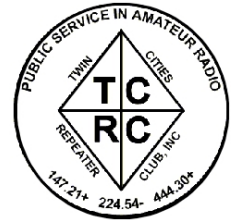


# The Repeater



The Official Publication of the Twin Cities Repeater Club, Inc.

## CQ Field Day, W Ø B U, Three Alpha, Minnesota!

By Phil Lefever, KBØNES, Field Day Chairperson

While spring was late in coming, I think we can safely say it is here now. This means that the TCRC Field Day committee is turning its thoughts to this summer's upcoming event. Even though the sunspot peak has come and gone, conditions on the HF bands have remained good, making for the possibility of some excellent radio conditions for this year's event.

This year, the ARRL-sponsored operating event/contest/social gathering is scheduled for the weekend of June 22 and 23. Field Day was originally started in the name of training amateur operators to operate using temporary stations, in less than ideal conditions. The lessons learned by those that operate Field Day are invaluable, in the event that any large-scale disaster ever occurs. Within hours, we could have several stations on the air using temporary equipment to provide wide range communications. All this is accomplished without using any permanent equipment, and using only emergency power. Field Day helps us to keep our skills sharp, and teaches us how to pull together and work as a team.

As in past years, we plan to use our normal Field Day location at a farm site just South of Rosemount. This site has served us very well in the past. There is ample room, yet it is still fairly close to the metro area. Our farmer friend, Jerry Stezel, has been a gracious host for many years, preparing the area prior to each event. The most amazing part of his hospitality is that he isn't even a Ham!

As in years past, we will be entering in the 3A class. This means that we are able to run three full-time HF stations for the duration of the operating event. The rules also allow for several "bonus" stations that give us the capability of additional contacts without moving us into another class. One of these bonus stations is our VHF/UHF station that we will operate on all modes, on some or all of the bands between 50 MHz and 2304 MHz. We will also work some of the Amateur Satellites for fun and bonus points. A change in the rules this year will make our second bonus station a GOTA (Get On The Air) station. This is a replacement for the former Novice and Technician Plus station, due to the declining number of licensed Novice and Technician Plus class operators since the FCC license restructuring occurred. The GOTA station will be staffed by Novices and Technicians, or by somewhat inactive operators. The intent is to give new operators and non-hams a chance to get some real HF experience. The HF stations will be operating on 80m through 10m using SSB, CW and PSK31. All five stations will be connected via a computer network, to facilitate the logging of all of the contacts we make.



Phil Lefever, KBØNES

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Spring/Summer 2002  
Volume 25, Number 2

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Field Day  
2002  
June 22 – 23  
Be there!



Becky (KBØWZU) and Monica (KBØUWZ)

## Field Day — FØOD Station

That time of the year is here again for raising antennas and calling CQ. This is the one weekend a year I really look forward to, getting to see old friends and meet new ones. This is the weekend the TCRC truly shines. It is so wonderful to see all the people come out to help and to participate in something that is not only fun and rewarding but also necessary.

Along with the contesting, here are a couple of other things that will be going on at the most visited Station at Field Day — the FØOD Station:

**POT LUCK DINNER** – Saturday June 22<sup>nd</sup>, starting about 6:00pm. *Bring a dish to share.* Hot dogs will be provided by the TCRC.

**PANCAKE BREAKFAST** – Sunday June 23<sup>rd</sup>, starting at 7:00am. Station Operators get to eat first!

We are always looking for donations of Pop and Ice throughout the weekend. Donations of any kind will be greatly appreciated. Please bring your food donations early on Saturday for set up.

I am looking forward to seeing you at Field Day. **73 from Monica – KBØUWZ**

**The Repeater** is published quarterly by the Twin Cities Repeater Club, Inc. (TCRC). The TCRC is organized as a nonprofit corporation in the State of Minnesota, with Articles of Incorporation and Bylaws. The club elects officers annually. These officers are simultaneously elected for a two-year term on the Board of Directors. The Repeater Trustee is a permanent member of the Board of Directors. Unlike the other Officers and Board Members, the Trustee may select a proxy to serve in his place at meetings of the Board. Membership in the TCRC is \$25 per year. The TCRC is an official ARRL affiliated society.

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**President:** Shanon Haralson, KCØEIG

**Vice President:** Ian Boje, KCØITQ

**Secretary:** Tim Cole, KØOLE

**Treasurer:** Pat Cain, KØPC

#### **Board Members:**

All of the above Officers, plus...

Ivan Frantz, WØBU, **Repeater Trustee**

*Ivan has currently appointed Mogens Dantoft, OZ9MD, as his proxy for Board Meetings.*

Kelvin Olson, NØMQL, **Past President**

Phil Lefever, KBØNES, **Past Vice President**

Kevin Uhlir, NØBEL

John Toscano, KBØZEV

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*(Vacant—This could be you!), Editor*

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Ian Boje, KCØITQ, 2<sup>nd</sup> Tuesday

Tyler Williams, KØZDA, 3<sup>rd</sup> Tuesday

Phil Lefever, KBØNES, 4<sup>th</sup> Tuesday

John Toscano, KBØZEV, 5<sup>th</sup> Tuesday

#### **Metro Skywarn Liason:**

Jeff Goodnuff, WØKF

#### **Minnesota Repeater Council Liason:**

Jeff Goodnuff, WØKF

# President's Report

by Shanon Haralson, KCØEIG

I am pleased to report that the TCRC picnic on May 11<sup>th</sup> went well, despite the lousy weather. Twenty hearty club members showed up to eat burgers and hot dogs and lots of shared dishes. The TCRC also had a respectable turnout in Dayton last week for the Hamvention. We kept in touch by simplex, and I don't think Ian (KCØITQ) has ever been so popular! They tell us that over 25,000 hams attended, leaving behind \$10 million in the local economy – I know that we did our share! Another thing we are pretty excited about is our new six meter repeater that is almost ready for operation. See the Tech Team report from Phil and Tech Team Chair, Kevin, NØBEL, along with an article by John, KBØZEV, about the obstacles the club has had to overcome to get to this point. I also want to thank John for stepping in at the last minute to put together this great newsletter. All of the folks that contributed articles also deserve some praise.

The next big event on the TCRC calendar is Field Day 2002. Remember that Field Day falls on the fourth full weekend in June, so keep your calendar free. There will be plenty for everyone in the family to do. In addition to all of the contesting, organized by Phil, KBØNES, there will be plenty of hungry mouths to feed. Again this year, Monica, KBØUWZ, and Becky, KBØWZU, will be coordinating the FØOD station. They will not let you go hungry – you will eat too much. Be sure to get in touch with these folks to volunteer your services. I remember my first time out at Field Day with the TCRC — it was not what I expected at all. I was very surprised to see all the hams with their families and friends. I had imagined that when I got out to the farm to help set up, all I would see and talk about was Amateur Radio. The TCRC Field Day is a lot of fun for everyone. You can work a station, or sit and log a station, or just sit and watch us run around trying to make sure we have everything up and on the air. I encourage you and your family and friends to come out and enjoy the fun with us. Bring some food to cook on the grill and something to share with others. It is a great event for everyone. I enjoy spending the time talking with club members and their families. Don't be shy, come out and spend the weekend with us and have some fun. I look forward to seeing everyone there.

With all of this activity, the club is making great progress and is an exciting place to be involved. I encourage you to think about how you can make a difference by attending events and volunteering your skills. As noted in this newsletter, there are several volunteer opportunities available. Please let me know if you would like to step in and help out.

## Welcome, New Members!

The Twin Cities Repeater Club would like to welcome the following fine folks who have joined our organization since January of 2002. Listen for them on the air, and give them a friendly TCRC Hello!

Gary Peteler, KØUWC, Bloomington

Mike Ekholm, KCØMPU, Richfield

Gary Shade, KCØLFP, Apple Valley

Dave Buending, AD2B, St. Louis Park

Bob Keenan, WØGTN, St. Paul

Mark McKeever, KCØLQN, Rosemount

Thomas Lewandowski, N9DVT, Blaine

Clay Bartholow, WØLED, Crystal

J.R. Mathewson, KCØMDL, Maplewood

Matt Wellumson, KCØLAW, Chanhassen

Stephen Shaner, KCØLWS, Lakeville

Mike Dougherty, KB7MCI, St. Michael

Scott Rajala, KCØLYY, Eagan

### *(Field Day 2002, Continued from Page 1)*

Apart from the operating fun, Field Day has also become a major social event. Many individuals come out just to socialize and to help out with the setup or tear down. Of course the potluck dinner on Saturday night is reason enough to come out! Be sure to bring your friends and family! We can also always use another dish of potato salad!

The planning meetings will begin in late May, and we can always use extra people to make this event better than ever. If you would like to help out in any fashion, let me know. Also, keep an ear to the Tuesday night net, and look for any Field Day related email that may come across the TCRC-L email list. I will post a schedule of the meetings and other pertinent times and dates for this year's event. Also if you wish to operate and you would like to sign up for a specific time or band/mode let us know early so we can best accommodate you.

Remember, Field Day is an event that happens only once a year. Be sure to mark the fourth weekend in June (21<sup>st</sup> – 23<sup>rd</sup>) on your calendars, so you are sure to have the weekend free. If you miss it, you will have to endure hearing others talk about how great it was, for an entire year afterwards. Come out and join in the fun, and try your hand at some of the bands or modes you don't normally operate. I guarantee you will have a great time.

See you all there! **Phil Lefever, KBØNES, Field Day Chairperson**

# Technical Team Update

by Phil Lefever, KBØNES,  
TCRC Tech Team Vice Chair  
and

Kevin Uhler, NØBEL,  
TCRC Tech Team Chair

During the past few months, the TCRC Tech Team has been very active. We have had a few meetings and made a number of decisions as to which direction we plan on taking on a number of different issues. I will recap some of what has been taking place on a system-by-system basis.

## 147.21 Repeater

The TCRC's 2 Meter repeater has been the center of most of the Tech Team time recently. Issues we have been working on have been:

- New North and West Remote Sites

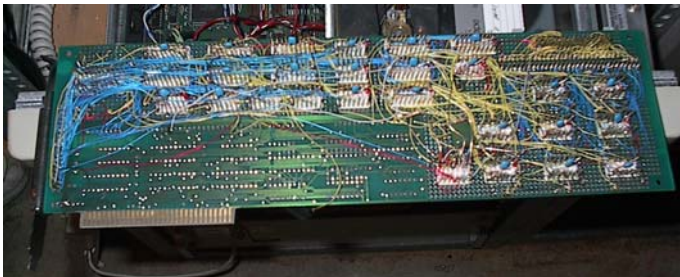
Thanks go to Mike, NØDGG and Rich, WØRFK for locating and installing our equipment at two new locations for our North and West remote receivers. The new sites are well located, with very high elevations, and they enhance our coverage greatly.

- Audio System Modifications and Voter Tuning

Some of the original equipment that was used for interfacing the remote receivers and voter system to the repeater was recently removed from service. This equipment was old and redundant, and complicating some future upgrades we have planned. The equipment was removed and some new modifications were made to the voter and audio systems. As of now, the audio levels are set fairly close to optimal, but in the near future we will do a final alignment with the aid of some accurate test equipment. We will also be doing some voter tuning to improve the voting action of the repeater.

- Long Term Replacement for the OLE Board

The OLE board is a digital I/O and DTMF decoder board that is in a PC and attached to the repeater system. Its function is to monitor the system, reading receivers, voting, and perform other activity such as serve sound files for repeater ID's to the basic repeater controller. It provides the necessary hardware that makes most of the advanced functions of the 147.21 repeater work. It also provides the Tech Team with daily information as to the performance of the system.



The current OLE interface board was built in 1994. Club members originally constructed this board using a wire wrap prototype board. This represents two possible problems. First, it is one-of-a-kind, and if anything catastrophic ever happened to it, it could take a long time to create a duplicate. Second, since it plugs into a bus slot in the computer, there are possible interactions with the host computer that makes future computer upgrades trouble prone. The OLE board uses the ISA interface,

which is not present on many current PC motherboards. The last time we had to replace the PC's motherboard, we found that the OLE board caused the replacement Pentium 200 CPU to "hang". We had to find an old 80486 motherboard that would accept the OLE board in one of its slots to get things going again.

It was the decision of the Tech Team to move forward with a new OLE system that will overcome these problems. We are currently working on an interface board that will be outside of the OLE computer and made on a proper etched PCB. We will also create a second copy as a spare. There will also be increased features and functionality designed into the new system.

- Replacement Power Amplifier

Our original EF Johnson solid-state power amplifier has been repaired. We will be integrating this amplifier back into the system to give a slight increase in our output signal. We will also be adding a new ferrite isolator that will protect the amplifier from possible damage due to antenna system problems or high SWR. The GE amplifier, which we have been running recently, produces around 55 watts, and the new configuration should add an additional 15 watts or so.

## 224.54 Repeater

This repeater, being a simple single site repeater, doesn't require much maintenance. The one issue that we have on our agenda is replacing its aging antenna, which has been in use since 1996. There is a possibility that the current antenna is adding noise to received signals during periods of high wind.

## 444.30 Repeater

Again, like the 220 system, this repeater is a very simple system. At present, the system is working perfectly. The only work we are likely to do to it in the near future is to add a PL tone during transmit. This would allow users to run a tone squelch on their radio to quell intermod and to facilitate better cross-banding use. Unfortunately, this is a fairly involved modification that will require some alteration of the transmitter in the repeater. We hope to get it out of the way in the near future.

## The new 6 meter system: 53.37/52.37

After a long period of being stalled waiting for a coordinated frequency pair, we are finally rolling again! We have been assigned the frequencies of 53.37 Output and 52.37 Input. At this point in time, our plan is to incorporate a 100 Hz tone squelch, to help prevent excessive noise during band openings. We will have the ability to remotely turn off the tone, and if the repeater works well without it, we may revert to a carrier squelch system. If you are programming your radio, set it to transmit a 100Hz tone just in case!

We have basically all the bits and pieces we need to make this system happen. The radios are currently being reworked to function as a repeater. We are also pending a frequency study by the City of Burnsville to make sure that these frequencies can't cause any interference to any other radio equipment at our shared sites. We hope to get this system online in the next couple of months. This repeater will be an interesting addition to the club's other three repeaters!

As always the Tech Team is here to serve the TCRC members. If anybody has any ideas or suggestions be sure to bring them up to a Tech Team member or email them to [tech@tcrc.org](mailto:tech@tcrc.org)

**Phil, KBØNES and Kevin, NØBEL**

# What's So Hard About Setting Up a Six Meter Repeater System?

John P. Toscano, KBØZEV,  
Member, TCRC Tech Team

For those of you who have been paying attention, you know that we on the Tech Team have been talking about a new 6 meter repeater for a long time. You may be thinking to yourself, "What can take so long to get it going? Buy it, bolt it into place, and turn it on. Right?"

Well, it's a bit more complex than that. I thought some of you might be interested to know a little bit more.

**Obstacle One:** Make the commitment. Obviously, this was not a problem for us. The TCRC has a long history of getting the urge to do something, and then following through. Slowly, maybe, but we do usually follow through. (Our ambitions always seem to exceed our grasp. You can look on that as *bad*, indicating that we're unrealistic in our plans and over-extended. Or you can look on that as *good*, indicating that we haven't ever stopped dreaming of one more thing to do for our members. Take your choice.)

**Obstacle Two:** Location, location, location (to steal an expression from your friendly local real estate agent). Now, you're probably saying to yourself, "What a lame excuse, you already have a perfect location on the Burnsville water tower!". Guess what, it's not quite so simple. First of all, the City of Burnsville doesn't want any more transmit antennas on this water tower, now that they have filled it up with a number of commercial customers' equipment. Second of all, the most cost-effective arrangement for our 6 meter repeater system is to make it a split-site system, meaning that we need *two* sites!

Why two sites? One is for receive, and one is for transmit. The receive site will indeed be at the same location as all the rest of our repeaters, on the Burnsville water tower just north of the Burnsville Shopping Center. The transmit site will be located on a different piece of city property at a high elevation, with a line-of-sight view to our main site. And we are getting the second site at the same "screaming deal" as the first, namely zero dollars per month rent. But why split the receive and transmit sites? The short answer is "DESENSE". Ever listen to the repeater while standing next to someone who is using it? Ever notice how you can't hear the output of the repeater when a strong transmitter is nearby? Even if the other guy is only using a 5 watt handheld, his signal (only 600 KHz away from the frequency you're listening to, in the case of the 2 meter repeater) completely swamps the front end of your radio, making it temporarily deaf. Now imagine putting 100 watts into a 7 dB antenna (500 watts of ERP), That's what the 147.21/147.81 repeater has to deal with! To prevent the 147.21 transmitter from making the 147.81 receiver deaf, we use very heavy-duty filtering to isolate the receiver and transmitter from one another, and also use separate antennas at two different locations on the water tower. The filtering is performed with a duplexer, which is composed of six coaxial cavity filters that are about 3 feet tall and about 8 inches wide each. They are configured in a Bp/Br arrangement – Bandpass/BandReject, which means that the 147.21 transmitter has a bandpass filter peaked at 147.21 MHz, and a band reject (notch) filter centered at 147.81 MHz. The receiver has a bandpass filter peaked at 147.81 MHz and a band reject filter centered at 147.21 MHz.

Similar filters for a 6 meter repeater would be about three times as large, and would be very expensive. A much more cost-effective solution is to isolate the transmitter and receiver with physical separation.

**Obstacle Three:** Equipment acquisition. This was actually the easiest part. The Tech Team Vice-Chair, Phil (KBØNES) found a good deal on a GE Mastr II mobile low-band VHF radio that can be re-tuned to the 50 MHz band, and a matching GE Mastr II radio that can be re-tuned to an appropriate link frequency (above 222 MHz, to comply with FCC requirements). The Mastr II is nice, because the receiver and transmitter sections are highly modular. We can swap receiver sections between the two radios, and have one radio that receives on 6 meters and transmits on UHF, and another radio that receives on UHF and transmits on 6 meters. The first radio (6M receive, UHF transmit) goes at the main repeater site, and listens for your 6M signal. When it hears you, it sends your audio on a UHF link to the second site, where the second radio listens for the UHF link signal, and re-transmits it on 6M, one megahertz away from your original signal. Neat, eh?

Of course, we had to build/buy/beg/borrow more bits and pieces along the way, such as a pair of 6M antennas, a pair of link antennas, a simple repeater controller, coax, connectors, crystals, etc. But all of that has been done.

**Obstacle Four:** HAAT Survey: From past experience with our three prior repeaters, we knew that we would have to prepare an analysis of the **Height Above Average Terrain** of the new site to be used for our new 6 meter repeater. In the past, this was a very tedious process, involving the purchase of a whole bunch of USGS topographic "quad" maps, lots of measurements, and complicated calculations. Fortunately, one of the Tech Team members was able to knock off the HAAT survey for the new site in very little time, thanks to a piece of software called DeLorme 3D TopoQuads, plus a Microsoft Excel spreadsheet.

**Obstacle Five:** Frequency Coordination. This has been the hardest part so far. Trust me, you really do not want to put up a repeater without getting a coordinated frequency first. Sure, it is "legal", but you are setting yourself up for enormous grief down the road. So, we applied to the Minnesota Repeater Council for a pair of 6 meter frequencies for the repeater itself, and a UHF link frequency above 222 MHz to tie the two sites together. And we waited, and waited, and waited. Unfortunately, our coordination request came to the MRC at a bad time. Their organization was in the midst of a major upheaval, with the death of one of their officers, unavailability of some of the other officers, etc. They were basically operating in sheer survival mode, and mainly concentrated on protecting Minnesota's existing coordinated frequencies from encroachment by surrounding states, which left the coordination of new frequencies a very low priority that they simply couldn't handle. Thankfully, the MRC is "back on their feet" once again. They have a new slate of officers, have held a couple of meetings, and have given us the frequency coordination that we need in order to proceed.

**Obstacle Six:** Frequency Study at the Repeater Site. Have you ever driven through downtown Minneapolis and heard loud, obnoxious noises come out of your VHF/UHF FM radio transceiver? Maybe you've heard of the problem called "intermod", short for "intermodulation distortion". When two or more strong signals on different frequencies are present, they mix together and generate additional signals at the sum and difference of each pair of the original ones. Pack a lot of transmitters on different frequencies into a small space, such as the top of a water tower, and you may get frequency mixes that cause the systems to interfere with one another. To prevent this nightmare, the City of Burnsville (like any other reputable multi-transmitter site host) requires that a frequency study be done before allowing any new transmitters to be added. We are waiting for the frequency study right now. In the past, we were fortunate enough to get the frequency studies done for free. Not this time, however. It will cost us several hundred dollars for this one, but fortunately the TCRC Tech Team budget can handle it.

(Continued on Page 5)

(6 Meter Repeater, continued from Page 4)

**Obstacle Seven:** Putting it all together. We have already performed the basic receiver/transmitter swap on the Mastr II radios, and installed new crystals for the coordinated frequencies. The next step will be to re-tune the Mastr II's from their original non-Ham frequencies to our coordinated frequencies. Of course, there is a little risk in doing things this way. If the frequency study (Obstacle Six, above) comes back with a bad result, we will have to go back to step Five, get *new* coordinated frequencies, buy new crystals, etc. Hopefully, our gamble will pay off with some time savings. Since the UHF Mastr II has way *too much* output power for our link usage, we are removing the final amplifier. But the exciter output level that remains is *too low* for our link usage. So we are building a low-power amplifier from a solid-state "brick" module and supporting components. We also need to get everything wired up and connected to the simple repeater controller, and tested.

**Obstacle Eight:** Putting it on the air. Once everything is ready to go, the Tech Team will have two tower climbing "parties" to put up the antennas and connect the feedlines. While that's underway, other Tech Team members can install the receiver and transmitter at the respective sites.

**The Finish Line:** Key up on 52.37 MHz with a 100 Hz PL (CTCSS) tone encoding, give your ID, and release the PTT. Listen for a courtesy tone, and the CW message "W0BU/R", to come back on 53.37 MHz. If it happens, that means that success is ours, and the TCRC can claim to be the only Quad-Band Repeater Club in the Twin Cities Metro Area!

73 until then, from John, KBØZEV

## Burper Gets 120 Days

Aaron H. Goldberg, the Burnsville hacker also known to TCRC members as the "Burper", was sentenced to 120 days in jail, 60 days of electronic home monitoring, and five years of probation by the Dakota County court on April 23, 2002. He is also prohibited from having "any radio or computer software" that is capable of transmitting. Mr. Goldberg, formerly KBØTUJ, plead guilty in Dakota County Court on February 22, 2002, to obstructing the legal process in connection with breaking into police communications during 2000 and 2001. Mr. Goldberg was called "The Burper" by TCRC members because of his habit of making vulgar sounds on various repeaters including the 147.21 machine. Articles relating this information appeared in the April 24, 2002 editions of the Saint Paul Pioneer Press and the Minneapolis StarTribune.

Mr. Goldberg's ham radio license, KBØTUJ, was cancelled by the FCC on May 11, 2001. The FCC's ULS (Universal Licensing System) database shows two letters of enforcement against him. The first one, dated March 27, 2001, required him to appear for re-testing in order to retain his license. The second letter, dated May 11, 2001, was an acknowledgement that Mr. Goldberg has surrendered his license. Although the FCC was slow to change the status of his license in the ULS database, it currently shows the license status as cancelled.

The TCRC was sorry to find that this hacking was being done by a (formerly) licensed ham, but we are greatly relieved to have his malicious activity terminated. It is our sincere hope that Mr. Goldberg's arrest, conviction, and sentencing will discourage other people from malicious interference with legal radio communications systems.

## Calling All Volunteers! TCRC Needs Your Help!

The Twin Cities Repeater Club is looking for some "new blood" to fill some vacancies! If you have some time available, and have the desire to help your fellow club member by donating some of that time, please consider volunteering for one or more of these opportunities.

**Newsletter Editor:** As you can see from the masthead on page 2, this edition of The Repeater was put together by a "pinch hitter", after the resignation of the former editor due to increasing work commitments. If you'd like to take an active role in the creation of the quarterly issues of **The Repeater**, your help would be greatly appreciated. Please contact the club President, Shanon Haralson, KCØEIG.

**Newsletter Article Writers:** The Editor's job is always easier when he or she can concentrate on the editing and structuring of the newsletter, rather than producing all of the content also. Do you have something to share with your fellow TCRC members? Please consider writing an article. Don't worry about perfect spelling, punctuation, and grammar – that's the Editor's job! Send your articles by email to [newsletter@tcrc.org](mailto:newsletter@tcrc.org) or in the US Mail to our club P.O. Box address as listed on the back page of the newsletter.

**Membership Committee Co-Chair:** Steve, WØGXO, has also fallen into the trap of allowing life to get in the way of his Amateur Radio hobby! But work and family commitments have to take precedence over the TCRC, so he will be stepping down soon. Steve's responsibilities include sending out the "Welcome New Member" and "Welcome Prospective Member" information packets, mailing out the reminder postcards to folks whose memberships are about to (or already have) lapsed, and making the club badges. In addition to common sense and modest "people skills", some degree of computer proficiency is very helpful, and ownership of a color inkjet printer for making badges is a strong plus. (The TCRC supplies the use of a laminator and the clear plastic lamination pouches for the badges, so no extra investment there is required.) Willingness to attend local hamfests to encourage new folks to join is also desirable. Please contact our other Membership Committee Co-Chair, Steve, NØOWL if you would like to volunteer or even to just find out more about the position.

**Webmasters:** If you have some skill at writing web pages, and want an outlet to express yourself while helping out the TCRC, consider a position on our Information Services Committee. Some of our pages are created with a plain ASCII text editor (like Notepad), some are created with the help of programs like Microsoft Word and Microsoft Excel, and Microsoft Front Page. Many of them are simple HTML, while others use advanced iHTML coding. We are planning to change over from the expensive commercial iHTML language to the free PHP and MySQL web languages for our advanced database functions, so if you are already familiar with these, you could be an especially valuable contributor to our efforts. (The rest of the webmasters are currently trying to teach themselves these languages, so wish us luck!) Contact [webmaster@tcrc.org](mailto:webmaster@tcrc.org) or send email directly to one of the existing webmasters listed on page 2 of this issue, or on the World Wide Web at the TCRC home page.

**Field Day Operators:** As you can see from the Field Day 2002 articles in this edition of The Repeater, this annual event is right around the corner. Do you have the desire to try working HF but only have a Technician license? No problem! The TCRC Field Day operates under the Extra Class callsign of our repeater Trustee, Ivan Frantz, WØBU, and so our Field Day radio operators can work on virtually any band. While we are especially interested in crack CW operators, we also have plenty of opportunity for folks who are more comfortable communicating through a microphone. Contact Phil, KBØNES, the Field Day Chair.

**Members:** Last, but not least, *please check to see if your dues are paid up*, and strongly consider re-joining if your membership has expired!



**Twin Cities Repeater Club, Inc.**  
**P.O. Box 11534**  
**St. Paul, MN 55111-0534**

**Place  
Stamp  
Here**

Your Membership Dues  
are Up-To-Date. Thank  
you for your Support of  
the TCRC!

Your Membership Dues  
Have Expired. Please  
Consider Renewing your  
Membership Today!

## Join the Twin Cities Repeater Club!

P.O. Box 11534, St. Paul, MN 55111-0534

<http://www.tcrc.org>

Fill out this Membership Application Form, and mail it with your check for \$25.00 payable to the Twin Cities Repeater Club, to the mailing address listed above. You can also fill out this form electronically at the web address listed above, and either send us a check, or pay online using the PayPal system.

Name \_\_\_\_\_ Callsign \_\_\_\_\_ License Class \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone \_\_\_\_\_ Work Phone \_\_\_\_\_ Computer Phone \_\_\_\_\_

Ok to list your address in club publications?      \_\_\_No \_\_\_Yes

Ok to list your phone in club publications?      \_\_\_No \_\_\_Yes

Are you available for Emergency Service?      \_\_\_No \_\_\_Yes

Are you a member of the ARRL?      \_\_\_No \_\_\_Yes

Are you a member of Metro Skywarn?      \_\_\_No \_\_\_Yes, spotter ID: \_\_\_\_\_

Are you a member of ARES?      \_\_\_No \_\_\_Yes

Would you like an autodial speed dial number?      \_\_\_No \_\_\_Yes, to phone # \_\_\_\_\_

Would you like a club ID badge?      \_\_\_No \_\_\_Yes (free to new members, otherwise \$5.00)

What is your internet e-mail address, if any?      \_\_\_None

Would you like an e-mail alias set up, so that mail sent to **yourcallsign@tcrc.org** gets redirected to the e-mail address you listed above? This can be handy on the air!      \_\_\_No \_\_\_Yes

Do you want a copy of the TCRC Handbook?      \_\_\_No \_\_\_Yes (add \$9.50, which includes postage)

Do you want a TCRC binder to hold it?      \_\_\_No \_\_\_Yes (Add \$5.50 to the above)

This is \_\_\_New Application \_\_\_Renewal \_\_\_Other Change \_\_\_Callsign update, old call was \_\_\_\_\_