# The Framingham Circuit

Newsletter of the Framingham Amateur Radio Association February 2008, Vol. 75, No. 2

## In This Issue



## Thursday, Feb 7
### This Month's Meeting

Bill Ricker, N1VUX will be giving a talk on VHF propagation.

### Submitting Material to the Circuit

Material may be submitted for publication by sending it directly to the editor. This can be done by US Mail, or via the Internet (preferred). The deadline for each issue is the ***Wednesday***, one week before the monthly meeting.

**by mail**
Robert Hess, N1UVA
178 Mountain View Ave
Bristol, CT
06010

**by internet**
circuit@fara.org

## President's Message

Winter has certainly made its presence known with a couple of good storms and very cold temperatures. However, through it all, your club has been working very hard to make our Diamond Anniversary year extra special for you. First, Sumner, W1VIV, has found a supplier for the 75th Anniversary blue denim shirt with the special logo embroidered on it. This is a one time ever edition, so please see or email Sumner, who must have your check for $21 (made out to FARA) by February 15. Also, we have received the special commemorative pins which are a bargain at $3.25 each. These will be on sale at the February meeting! Bev, N1LOO is looking into special T-shirts for the event, as we haven't had a new run of them in a long time. All of these are being sold at cost, and the club is not making a profit on them.

By now you know that the Anniversary Party will be held on Saturday, June 14, at the Marlborough Marriott hotel. Tickets for the event are $30 each and include a great buffet dinner and party favors (see the flyer attached to this Circuit for more details). Thus far, we have approximately 50 people who have expressed interest in coming to the celebration. However, according to the bylaws, we need YOUR vote at the February meeting to approve an expenditure of up to $1000 for party favors and door prizes. Without your vote, this may not happen! I wish to thank our party chairperson, Greg, W1TDF, for donating his time and resources in printing the tickets, and, more importantly, taking orders for the bash.

After the business portion of the meeting, we will be recognizing Bryan Cerqua, W1BRI, for all of his hard work in getting our 147.15 repeater back on the air. Bryan did a fantastic job and we owe him a great "thank you!" We will cap off the meeting with a presentation on VHF propagation by Bill Ricker, N1VUX. I understand from Bryan that this is an excellent talk. We will also be resuming our monthly FREE raffles! There's a lot going on, so please make every effort to attend this meeting!

Finally, have you taken advantage of Ed W1NXC's FREE classes? Look for the schedule elsewhere in this Circuit. Our renowned "License in a Weekend" course will take place on March 15 and 16. If you know of anyone who is looking to get into ham radio, please recommend this class. Many FARA members are graduates of Ed's program and have become very active hams as a result.

And, as if this wasn't enough, the FARA flea market is only two months away! As in the past, we will be looking for people to assist us in making this a success. Thank you Bev, N1LOO, for taking charge of this again!

See you at the Feb.7th meeting! Come in from the cold and enjoy the warm camaraderie of your fellow FARA members and learn something new! I still want to wear my straw hat if we have at least 30 people in attendance!

73, Gordy K1GB

## 2008 Scholarship Rules

As in previous years the rules are:

1. Must be a member of FARA.

2. Applications must be turned in or post marked by April 15, 2008.

3. Must be a license radio amateur.

4. Preference will be given to graduating high school seniors.

For applications contact Richard Cosma AA1VI 508 877 8241

Or richard.cosma@alkermes.com

## First Alert-License-in-a-Weekend March 15, 16, 2008

By Ed, W1NXC

Here it comes again! FARA's License in a weekend. This will be our 16th year of offering an entry-level course for prospective Ham radio operators. Almost 200 students have taken this accelerated course and over 90% have obtained their FCC Tech license.

This year there will be a few changes, mostly minor ones. Last March a severe ice storm wiped out our usual Friday night session. As a result, however, we realized that the course could be adequately covered in just two days, Saturday and Sunday. The seven students who braved the weather (Saturday was almost as bad as Friday night) all passed the Tech exam on Sunday. The first session is now scheduled for Saturday morning at 9 am on March 15, at the club location downtown Framingham.

We will also have a cut-off date for registrations of March 1, 2008. Strict adherence to this date will allow us to arrange for facilities, text books, food and other miscellaneous details.

## A Regulated DC Voltage Reducer

By Sumner Weisman, W1VIV

Much of our ham radio equipment runs on a nominal 12 Vdc these days. Not only are we powering mobile radios with our automobile batteries, but most of us also have one or more AC line-powered 13.8 Vdc regulated supplies as part of our indoor stations as well. That's fine as long as your radios are designed to operate on this voltage, as most are. But, what happens when you need a regulated DC voltage other than that? Is it necessary to go out and buy another supply? Often, it's not. In my case, I needed a regulated 6 Vdc at 600 ma to power a small HT. I had been using it on batteries, which frequently needed recharging. Looking around at several 13.8 volt supplies in my shack, I knew it would be foolish to buy a new supply. I decided to design a device that would reduce the 13.8 volts to 6 volts, and could be used both indoors and in my car. Figure 1 shows the finished product, which has turned out to be very handy and gets a lot of use.

Many long-time hams have a pretty good junk box, loaded with parts that you "might" need someday. Mine is usually quite adequate, and I quickly found everything required for this project with only one exception – I didn't have a socket for a large TO-3 transistor case. A short note on our radio club's e-mail reflector soon solved that problem, and I was ready to go. It's a great feeling of ham radio self-sufficiency when you can build a weekend project without going shopping first!

**Circuit Description**

See the schematic, Figure 3. The output voltage is determined by a zener diode reference that drives a dc current amplifier. The amplifier circuit, where one emitter follower drives another, is called a Darlington configuration or *beta* multiplier. *Beta* is a term for the DC current gain of a transistor, and is called $h_{FE}$ on transistor specification sheets.[1] The DC current gain of Q1 is multiplied by that of Q2, resulting in a circuit which can supply a high output current with only a very small input current required. Using a 2N3055 power transistor for the output stage, mounted on a small heat sink, (see Figure 2) the circuit can easily supply the 3.6 watts needed by the HT. The zener diode must be selected to be about 1.4 volts higher than the required output voltage, since each transistor will reduce the voltage about 0.7 volts. This is the typical voltage drop of a forward-biased PN junction, specified as $V_{be}$, (voltage, base to emitter). The purpose of capacitor C1, a disc ceramic, is to provide a low AC source impedance to the load.

**Construction**

I fabricated a small heat sink for the output transistor out of 1/8th inch aluminum stock. When mounting this transistor, I used thermal heat sink grease on both sides of the insulating washer for optimum heat transfer. The layout is not critical, nor is the construction method. As the photo shows, I used the perf board method with push-in pins.

In order to test the supply, I ran it for an hour at full load, and the 2N3055 and heat sink got fairly warm to the touch. This is not a concern, since the actual operating duty cycle when using an HT is far lower than the worst case condition I simulated. If you require more output current than I did, you can package the supply with a larger heat sink. The 2N3055 is a real work horse, and can supply up to 15 Adc of output current as long as the maximum power dissipation is not exceeded. Don't forget to derate the power dissipation spec above 25° C. You may also have to increase the fuse size. I do not recommend mounting the 2N3055 metal can transistor to the outside of the housing, since the collector is connected to the case and is "hot" at +13.8 Vdc. That's why I mounted it inside, to avoid an accidental short to ground.

Always remember that hams must be innovative. If you can't find a zener diode with the required voltage rating, than simulate one. Select the next lowest rated zener, and add forward biased rectifier diodes in series. In other words, the anodes will go to the more positive voltage. Each diode will add about 0.7 volts to the zener rating. They are inexpensive, and using several in

### FARA Email Reflector

If you have email and aren't signed up for the FARA email reflector, you're missing out on the last-minute news and updates. To sign up, send an email to Sharon at kc1yr@kc1yr.com requesting her to add you to the reflector.

**Shopping Online?**

Use fara.org/amazon and help out the club. FARA receives a small percentage of your order.

### Membership Dues

Annual membership dues are as follows: (Make checks payable to FARA)

Regular FARA $15

Student / Retired $10

Repeater (voluntary) $10

series with the zener can easily give you the voltage you need. The 1N4001 or equivalent is fine for this application.

Obviously, you could wire the input cable directly to your power supply terminals. I chose to use a plug for a lighter socket so that I could also use it in my car as well. For indoor use, I modified one of my 13.8 volt supplies by adding a cigarette lighter socket, bought in an auto parts shop, to the front panel. They also make commercial supplies using this configuration.[2] I now can go from car to car to house with no changes!

**Customize the Circuit**

If you need a different output voltage, the design is easily changed. Simply select a zener diode that is rated about 1.4 volts higher than the required output voltage. You may also have to change resistor R1, since the diode must have sufficient current to ensure that you are operating above the knee of the zener curve. 20 to 40 mA is typical – look for $I_{zt}$ (the zener test current) on the spec sheet.

Equation 1: By Ohm's Law, $$R1 = \frac{(13.8V - V_Z)}{I_Z}$$

Equation 2: $$V_Z = V_{OUT} + 1.4$$

Substituting, $$R1 = \frac{[13.8V - (V_{OUT} + 1.4)]}{I_Z}$$

Therefore, $$R1 = \frac{12.4V - V_{OUT}}{I_Z}$$

Where:

$V_{OUT}$ = desired output voltage

$V_Z$ = zener diode voltage rating required

$I_Z$ = zener operating current

It probably won't be necessary to change R2, since the LED indicator lamp can operate over a wide range of current. If it is too bright or too dim, change R2 accordingly.

**Get Out and Operate!**

This was an easy weekend project, and it saved the cost of a regulated power supply. The handy little voltage reducer/regulator goes everywhere my HT goes, and it definitely makes operating easier and more fun. I still have to recharge my batteries now and then, but certainly not as often.

**Notes**

[1]Typing the transistor part number into Google is an easy way to get specification sheets, usually in PDF format.

[2]For example, Radio Shack part number 22-507. www.radioshack.com.

## FARA Horizons

| | |
|---|---|
| Feb: | (Meeting) Bill Ricker, N1VUX on VHF propagation |
| March: | (Meeting) Mark Rubin, WB1ARZ and John Ruggerio, N2YHK from W.E.C.T (Worcester Emergency Communications Team). |
| March 15-16: | License in a Weekend |
| April: | (Meeting) Scott Anderson, NE1RD on "The 100 pound DXpedition" |
| April 6: | Flea Market |
| May: | (Meeting) Pizza Party after Flea Market |
| June: | (Meeting) TBD |
| June 14: | FARA 75th Anniversary Party at Marlborough Courtyard Marriot Hotel |
| June 28: | Field Day |

# EVERYONE IS INVITED

**SAVE THE DATE JUNE 14**


**GRAND PRIZE A 19" LCD HDTV**

# Anniversary Celebration

**The Framingham Amateur Radio Association was founded in 1933, and this year we are celebrating our 75th Anniversary.**

**Come join us at the Marriott Courtyard in Marlborough on Saturday June 14, at 6:00 PM**

**There will be music and fine dining, door prizes, and a 19" HDTV Grand Prize. The meal is buffet style, so everyone gets what they like best, and lots of it.**

**Directions:** **The Marriott Courtyard is at 75 Felton St. Marlborough MA 01752 From Rt. 495, take Exit 24B (Rt. 20 West). The Marriott sign is visible as you exit.**

| Ticket Info | For tickets, send this form and a check **(Payable to FARA)** by May 31 to **Greg Andrews W1TDF, 32 Springhill Rd. Framingham, MA 01701** |
|---|---|
| Greg Andrews<br>508 877-7115<br>(Before 9:00 pm)<br>andrews.greg@gmail.com<br><br>Tickets $30 each<br>Purchase by May 31 | Enclosed is a check (payable to FARA) for $_____For__Tickets<br>Name_____Call Sign_____<br>Address_____<br>City_____State_____Zip_____<br>Phone<br>(____)_____Email_____ |

## Club Information 2008

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|---|---|---|---|---|
| President | Gordy Bello | K1GB | 781-891-5572 | president@fara.org |
| Vice President | Leo Cantin | WA1HAM | 508-877-3319 | vp@fara.org |
| Secretary | Tom Malloy | N1FTB | 508-655-0392 | secretary@fara.org |
| Treasurer | Peter Simpson | KA1AXY | 508-429-7069 | treasurer@fara.org |
| Director | Bev Lees | N1LOO | 508-626-2012 | director@fara.org |
| Director of Training | Ed Weiss | W1NXC | 508-881-2301 | |
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| Publicity Coordinators | Joe Weisse | W1HAI | 508-654-9999 | wa1hai@arrl.net |
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| Newsletter Editor | Robert Hess | N1UVA | 860-227-9188 | circuit@fara.org |
| Webmaster | Sharon Gartenberg | KC1YR | 508-877-6692 | webmaster@fara.org |

Meeting: Club meetings are normally held on the 1st Thursday of each month at 7:30PM in the basement of the Danforth Museum, on Lexington St.

Club Nets: FARA Net: Sunday, 7:30PM, 147.75/147.15 - social/chat, ARES preparedness

Club Station: W1FY, the club station and shack, is open Saturday mornings from 8:30-12:00. Call the club number, 879-8097 to confirm.

Club Web Site: http://www.fara.org