The CMRA SQUELCH TALE

AMATEUR RADIO SERVING THE PUBLIC

July 1994 | An ARRL Special Service Club | WDØDVG Repeater 146.16/.76

President's Corner - Bill Stroud NØNMB

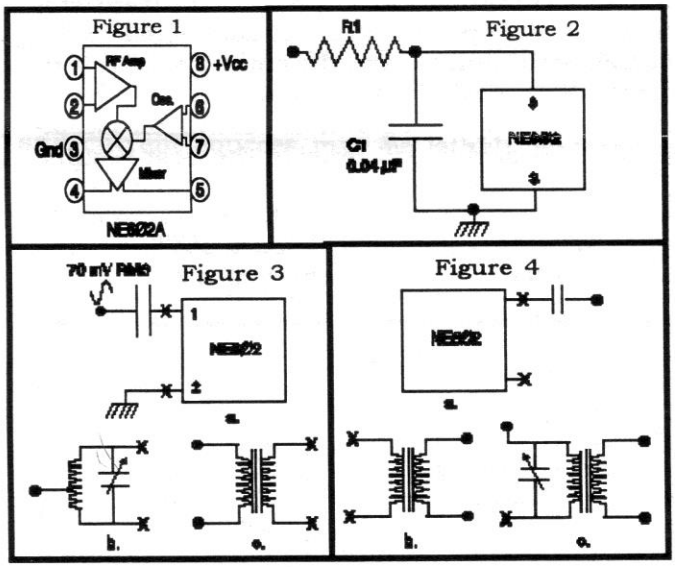
Since all the most "impotent" people were out of town last meeting, we don't have any minutes! Perhaps this synopsis will suffice.

The Salvation Army was approached as a user of Amateur Assistance. Rob, NØLLZ stated that a few "lids" were making the repeater virtually useless for the rest of the members. Mike, NØLBA, said he would contact the offenders and try to educate them. The Treasurer reported $4,659 in the checking account. Bill Brady, NØUEY reported that the University added an extra $845 charge to the bill for the Hamfest. Alternatives for next year were discussed. A Boone Electric Coop. repersentative gave a talk on new satellite TV dish technology. I would like to remind all good operators to look again at the Amateurs Code of Operation in the ARRL Handbook.

NOTICE: Please make every effort to attend the July 12 meeting. We need to make some very important decisions about the future of our Hamfest! See you at the Boone County Electric Coop. building at 7:00 p.m.

Circuit Notes - Perry Ogletree NØNMC

The NE6Ø2 - Part II



In this installment, we will look at basic use of the NE6Ø2 (see figure 1). The chip has a voltage limit of +8 volts on pin 8. You may use a 9 volt battery if you have a 1 K ohm resistor as R1 (see figure 2). For lower voltages, a 150 ohm resistor is fine. If you intend to power the chip with higher voltages, you will need to derive a lower voltage from the supply to prevent damage to the NE6Ø2 (see the ARRL Handbook). The PC board we will design will have provisions for a "three terminal" voltage regulator. One note:

Due to the VERY high gain (20+ db.) of the RF/Mixer, close attention should be given to supply bypassing. The Ø.Ø4 µF. capacitor is actually several caps in parallel. Also, be sure to use short lead lengths.

The input to the RF/Mixer stage is shown in figure 3. Pins 1 and 2 connect to the bases of two transistor in the balanced mixer. The transistors have internal 1.5 K ohm resistors from the base to ground. The input impedance is in the range of 1 K ohm. The basic input shown in 3a. is single ended and will not give the best performance at high signal levels. Figure 3b. shows a single ended, inductive matched tuned circuit. Figure 3c. shows the use of

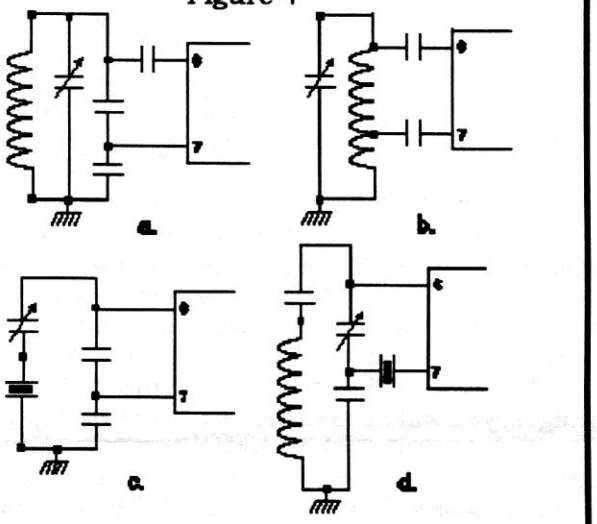
Circuit Notes (continued)...

a balanced transformer for maximum performance. For most applications, the circuit of 3b. will give very good results.

Output configurations are shown in figure 4. Internal resistors are connected from the collectors of the output transistors to the power supply pin. The output impedance is around 1.5 K ohms at each output pin. The simple output circuit of 4a. will provide a workable solution. Better performance will result from the circuits shown in 4b. and 4c. The single ended output of 4c. will do for most applications.

The internal oscillator transistor can be reached via pins 6 and 7. The base of the transistor is connected to pin 6. Pin 7 is connected to the junction of the emitter and the emitter's DC return resistor. Standard LC and crystal oscillator circuits will provide adequate operation. As with all oscillators, careful design will provide the best results. Figure 5 shows several typical circuits. Colpitts and Hartley LC circuits are illustrated in 4a. and 4b. Figure 4c. shows a crystal Colpitts oscillator and 4d. is a Butler crystal overtone oscillator.

Figure 4



In the next installment, we will look at the audio amplifier circuit and start the design process. As I have stated before, if you have any suggestions or ideas, please let me know!

AMATEUR FREQUENCY OPERATION RECOMMENDATIONS (ARRL Band Plans)

Reprinted from "The Considerate Operator's Frequency Guide", January 1993 QST, page 61 and the ARRL Repeater Directory. This information is for quick reference only - refer to the band plan listings in the Operators Manual, The FCC Rule Book or the ARRL Repeater Directory for full details. For sharing arrangements, see Section 97.303 of the FCC Rules. For detailed packet frequencies, see QST, September 1987, page 54 and March 1988, page 51.

160 METERS (1.8-2.0 MHz):

1.800-1.830	CW, RTTY and other NB modes
1.830-1.840	CW, RTTY and other NB modes Intercontinental QSOs only
1.840-1.850	CW, SSB, SSTV, other WB modes Intercontinental QSOs only
1.850-2.000	CW, phone, SSTV, other WB modes

80 METERS (3.5-4.0 MHz):

3.590	RTTY DX
3.580-3.620	RTTY
3.620-3.635	Packet
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency

40 METERS (7.0-7.3 MHz):

7.040	RTTY DX
7.080-7.100	RTTY
7.171	SSTV
7.290	AM

30 METERS (10.1-10.15 MHz):

10.130-10.140	RTTY
10.140-10.150	Packet

20 METERS (14.0-14.35 MHz):

14.070-14.095	RTTY
14.095-14.0995	Packet
14.100	NCDXF Beacons
14.1005-14.112	Packet
14.230	SSTV
14.286	AM calling frequency

17 METERS (18.068-18.168 MHz):

18.100-18.105	RTTY
18.105-18.110	Packet

15 METERS (

21.070-21.090	RTTY
21.090-21.100	Packet
21.340	SSTV

12 METERS (24.89-24.99 MHz):

24.920-24.925	RTTY
24.925-24.930	Packet

10 METERS (28-29.7 MHz):

28.000-28.070	CW
28.070-28.150	RTTY
28.150-28.190	CW
28.190-28.200	New Beacon subband *
28.200-28.300	Old Beacon subband *
28.300-29.300	Phone
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite Downlinks
29.510-29.590	Repeater Inputs
29.600	FM Simplex
29.610-29.700	Repeater Outputs

* Note: The FCC states in 97.203(d) that automatically controlled beacons may only operate on 28.20-

Next issue, we will continue with the VHF/UHF bands....

EFFECTS OF CURRENT ON THE BODY AND ELECTRICAL SAFETY-Don Blenden NUØT

Here are some facts and figures regarding electrical current, and how it interacts with the human body. It never pays to get careless working with live circuits. Increasing your knowledge will make you ever more prudent when working with energized gear or circuits in or outside the home.

Direct current produces heating in live tissues. However, the starting and stopping of DC (switching it on and off) briefly mimics AC and produces contractions of muscles, or the feeling of the "shock". This occurs when the DC current changes from Ø to maximum, and from maximum to Ø.

Alternating current (AC) effects tissues differently depending on the frequency of alternations. 6Ø Hz. AC produces severe muscle contractions and the unpleasant sensations of "shock" and heating. As the frequency of alternations increases, there is less muscle contraction and more heating and burning of tissue. RF levels of AC produce heating of tissue and burns, the severity of which is determined by the duration of contact and amount of current.

Considerable research has been done on human volunteers to determine the effect of AC. Measured current is applied to hand held electrodes and increased until the person can just barely release the grip on the electrode; this is called the "let go" current threshold. Somewhat higher levels contract muscles to the point the person has no control. In groups of men and women, using 6Ø Hz .current, the following results (average values for each group) were obtained:

Men	Women	Sensations
"Let go" threshold		
16.5 ma.	**1Ø.5 ma.**	**painful**
"Hold-on" threshold (muscle tetanus)		
23 ma .	**15 ma .**	**very painful**

At a level of about 5Ø ma. of AC current, the heart muscle will go into fibrillation, which amounts to non-effective quivering rather than effective contraction and pumping. The person loses consciousness if the brain is deprived of blood supply for about 5 seconds. The duration of the current is obviously extremely important, and the larger the current, the less time needed to cause the effect. Brief exposure to electrical current is used clinically as an emergency procedure to stop fibrillation and to begin effective beating.

Various tissues of the body vary in their resistance, which of course interrelates with voltage and current. Resistance rapidly drops in tissue after the initial introduction of current, so the values given next are "Initial" values, which rapidly decline if the current persists. The higher the voltage, the faster the decrease in resistance.

Ranges of Initial Resistance	
Dry skin	**1Ø K Ohm to 3ØØ K Ohm**
Wet skin	**1 K Ohm to 1Ø K Ohm**
Open skin (cut)	**2ØØ Ohm to 1 K Ohm**

Ohm's law states, I = E/R. Then assuming household voltage and dry skin, I= 12Ø/1Ø,ØØØ = Ø.Ø12 or 12ma. Giving us a current approaching the "Let Go" threshold. Applying 12Ø volts to one hand with the other hand touching a ground source makes a highly efficient circuit with current passing through the chest, INCLUDING THE HEART. Remember that about 5Ø ma .can put the heart into fibrillation, which may or may not recover without fast intervention.

The diagrams show how the tissues of the body serve as resistance and pathways for the passage of current. These simplified drawings are for understanding only! ANY contact with voltage and current sources may be lethal. A complex combination of circumstances determines the outcome in each instance.

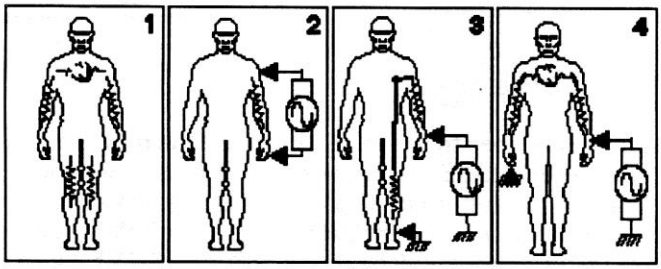


Figure I. The body is a big, highly complex resistor. Different tissues have different levels of resistance, and the resistance decreases as current starts to flow through tissues creating a "snowball" effect.

Figure II. When contact occurs, and the body has no external ground, the tissues of the body serve to complete the circuit. This presents a relatively high resistance, but that resistance begins to decrease rapidly allowing current to increase. This is an inefficient circuit, but still dangerous.

Figure III. If the lower part of the body is grounded (wet floor, wet shoes, bare feet, etc.) and the hand contacts AC, current passes between the point of contact and ground using the shortest path and lowest resistance. Some current passes through the heart muscle. The greater contact area lowers the resistance allowing larger currents to flow increasing the danger of electrocution.

Figure IV. If one hand touches a ground source (approximating an earthen ground) and the other touches a source of AC, a lethal potential exists. The current path goes through the chest and heart muscle as the shortest route and lowest resistance. The current rises to lethal values!

Does this make the workbench a hazardous area-- working with both hands? ABSOLUTELY! Always follow the safety procedures outlined in the ARRL Handbook. DON'T let yourself get nailed!

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SAREX/SPACE NEWS

As this issue goes to press, the next shuttle mission is scheduled to lift-off. If all goes well, you may be able to work the astronauts! The worldwide SAREX downlink frequency is 145.55 MHz. The downlink is the Astronauts' transmit frequency. PLEASE DO NOT TRANSMIT ON THIS FREQUENCY!
The worldwide FM packet uplink frequency is 144.49 MHz. The FM voice uplink frequencies are 144.91, 144.93, 144.95, 144.97 and 144.99 MHz. Earth Stations should use these as their transmit frequencies.

For a little taste of space, the DO-17 "Dove" satellite can be heard on 145.825 MHz. several times a day. It has a packet burst and voice ID saying "Hi, this is Dove in space." The signal is very strong and can even be heard on an HT!

Classified Ads

WANTED: Solid state 6 meter SSB transceiver, digital readout nice but not required. FT-620B or similar ideal! Please contact :

Perry Ogletree NØNMC
3609 Bray Ave.
Columbia, MO. 65203-0877
(314) 445-2662

For Sale: Your bargains that everyone else wants! List them here...

Editor's Corner - Perry Ogletree NØNMC

Here it is the second month of Summer! I hope you are getting all those antenna projects in order. If you're like me, you will wait until it's snowing and 20 below! Anyway, I hope you had fun at the Hamfest. It sure seemed to be a great show this time. KUDOS to all those who helped make it a success. It's unfortunate that the University does not want to cooperate to increase public participation and awareness of high tech hobbies. I guess there isn't enough money in it for them. It seems funny to me that a public funded institution has such a "greedy" outlook. I guess it is time to start writing letters to our state reps and start working to replace those who don't help open up our public institutions. Until next time, keep the info on the highway!