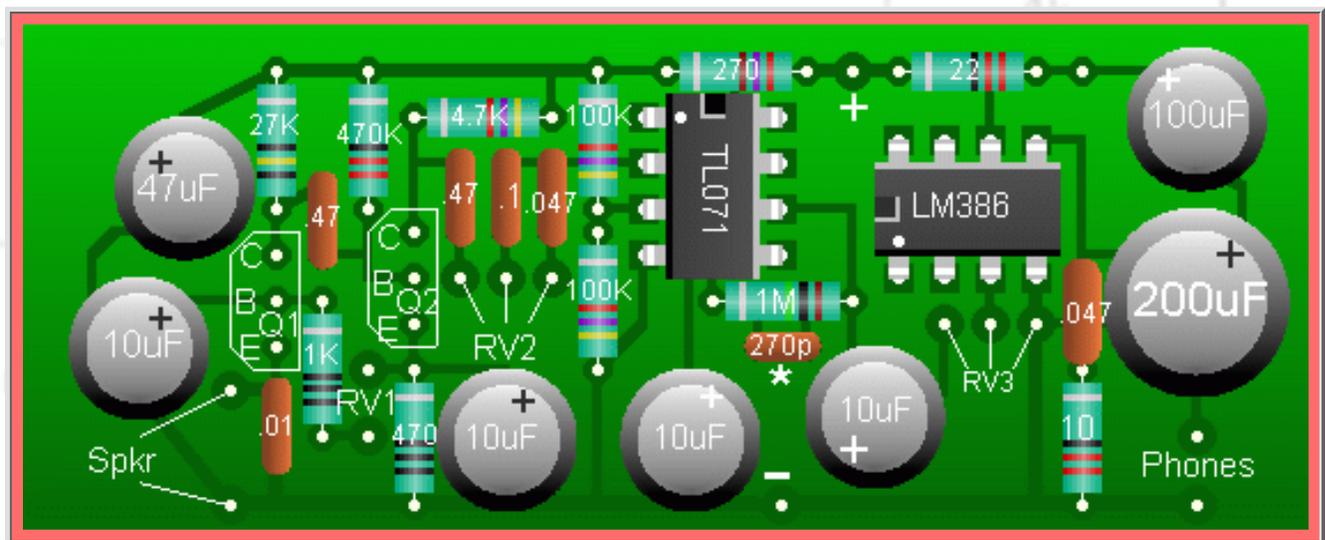
. With 8 ohms stereo headphones connected in series the impedance will be 16 ohms at the output of the amplifier .



Using Super Mike

● Super Mike amplifier can be used anyway you want with or without the " Shotgun" . I used it with a dish type system and it performed very well . On its own the speaker can be used against a wall surface with excellent reception . It is extremely sensitive and best results are obtained by setting the volume as low as possible to start with , set RV1 and RV2 to mid point , ambient noise will be present and cannot entirely be eliminated as it is present at all frequencies . Adjust RV2 for best clarity then slowly adjust RV1 for best frequency selection while adjusting RV3 for a comfortable listening level .

Layout



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