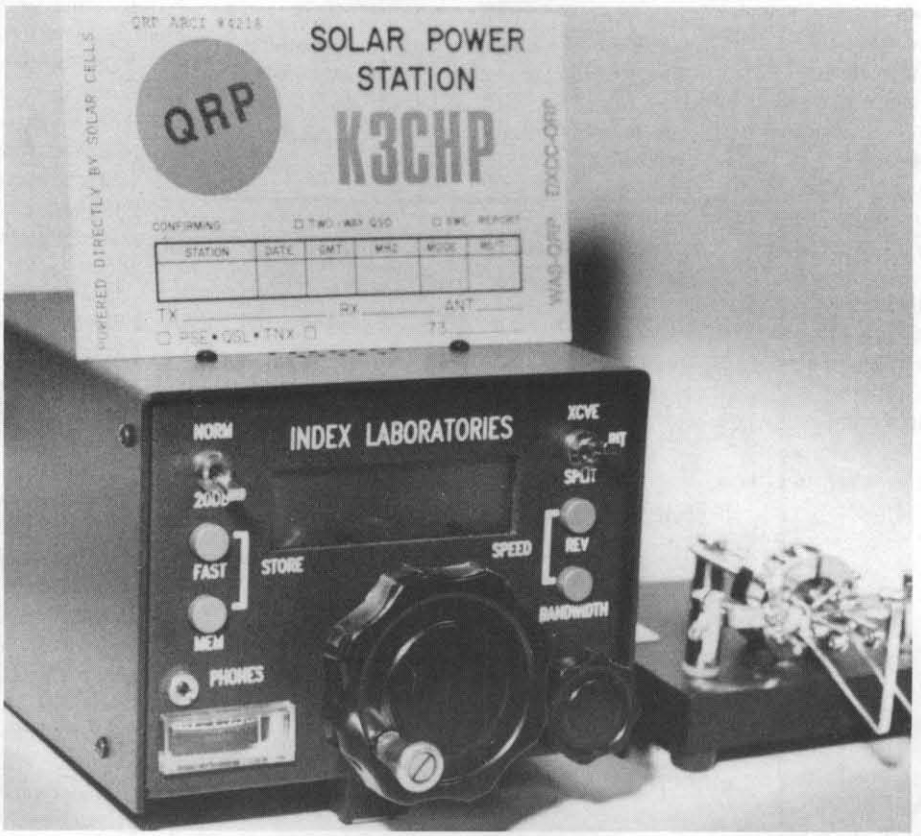
QRP Quarterly

Journal of the QRP Amateur Radio Club, International

July 1996 Volume XXXIV Number 3



Congratulations to **Joe Mikuckis, K3CHP**, the winner of our cover photo contest for July, 1996. Joe recieves a one year subscription renewal for shairing this picture with us. He said "I have operated directly form solar cells since 1976 and have **WAS** as well as many DX contacts"

The QRP ARCI is a non-profit organization dedicated to increasing world-wide enjoyment of QRP operation and experimentation, and to the formation and promotion of local and regional QRP Clubs throughout the world.

NOTES FROM THE PRESIDENT

BUCK SWITZER, N8CQA

DAYTON 1996

Where to start???? Four Days in May Symposium. My sincerest congratulations and thanks to Paulette, N9OUH; Bob, VO1DRB; Bruce, W6TOY and Preston, WJ2V! The Committee and QRP-ARCI hosted 100 persons from 7 AM until 5 PM, eleven speakers presenting on a variety of QRP related topics, kept us occupied throughout the day , with an informative luncheon presentation by Dr. Rick Zabrodski, VE6GK. The Committee has agreed to do the symposium again and, of course, QRP-ARCI will sponsor the event in 1997! My thanks to those who helped out at the booth and special thanks to Mike Bryce, WB8VGE, for providing the computer and program to allow us to update/input renewals and new members on the spot. I promise not to swear at it next year Mike.

The Board of Directors met both Friday and Saturday nights, putting in over three hours each night. Following much discussion, the following motions were adopted (in order of importance, not necessarily occurrence):

DUES:

Effective 1 July, 1996, renewal rates will be $15.00 for US members, $18.00 for Canadian members and $25.00 for DX members. The $2.00 additional initiation fee will be retained making new memberships $17.00 US, $20.00 Canadian and $27.00 for DX. The discussion on this issue revolved around the amount of increase, not the necessity for an increase! QRP-ARCI has not increased dues since 1987 and both postal and printing costs have increased appreciably since then. We have been losing money on the DX members for the last year.

The Board also decided to set a maximum of two years for any renewal. This decision was based on an upsurge in multiple year renewals, apparently in anticipation of a dues increase. Carrying long term renewals can be a liability in these days of increasing mailing/printing costs.

Quarterly Size:

Effective immediately, the QRP Quarterly will not exceed 48 pages. This decision is prompted by the Board's need to control the costs of producing and mailing the Quarterly. We in no way mean to imply any negativity on the wonderful job Monte and his crew are doing , we simply can't afford any more 60+ page issues!

Advertising Rates:

Effective 1 July, 1996, a full page ad will cost $300.00, a half-page ad $180.00, a quarter-page ad $ $100.00 and an eighth-page ad $60.00. This represents an appreciable increase from our previous (break-even) rates. The Board's feeling is that the ads (if any) must substantially defray the cost of publishing the QRP Quarterly.

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Fiscal Year:

Effective 1 April, 1997, the QRP-ARCI's fiscal year will run from 1 April through 31 March. This change will allow an annual fiscal report to be given at the Dayton meeting in May. The present fiscal year runs from 1 July through 30 June.

Regional Representatives:

The Regional Representatives are: Jim Stafford (BoD), W4QO, Eastern Area; Hank Kohl (BoD), K8DD, Central Area; Doug Hendricks (BoD), KI6DS, Western Area; Bob Gobrick (BoD), VO1DRB, Eastern Canada; and Dr. Rick Zabrodski, VE5GK, has accepted the appointment as Western Canadian Area Representative.

Saturday's Board Meeting was concerned with amendments to the By-Laws. Thanks to Bob Gobrick, VO1DRB, for all his work on this important document. Many of the changes eliminate unnecessary verbiage from the By-Laws(i.e. deletion of mention of FCC regulations in a document governing an international organization!). Also, the election terms were corrected to meet our current four year terms and six member Board. The Editors job description was expanded to include his appointment of QRP Quarterly staff. The majority of these changes are intended to bring the By-Laws into line with current operational procedures. Much discussion took place regarding the "International" portion of the Club's name. After lengthy discussion, it was decided to leave the Club name intact. We will expand the Regional Representatives numbers to ensure "International" involvement and representation. Also, the Board agreed to add to the "Mission Statement", on the front cover, wording to include our interest in the formation and promotion of local and regional QRP Clubs. Current members wishing a copy of the amended By-Laws may obtain a copy from Myron Koyle, N8DHT, please enclose an SASE with $0.55 postage. No SASE, no copy of the By-Laws.

The Friday PM Banquet was again, a sold-out success thanks to Pete Meier, WK8S and all the prize donators. During the Banquet, Mike Czuhajewski, WA8MCQ, announced the QRP-ARCI Hall of Fame electees and several other awards were presented. Two interesting speakers kept the crowd entertained during dessert and almost everyone won a prize!

The Saturday PM Pizza Party was well attended. The NorCal Building contest judging took place about 8 PM and many great examples of 40-9er's and Regen's were judged. Next year, the contest will consist of a design contest ending 11/01/96 with the winning designs to be kitted for the '97 building contest. Thanks to NorCal and Doug for this fine project!

Next year the BoD will meet on Friday AM so that they can enjoy the social aspects of Dayton. We now have all the BoD members and Officers on e-mail and can communicate on the internet. This is a great improvement over "snail mail" and should allow us to conduct business in a timely fashion.

Table of contentS

Threat to 2m & 70 cm.

There is an industry working group known as IWG-2A that is preparing a draft US proposals for the 1997 World Radiocommunication Conference. This includes, among other things, the use of the 144 and 420 MHz bands.

Please read the editorial in the July 1996 issue of QST for full details, or check their web page at; http://www.arrl.org

In the Future

We are working on an article that will explain what **CCW** is, how to do it and what it can and can't do for QRP.

There are negotiations ongoing for another new column, this one dealing with **TEST EQUIPMENT;** What it is, how to use it and even some items that you can make.

Jim Cates, WA6GER, the co-founder of the NorCal QRP Club, was saddened on May 29, 1996, by the death of his wife, Electra.

Jim and Electra celebrated their 50th wedding anniversary last fall. Electra was a wonderful lady and will be missed by all of her family and friends.

May our thoughts and prayers be with Jim during this difficult time.

THE QRP HALL OF FAME FOR 1996

Michael A. Czuhajewski, WA8MCQ, 7945 Citadel Drive, Severn, MD 21144

The QRP ARCI is pleased to present the 1996 inductees into the QRP Hall of Fame. Announced publicly at the QRP banquet at Dayton, seven people (a little under half of those nominated) joined the four 1992 inductees. (The Hall of Fame process is not a competition for a certain number of slots; rather, each nominee is voted on individually. This year the voting body was the [outgoing] Board of Directors. At Dayton it was agreed to expand that in the future to include the Board, President, Vice President and Hall of Fame members.)

Before anyone asks, there was no Hall of Fame action for 1993, 1994 and 1995 for a variety of reasons, but now that there is a single person in charge of running the QRP Hall of Fame--me--there will be a regular call for elections. And if things fall through the cracks again, at least there is now a specific person to blame!

These are the 1996 inductees into the QRP Hall of Fame (in alphabetical order):

Brice Anderson, W9PNE
George Burt, GM3OXX
Tom Davis, K8IF
Wes Hayward, W7ZOI
Rick Littlefield, K1BQT
C. F. Rockey, W9SCH
Adrian Weiss, W0RSP

From my days in the Air Force I remember something called the Twelve Outstanding Airmen of the Year. It was quite an honor to be selected from a few hundred thousand enlisted people. But when the winners were announced, the short paragraph or two published about each ones achievements often didn't really do justice to them. It's the same with the QRP Hall of Fame, but I'll give it a try anyhow. There will be some relatively new QRPers who may not know of the accomplishments of many of these people, and when they see the names they'll say "huh?" Rest assured that for each person who does that, there will be several who will smile and say, "Ah, but of course! Justice done at last!"

Brice Anderson, W9PNE

From a nominating letter submitted by W9SCH--"I first became aware of the work of Brice during our mutual "adventures" with the Milliwatt [QRP magazine] during the early 1970s. Brice has made numerous innovative contributions to the QRP literature in nearly every aspect of the activity (look through the files of almost any QRP publication of the last two decades, or more to confirm this). I personably recall his "Sucrets Box QRP Rig" in the Milliwatt, and his numerous articles on antennas (particularly small transmitting loops) as being particularly stimulating and inspiring to me, for instance. To me, Brice Anderson will always be 'The Grand Old Master of Ninth Call Area QRP'."

Brice reports that he started his ham career with QRP in 1932 at the age of 13, running one watt input to a UV-199 tube. He later graduated to a type 45 tube at a blistering three watts output. In the 1970's and 80's he was involved extensively with milliwatting; he worked all 50 states with 50 mW output, followed by 37 states with 25 mW, including Hawaii on SSB. In 1975 he received an ARRL WAS certificate earned with one half watt input, the first WAS issued for such low power. In 1982 he received DXCC QRPp Trophy #40 from the Milliwatt magazine, which also honored him for 50 years of QRP operation.

In the 1989 ARRL CW DX contest, he dropped to 20 mW output and worked 47 DX stations in 29 countries; in one 44 minute session he worked 5 continents, although it took him another 4 1/2 hours to find the 6th; that made it a 5 hour WAC with 20 mW! When the 30M band was opened, he worked all 50 states in 2 weeks with the QRP "legal limit" of 5 watts. In the first CQ WW WPX CW contest in 1979, he entered in the QRPp division and was the highest QRPp scorer in the world. (Brice also send along a list of almost 3 dozen contests in which he was first place QRPer in Illinois.)

George Burt, GM3OXX:

Although less known on this side of the pond than in GQRP circles, GM3OXX has been deeply involved in QRP for a large number of years, both operationally and technically, and has many truly outstanding accomplishments to his credit. He received Adrian Weiss' coveted DXCC Milliwatt trophy #2 (December 1978) for working at least 100 countries with one watt or less; as of 1992 he had 200 countries confirmed with 1 watt output, and he also has over 70 countries confirmed two way QRP. George was the very first person to win the difficult and prestigious QRP Master award conferred by the GQRP Club, in itself a most impressive achievement.

Not only a very accomplished QRP operator, George is technically astute. He has had numerous technical articles in SPRAT, and is the originator of several very popular GQRP projects, such as the OXO, ONER and STX. Says G3RJV, "the ONER [transmitter] must be the most commonly built QRP circuit in the world - over 1,000 kits have been sold!" G3RJV also says, " "All of his QRP work has been with completely home designed and homebuilt gear of a very high standard, and he has never used more than 1 watt of RF output, and only simple wire antennas. I think, world wide, few could beat him as a QRPer. I do not think you could find a more worthy recipient anywhere."

George Burt was unanimously inducted into the QRP Hall of Fame.

Tom Davis, K8IF

Although apparently not involved in QRP in any capacity since the late 1970's, Tom had a profound affect on the QRP community. While the QRP ARCI was in existence at the time, it did not have the "5 watt and under" focus that it does today. The Club was originally founded with the goal of members voluntarily limiting their power to 100 watts (input, in those days) to reduce QRM on the bands and make operation more enjoyable for all. While there were many who were interested in "true QRP", that was not the basis of the club. As detailed in the October 1995 QRP Quarterly reprint of an Adrian Weiss CQ magazine column from the 1980's, Tom sensed the strong desire of many to have an organization devoted to low power operation and experimentation.

In his nominating letter, Rich Arland (K7YHA) said, "Tom's dedication to low power communications resulted in significant changes in the QRP ARCI bylaws and resulted in changing the club from a 100 watt organization into a true QRP club. Tom's leadership during the trying times of the late 1970s gave hope that our club might evolve into a club that really represented low power communications.

"He eventually became President of the QRP ARCI. Over a period of several years he managed to help many "true QRPers" get elected to the Board of Directors. Through his persistence, a vote of the membership was taken which overwhelmingly favored changing the tone of the club from a 100 watt dinosaur into a 5 watt survivor. This eventually led to a massive rewrite of the club bylaws and awards/contests criteria. Finally, through the dedication and tenacity of Tom Davis, the QRP ARCI could proclaim that it was truly a QRP club that represented the interests of those radio amateurs who wished to

run 5 watts or less RF output power. Without his leadership, the QRP ARCI would not be the guiding light of low power communications to amateurs all over the world."

Wes Hayward, W7ZOI

This was probably one of the easiest votes this time around! Few have done more for QRP than he has, having co-authored the "QRP bible", Solid State Design for the Radio Amateur, co-authored by 1992 QRP Hall of Famer Doug DeMaw, W1FB. One of the best known QRP technical gurus, Wes also has a long string of excellent technical articles in the amateur press which have been of tremendous value to technically oriented QRPers everywhere.

When I brought up the subject of nominating him, Wes told me not to bother. I told him that I'd respect his wishes since I knew others would jump at the chance. Sure enough, the first one received was from his friend Roy Lewallen, W7EL. Says Roy, "A great deal of the work I've done, and much of the work being done by others in the technical arena of QRP, has its roots in Wes' many unique insights and accomplishments. He pioneered the modern use of direct conversion as a low cost but high performance technique. Most modern QRP superheterodyne receivers use crystal filters designed using methods he developed. Hundreds, if not thousands, have duplicated his "mountaineer" rigs and his "universal" QRP transmitter.

"Many of the circuits and techniques we use today were popularized, if not originated, by Wes; his TR switching, oscillator, transmatch, amplifier, RIT, and other designs can be seen scattered throughout modern QRP rigs. Wes has left a rich heritage of circuits, techniques, and ideas which are still being built upon. The book "Solid State Design for the Radio Amateur" remains a classic after nearly 20 years of publication, as do many of the myriad articles he has published over the years.

"I personally have used many of Wes' ideas and circuits as the basis for the rigs I've developed. This is true of nearly all of the people currently doing QRP design. To my mind, among the entire QRP community, none is more deserving of this honor than Wes."

Wes is also the author of Introduction to Radio Frequency Design, recently reprinted by the ARRL. Originally published in 1982, this is a more technical, in depth treatment of a wide variety of topics and is prized by many QRPers.

Wes was inducted unanimously into the QRP Hall of Fame.

Rick Littlefield, K1BQT

From the nomination by Ken Roberts, VE3BGW: "Rick was instrumental in popularizing the NE602 superhet design for homebrew QRP rigs. Until his initial article in Ham Radio in January 1989, typical small QRP rigs had direct conversion receivers. A lot of new designs have evolved from work first done by Rick. Designers such as Dave Benson, NN1G, and Wayne Burdick, N6KR, as well as many from Europe give credit to the originator of this QRP application. Ricks design was well done, his articles well written, his workmanship excellent and his advice and help freely given.

"But that wasn't the end of it. Rick worked long and hard with MFJ to bring their popular 90XX series to market, proving the quality of his design in the commercial marketplace. The popularity of the MFJ products is a tribute to the initial design done by Rick Over 8 years have gone by since his first work, and the basic design is still being emulated. It is rare when one individual can force a hobby to take a quantum leap forward. Rick has done this by recognizing the value of new devices, applying them in a robust design, fabricating the design with professional excellence and writing of his work in a down to earth style. In doing so he has moved our hobby forward to a new plateau."

And from Bob Gobrick, VO1DRB/WA6ERB "I, and I suspect many others, consider him to be the "father" of the NE602-based QRP transceiver. The design and construction work that Rick did has inspired many modern day NE602 superhet designers. The number of hams drawn into QRP as a result of Ricks simple yet high performing NE602 transceiver designs is immeasurable."

Rick is also the author of a number of other homebrewing articles over the years which are of interest to QRPers.

C. F. Rockey, W9SCH

Another long time QRPer, "The Rock" is well known by many and considered by some to be a "QRP national treasure". Said Hans Schroeder, AE9G, "Hardly an issue of any of the QRP publications goes by that he does not have some sort of an article in it--GQRP, Michigan QRP, QRP Quarterly. Rock is a philosopher (you should read some of his letters), somewhat eccentric, but a joy to read. And in particular he is a QRP-philosopher. By that I mean that his whole approach to the ham business is to do the most with the least, whether that be building equipment or antennas."

And from Lowell Corbin, KD8FR, "Rock has been a long-time supporter of QRP and has produced a wealth of information through the many articles he has written for the various QRP clubs' publications. He has been the mainstay in supplying articles for The Five Watter [Michigan QRP Club journal] through the years, as well as for the QRP Quarterly and SPRAT."

"In an era when many old timers reject newer hams because they did not come up 'the hard way', or else shrug their shoulders at their lack of technical expertise, Rock welcomes them to the world of what he calls 'real ham radio' by patiently teaching them fundamentals and encouraging them to believe that they, too, can build and experiment with the best of them."

From Rich Arland, K7YHA, "I have read Rock's stuff for many years and he is an absolute QRP National Resource... lucky we have him in The Five Watter." Brice Anderson, W9PNE, writes, "Many antenna topics have been covered by my friend C.F. Rockey. If you don't know how to build a simple but effective antenna, you haven't read his articles in The Five Watter."

Adrian Weiss, W0RSP

Finally, at the end of the list only by accident of having a last name starting with "W", one of several people without whom the QRP Hall of Fame would not be complete. Ade was co-founder of The Milliwatt: National Journal of QRPp, which ran from 1970 through 1975; writer of a QRP column for CQ magazine from the mid 70's to mid 80's, and several technical articles in various magazines. Although I had a hand in the founding of the Milliwatt--I was already publishing the precursor to it when he came on board--it was the vision and drive of W0RSP that made it what it was.

I left to join the military after 4 issues, but he kept at it through the next 5 years, with six issues per year of QRP operating news and techniques, construction articles, tutorials, etc. The Milliwatt was the pioneering QRP journal in this country, probably in the world, and I am one of the lucky few to have a complete, original set of them, courtesy of K7YHA. (In the last few years I reprinted the entire set in three separate runs, the last in conjunction with Bill Kelsey, N8ET, and there are now well over a hundred more people with copies of this excellent QRP journal.)

From the nominating letter of Donald Younger, W2JEK--"Through his efforts as a writer, QRP has become a well recognized facet of amateur radio. His accomplishments include The Milliwatt magazine and later his QRP column in CQ magazine, in addition to numerous articles in CQ and elsewhere. He also was instrumental in the creation of a QRP category in the CQ Worldwide DX contest, the first of many contests that now have a QRP section. His books, "The Joy of QRP" and "The History of QRP in the US" are still sought by QRPers today."

From Rich Arland, K7YHA: "Adrian Weiss has been a major

influence in QRP for over 25 years. The Milliwatt served to enlighten thousands of low power communicators around the globe. In 1975 Adrian became the QRP editor of CQ magazine, a position he held for almost 10 years. His monthly articles on QRP operating and construction provided a guiding light to low power enthusiasts everywhere. Finally, a mainstream ham radio magazine had seen fit to recognize QRP as a major facet of the ham radio hobby by publishing Adrians articles about it on a regular basis. This served to confirm that the status of the low power operator had risen from obscurity to mainstream ham radio.

"Although both of his QRP books were printed in limited quantities, they quickly became historical landmarks in the evolution of low power communications. Both are "must" reading for the serious QRPer.

"In order to stimulate competition and promote excellence in low power communications, Adrian sponsored the DXCC-QRPp Trophy (for working 100 countries using less than 5 watts output), the DXCC-200-QRPp and DXCC-200-Milliwatt Trophies (for working 200 countries with 5 watts and under 1 watt respectively) and the Milliwatt Field Day Trophy for operators using less than one watt during the annual ARRL Field Day exercise.

"Adrian was responsible for the early emergence of the "Milliwatters", a group of hard core QRPers who amazed many of us by performing seemingly impossible feats of long-haul communications using milliwatt power levels. His dedication to this facet of the low power hobby served to stimulate many of us to try milliwatting and push our operating skills and station efficiency to the maximum.

"Adrian Weiss is the epitome of a True QRPer. His dedication to the hobby and his outstanding efforts to promote low power communications on a global scale set him apart from his peers."

AND FOR NEXT YEAR...

Later in this year, we'll announce the opening of nominations for the QRP Hall of Fame for 1997. That will be your chance to throw out the name of your favorite QRP hero(s) for consideration. If you know of someone deserving of the honor, sit down and write up a nominating letter with plenty of facts and justification, and their name will be on the ballot.

--qrp--

NOTES FROM THE VEEP

Mike Czuhajewski, WA8MCQ

RENEWALS, SUBSCRIPTION PROBLEMS, ETC

If you want to join the QRP ARCI or renew your QRP Quarterly subscription, make a check out to QRP ARCI, not to Mike Bryce, and mail it to Mike Bryce, not to anyone else. If you have subscription problems, write or send e-mail to Mike Bryce (73357.222@compuserve.com)

Myron Koyle, N8DHT, reports that he gets about a third of the applications and renewals sent to him. Send them to Mike Bryce instead; it's his job, and sending them elsewhere just slows things down and adds an extra chance for it to get lost in the mail. (I've even had people send ME renewals!)

Please make your checks out to QRP ARCI, not to Mike Bryce. He does not get the money, the club does. If he gets too many checks made out to him, the IRS may want to know where it's all going and why it's not reported as income!

If you have subscription problems, such as missing issues, do not contact Myron, do not contact me, do not contact N8CQA or your favorite Board Member or anyone else and don't post a complaint to QRP-L--contact Mike Bryce. That's his job, and going through anyone else only complicates and delays things. I get lots of complaints about subscriptions, and so do Myron, Buck and others. All we can do is tell you is to contact Mike.

Some people tell me they did that already and nothing happened--if that's the case, we'll tell you to try it one more time and if nothing happens again, then tell us and we'll look into it. The US mail is not notoriously reliable, as has been well documented in recent years, and particular parts of the country are notorious for lost, discarded and stolen mail.

And don't count on e-mail being 100% reliable, either. Many people tell me they sent e-mail to Mike and nothing happened. Mike tells me he never got them; I've been on both of ends of non-delivered e-mail dozens of times, as many of you probably have been. If you send e-mail to Mike, add wa8mcq@abs.net to the CC line, and perhaps n8cqa@tir.com as well, and ask Mike to acknowledge receipt by return e-mail. If you don't hear from him in a week, let me know about it. Don't put complete faith in either the USPS or the e-mail system, since neither deserves it.

If you want to join the QRP ARCI or renew your QRP Quarterly subscription, make a check out to QRP ARCI, not to Mike Bryce, and mail it to Mike Bryce, not to anyone else.

If you have subscription problems, write or send e-mail to Mike Bryce. (73357.222@compuserve.com)

Finally, be sure you renew your subscription well ahead of time. As mailing time approaches, Mike runs off the labels and gives them to the printer. If you have not renewed by then, your label is not there and you will not get that issue. You must have your renewal in several weeks ahead of the issue date. Do not count on Mike replacing copies that you missed because you didn't renew in time; those cost us $1.70 to mail first class and will no longer be sent at no charge to you. You might still be able to get them, but you will be expected to pay the extra postage. The same applies to all back issues that you missed: we had to pay to print those issues, and we have to pay to mail them to you--and a special mailing by first class costs a great deal more than bulk mail. Issues that were missed due to nonrenewal can be purchased; do not expect them to be free.

If you missed issues due to problems in the postal service, they will be replaced free if available, or your subscription will be extended by an appropriate number. However, if you moved and did not send us a forwarding address, you must pay for those missing issues if you want them. It is your responsibility to let Mike know when you move, and be sure to do it well in advance so the change will make it to the data base in time to get changed on the labels.

Again, to join or renew or complain about subscription problems, contact Mike Bryce--that's his job, he loves it, doesn't get paid a penny, and does a great job, especially with 1500 or more people on the mailing list. He reports that subscription complaints dropped greatly after some changes he made to the system, and he also added a line to the address labels that tells you exactly what issue will be your last. If you complained to him and nothing happened, do it one more time and then let me or Buck know if intervention is needed. Remember, it's up to YOU to keep us informed and paid so the QRP Quarterly keeps coming to your door! --qrp--

FROM THE EDITOR

Monte "Ron" Stark, KU7Y

What a difference a few weeks can make. No more snow, the sun is shinning and the temperature is heading to 90 degrees F, we are moved into the new place and most box's of goodies have been found.

We now have 12 Texas longhorns and one Brahma on the place. Garden started, weeds under control and I no longer drive halfway to the old house before I remember that we have moved!

So far I have one hole in the ground for a tower. Have collected 90' of Rohn 25, 40' of old surplus tower and one 50' crank-up. But just one hole done, no antennas up yet! Before June is out I will be back on the air.

The big Dayton get-together has made it's mark in the history books for another year. This time the QRP news of the year was the FDIM. Be sure to read about it in this issue. Congratulations to all for a grand job.

Remember the cover photo contest. We have had two winners so far and are looking for more entries. If you have a picture that you think others would like to see, send it to me. The winner gets a one year subscription or renewal. You can only win once every two years so there is room for a lot of winners!

Be sure to read the President's column. There have been some changes that will be seen in this and all future issues of The Quarterly. The bottom line is that we must keep the costs of publishing at or below the money received!

This issue will have a number of type sizes and column formats. We need to find out what most people find easy and pleasant to read.

We still have a few articles done in the larger type size and with the space between paragraphs. Everyone was not able to change format in time to meet the deadline.

The challenge for me is to get the same amount of information in fewer pages and keep it fun and easy to read. To meet that challenge, I need your help. As you read the articles, notice what you like and don't like about the format. Then let us know, either via e-mail or snail mail.

I will try to accommodate your ideas and wishes as much as I can, but one thing is firm.....there will be less "white space" and the number of pages will not exceed 48. Within those constraints, we can have a ball!

Our tech. editor, Ray Anderson, WB6TPU, had a hard disk crash just as he was finishing the technical articles for this issue. Not only were they lost but so was all his data and programs. Hopefully he will be back up and running at full speed by the next issue.

WIMU is coming, August 2, 3, and 4 of 1996, in Park City, Utah. Check out the WIMU96 home page at:
http://www.xmission.com/~mistral/WIMU96.htpl

There will be a QRP forum and prizes. The QRP ARCI and NorCal will have a table there just waiting for you to stop by and say "HI".

Thanks for all your support, letters, ideas and pictures. Please keep them coming.

Ron, KU7Y

INCOMING MAIL

Compiled by Larry East, W1HUE

Dear Ron,

Your comment that most QRPers who have written you want to see more technical articles has led me to write you concerning this subject. The reason you get such suggestions, I believe, is that all who stay in the QRP ARCI are the technically oriented types. Those who are not simply drop out. I would suggest that in fact you need less technical articles. You need articles that appeal to the QRP operator, and not just those technically inclined,

I refer to your membership list. When I was managing editor of The Quarterly I was shocked to discover how few members there actually were. It seems that there are a lot of QRP operators out in ham radio land, but most of them do not belong to the QRP ARCI. It would be interesting to discover the turnover of the QRP ARCI; further, it would be most interesting to discover why members drop out.

Perhaps the Board of Directors is happy with representing a certain sector of the QRP community. If the goal of the QRP ARCI is to appeal to those who enjoy experimentation rather than those who enjoy QRP operation (despite what the front cover states), then continue the way the club has been going, However, if you want to represent most QRPers, then I suggest a different approach to The Quarterly.

Please remember that not all QRP operators sit at their workbench every night working on some new design or modifying their HW-8 for the umpteenth time. Many of us have a life outside of amateur radio. Perhaps The Quarterly should appeal to people like myself and my QRP friends. Wouldn't it be nice if most of the QRP fraternity were involved with the ARCI? Our numbers would certainly be significantly higher than they are now, and perhaps pack a little more punch with the amateur radio community in general,

Have you ever seen our numbers published in the Quarterly? It seems that figure plus the finances rarely appear in published form. Perhaps the membership should be made aware of these facts and figures. As I said previously, I was shocked to discover how few members the QRP ARCI had. Moreover, what is being done to increase membership, or is that unimportant as some members might allege?

You should be congratulated, though, for publishing The Quarterly on a timely basis. Nothing like receiving one's copy of the April issue around the first of the month. You and your staff have done a nice job insofar as the appearance of the Quarterly is concerned. Keep up the good work.

All the best,
James P. Griffin, W9NJP
St. Charles, IL

Hi Jim,

Thank you for taking the time to write. You raise a very interesting question. ***Jim Stafford, W4QOB,*** *has just asked a question on the QRP-L reflector that should help identify the needs of The Quarterly. However, no one publication will ever be all things to all people. I doubt that very many read and enjoy every word, but if most find enough coverage of the things they like to justify the cost of membership, then we have done a good job! We have a new BoD now and membership building will, I think, become a hot issue! This issue will be a good place to start letting me know what articles you like and how much you like them. I would also like to see non-members tell us what we need to do to get them to join. I also don't spend eight hours at the workbench every night! In fact, I spend more time shooting and reloading than I do building radios! Then there are the fences, weeds, cattle, weeds, house to fix, weeds, barn to clean, weeds... de Ron, KU7Y*

Hi Ron,

The April of The QRP Quarterly issue arrived in New Jersey today, and I had to let you know that I think it's the best issue I've seen in the two years I've been a member of QRP ARCI. Great job, Ron! The content is improving issue by issue, and there's a lot for a newbie like me to learn from.

The front cover, which is graced by Stan Cooper's Sierra, brings pleasant memories of oh, way back a month ago, when I was privileged to attend the March NorCal meeting. I had Stan's Sierra in my hands, and it is a beauty. It inspired me, on the spot, to buy a KC-1 keyer/frequency readout kit that is now installed in my Wilderness Sierra. What a great little item!

The other neat thing in the April Quarterly is the first appearance of the call N2SMH on page 53. It's about time!

72 and keep up the great work!
David Miliniak, N2SMH
Glen Rock, NJ

Unless specifically requested that it not be published, any letter, note, etc. received by the editors and staff of The QRP Quarterly that is of general interest to our readers will be published when space is available. We reserve the right to edit all published correspondence as we find necessary. Opinions expressed are those of the authors' and do not necessarily reflect those of The Quarterly editors or the ARCI Board of Directors.

MILLIWATTING: 10db BELOW QRP

Thirty Meter Propagation Survey

Bob White WO3B, 8293 Shilling Road, Pasadena, MD 21122 HTTP://www.geocities.com/SiliconValley/5582
bob_white@ccmail.aerosys.loral.com

DAYTON and FDIM

Well I finally made the big trip to "Ham Mecca", and what a trip it was! Sharing a van with three other members of the Maryland Milliwatters, (K3TKS, W6TOY and WA8MCQ), for 1200 miles provided plenty of free time to learn more about milliwatting from some real veterans. Never a dull moment with that group. I might not have been able to teach them any new tricks when it comes to milliwatting, but the next time you correspond with any of them, ask about the Park and Dine, in Hancock, MD. I am sure that anyone of them will tell you that they did learn something of value from me.

I know you have all had your fill of Dayton talk by now, but I just want to say that Four Days In May (FDIM) was a wonderful experience for me, both as an attendee and as a speaker. Thanks again FDIM committee members for all your hard work. It is going to be a tuff act to follow.

I made several purchases while at Dayton, but the purchase which struck me as the one most critical to my milliwatting operations was the DSP purchase.

I have had a DSP unit in the shack for the last couple of years, but was never really impressed with it's performance in the area of low signal level CW reception. I knew that DSP had come a long way since I built that little 8 bit unit, but I was still under the impression that DSP was more suited for SSB work. Boy was I wrong!

JPS NIR-12 Dual DSP Noise/Interference Reduction Unit

While browsing the Vendor Hall I was taken in by a display which featured a NIR-12 DSP unit which was hooked up to a computer. Being the type of person which enjoys the flexibility of computer control, I stopped to learn more about what I was looking at. As luck has it Doug Hall, KF4KL was there to demonstrate the unit. Doug, being a fellow QRPer, was quick to pick up on what I was looking for in a DSP unit and able to demonstrate some of the features I was not aware enough to ask about. I started right off with "let me hear some CW" Doug feed the unit with an audio tape from which I could hear one strong CW signal, one weak CW signal, and a lot of noise. Doug pointed out on the Audio Spectrum Display, which was running on the PC, that there were in fact three CW signals present, but neither I nor Danny, K3TKS could hear more then two.

Then the magic began. Doug proceeded to eliminate the noise with the Dynamic Peaking feature, and by adjusting just two knobs, (one was bandwidth and the other center frequency adjust), he proceeded to tune in each of the three signals individually. While he was tuning I could watch the effects of the filtering on the Visual Audio Display. What an aid to low signal level reception. This unit also makes a nice, (though a bit expensive), fix for the AGC pop on my new improved QRP+, (which I forgot to review this quarter, but it is working well). I just leave the SCAF at 2400 and use the DSP to set my bandwidth.

The NIR-12 allows for adjustable bandwidth between 50 Hz and 3400 Hz and a center frequency adjustment between 200 Hz and 3400 Hz. Depending on the settings of these two adjustments, the unit can provide audio bandpass filtering, lowpass filtering or highpass filtering.

By using two 40 MHz TMS320C26 digital signal processor chips the NIR-12 can provide Notch filtering of multiple heterodynes, noise reduction and dynamic peaking simultaneously.

The ability to view the audio spectrum on a PC from the NIR-12 requires purchase of the software developer package which sells for an additional $35 and not only allows control of the DSP from a PC via an RS-232 port, it allows you to download the latest firmware updates directly from JPS via internet

Doug tells me that the software required to run the Visual Audio Display will be available soon as shareware. I fully expect that it will be available by the time you read this article.

Can you tell that I am excited about this unit? More so then you think. Why I haven't even mentioned the fact that I finally purchased the Kent single paddle key I have had my eyes on for the last three years.

Thirty Meter Propagation Survey

What is a TMPS? Why it's Chuck Adams, K5FO's 1996 30 meter propagation study. If you didn't attend FDIM and listen to Chucks talk about last years study, try to get your hands on the paper Chuck wrote about it. The band gets very hot during the summer months and has become a favorite hangout for many QRPers at this time of year. TMPS started on 1 May and will continue until the end of August.

So get up on 30 and try your hand. I can assure you that there are a lot of good ears on the band, and heck I'll be listening and looking for you with my new DSP unit.

Here are the reports I have received on 30 meter milliwatt activity to date:

Steve, N2MNN using a Wilderness Sierra set to 950 mW with a OHR WM-1 and feed through an MFJ tuner to a 40 meter full wave vertical loop (about 35 feet per side made from 10 gauge stranded house wire). Steve reports his best DX so far to be a OK1HWI on 10.114 at 22:54 UTC.

Mark, AA2PF, located in Buffalo, New York, while using a Ten Tec Argo 556, Weltz QRP watt meter, MFJ 971 tuner, and 40 meter dipole fed with 150 ohm twinlead has worked Manitoba, France, Eustatius Isle, Orkney Isle, and Italy at 900 mW , France and Czech at 700 mW, and Romania at 600 mW.

Kent, AB7OS in Scottsdale, AZ has 6 Qs AZ, CO, HI, KS, and OK while using a borrowed SWL 30-40 at 900 mW into a 20 ft ground mounted vertical. The vertical is a temporary setup with only 2 ground radials and leftover pipe from a fence he is taking out.

Still looking for his last few states for 30 meter QRPp WAS. Chuck, K5FO, who operates from Dallas, Texas is using a GM-30, MFJ-941C, Envirotronic Paddle with CMOS III keyer, 20 Ahr Gates Gel-Cell (I bet that lasts a long time), 30M wire with 10M counterpoise feed with 300 ohm ladder line and a $10,000 computer at 100MIPS to keep up with the logging. Chucks report in QRP-l format reads as follows:

K5FO TMPS 1996 Qs=12 States=10 Confirmed=04 DX=01 (All on one line)
AZ CO IN MI OR SD TX UT WI WY

WO3B's 1996 TMPS Station

This year I am running at 400mW, checked with an OHR WM-1, with a upgraded QRP+ into a 571 foot long horizontal loop, (four full wavelengths on 7.040 MHz), feed with 450 ohm ladder line. The highest part of the loop is at 55 feet in the west corner where it is feed. The lowest part of the loop 30 feet in the east corner. The loop tunes well on all bands 160 - 10 meters using an MFJ tuner. My QTH, located 12 miles SE of Baltimore, MD is about one-half mile from the Chesapeake Bay,

(about 100 yards from one of it's coves), is at sea level, and has sandy soil.

W4RNL, LB Cebik, just ran my loop through EZNEC for me, (thanks again, LB), and for 30 meters it is showing major lobes to the East and West at about 11.7 dBi. There are also several side lobes up to 8 dBi each, so the antenna is doing well in all directions.

So for 400 mW, (read and weep Chuck): WO3B TMPS 1996 Qs=19 States=15 Confirmed=00 DX=01
AL CA CO CT FL IA IN KS LA MD MI NH NY TN TX
Poland (also bagged Germany two hours before 1May UTC)

Milliwatting Tip of the Quarter:

To help you get a feel for what stations are most likely to return calls from your milliwatt signal, place an attenuator in your receive path which approximates your delta from 5W. Now, when you hear a station you could normally work at 5 watts, you should be good to go.

I use an attenuator to lower my output power and just leave it in-line for both transmit and receive.

--QRPp--

QRP, Really!

Bruce Muscolino

FDIM

As I write this, the echoes of Four Days in May (FDIM) are still ringing in my ears. From an idea hatched in last year's QRP-ARCI hospitality suite by Bob Gobrick, VO1ERB/WA6DRB, and myself, grew a true QRP happening. When we were asked last year how many people we thought we could attract, we said "maybe 25.". Over 100 of your fellow QRPers were in attendance, and no one, I mean NO ONE, nodded off all day no matter how tired their arms were from flying in the night before!

FDIM was a roaring success; it far exceeded our expectations. Before I left Dayton I personally thanked all the authors who prepared technical presentations, and I personally thanked the entire FDIM committee -- Bob Gobrick, who coordinated the whole event, Paulette Quick, N9OUH, who handled administration, arrangements, and registration, and Preston Douglas, WJ2V, who coordinated the vendor show, and I want to thank them again in print, in front of their peers!

What is FDIM you might ask. If you are on the internet or you read the other magazines, please forgive me the use of a few lines to bring your brethern up to date. FDIM is probably the largest QRP technical event in the free world. We had technical presentations by ten authors and myself, that covered areas of QRP of interest to everyone. You'll find a list of the authors and their papers at the end of this column. We had a catered "box" lunch and a talk by Dr. Rick Zabrodski, VE6GK, a successful Canadian occupational health physician and a QRPer of some note, and we had a show and tell in the evening, where vendors were given a forum in which to display their wares and say a few words about themselves. Each attendee got a bag full of QRP goodies -- a copy of the technical papers bound as a book; a copy of the new QRP data book written by Paul Harden and published by the Colorado QRP Club; a copy of Bruce Milne's new "QRP Companion" software; and the opportunity to meet their fellow QRPers face to face! And the cost was only $30.00 (not including of the cost of coming to Dayton and miscellaneous purchases while there)!

FDIM '96 was such a great success that we were asked by almost everyone there to do it again -- and we will -- plans for FDIM 97 are underway even as I type! As for FDIM 96, you can still get a copy of the proceedings, a 125 plus page 3-ring bound book containing the full text and figures of each paper from me for the paltry sum of $20.00, postage paid. You can get a copy of Paul Harden's book from the Colorado QRP Club, and you can get "QRP Companion" directly from Bruce Milne, WB2QAP. One of our authors did videotape the conference and we may eventually offer that as well.

Dayton

He stepped back a few feet and his eyes got wide and he said "You're Bruce Muscolino? From Wadsworth, Ohio?"

Imagine that, we'd been friends on the air 40 years ago and had never met in person!

Dayton is many things to many people. To me it is the opportunity to renew acquaintances with old friends and make new ones while depleting the bank account at the swap meet. Traditionally, the first day of the Hamvention(TM), Friday, the HARA Arena does not open until after noon. The swap meet, however, is open from 8:00 AM, or some such mythical hour. I got there about 9:30, and started to make my way around the swap meet. About the fourth tent I passed had a display of radios from my childhood, and I went in to look. I found a rig I thought I might like to take home, but it had no price tag, so I looked around for the owner. I saw a fellow standing behind some tables in the corner, and went over to ask. As I approached him I saw his call sign is W8ATH, a call that brought back memories of a teen-age 10 meter net that met several times a week in the Akron, Ohio, area. I asked him if he had lived in Akron -- he said yes, a long time ago. I told him I thought I had worked him numerous times. He looked at my present call and asked what my call had been -- I said K8BAL. He stepped back a few feet and his eyes got wide and he said "You're Bruce Muscolino? From Wadsworth, Ohio?" Imagine that, we'd been friends on the air 40 years ago and had never met in person! Ain't Dayton a wonderful place?

Of course the real reason we all go to Dayton is to see what's new and different in ham radio. QRPers look for QRP stuff, and I found some I thought was interesting. First there was the weather. I thought I was in the wrong town -- from about noon Friday until we left Sunday afternoon it was in the 80s and 90s, and probably still is! As far as goodies go, how often have you gone on a search for just the perfect box to house that new rig or other project, and ended up with the same old selection from Radio Shack, or Mouser? There's good news out there --, Mendelsons, a Dayton landmark (nine floors of surplus) has introduced a line of boxes in sizes QRPers will love. I bought five or six myself. Contact details are at the end of this column. The prices were reasonable, starting at around $3.00 and going up into the teens. Ten-Tec was also there with their line of kits and boxes -- not a new item, but some very classy items. They will send you a catalog. Again, details are at the end of the column.

S&S introduced a new digital VFO that has both a programmable output frequency and a programmable offset, plus a digital display. The programmable operating frequency and the programmable offset will allow the unit to be used with any rig.

A new vendor of QRP goodies is "The American Radio QRP Key Mfg Company", run by .Gil Kost. They manufacture a line of miniature telegraph keys that are perfect for small rigs, or even large ones. The keys are fully adjustable for contact spacing and spring weight, and sell for $39.95; and you'll probably want several. They are available with two different size knobs; I bought the large knob.

So what did your faithful scribe buy? I bought several boxes, some from Ten-Tec, and a few from Mendelsons. I bought one of Gil's new keys, and I bought a copy of Roy Lewallen's ELNEC antenna modeling software. LB Cebik, one of the FDIM authors, talked me into it -- not a hard job either. Oh, and did I tell you about the very nice E. F. Johnson Viking Ranger I I bought? When I was a kid, in the 50s, the Ranger was truly the Cadillac of novice rigs -- I always wanted one then and now the fantasy is a reality. No, I won't use it for QRP.

Who's using what survey ?

I'd like to get a little information from you so I can better aim my writings. Will you please drop me a postcard, or an email, telling me what rig(s) you use and which are your favorites? What antenna (or antennas) you use? And what are your favorite bands and operating activities? Thanks.

FDIM authors and their papers:

Coils, Linear Loads, and Capacity Hats: An Overview of Small Loaded Yagis -- **L. B. Cebik -- W4RNL**

Evolution of an Attic Antenna - QRP Operation from a Townhouse -- **Walter B. Thomas -- WA4KAC**

Using Vee Beams for Field Day -- **Ed Manuel -- N5EM**

Building Helically Wound HF Antennas **Bruce Muscolino -- W6TOY/3**

Options to a Homebrew QRP Station -- **The Rev. George Dobbs -- G3RJV**

Direct Conversion Receivers -- **Bill Kelsey -- N8ET**

A Guide to Building Hi Tech Kits -- **Kathy Szakonyi -- N3SAD**

Considerations in Receiver Design -- **Dick Szakonyi -- WA3ZOW**

30 Meter Propagation Study -- **Chuck Adams -- K5FO**

Milliwatting: Another Addictive Aspect of QRP -- **Bob White -- WO3B**

The QRP-ARCI Nets Program -- **George (Danny) Gingell -- K3TKS**

Contacts:

Miniature keys -- American Radio QRP Key Mfg Co.

Gil Kost
3710 Buckingham Road
Baltimore, MD 21207
(410) 484-7951
email: ahber@ix.netcom.com

Mendelson Elecrtonics

Harlan Mendelson
340 East First Street
Dayton, OH 45402
(800) 422-3525
email: mec@meci.com

S&S Engineering

14102 Brown Road
Smithsburg, MD 21783
(301) 416-0661

Ten-Tec

1185 Dolly Parton Parkway
Sevierville, TN 37862
(423) 7172

ARCI Sponsored 1997 Dayton Building Contest

Design and / or Build

There will be 2 contests sponsored by the ARCI for the 1997 Dayton Building Contest.

The first will be a Design Contest. The rules are simple; design a project that costs less than $25 for 1 quantity parts and is QRP related. Submit your design to Doug Hendricks, KI6DS, 862 Frank Ave., Dos Palos, CA 93620 by Nov. 1, 1996.

The winning design will be kitted by NorCal for the 1997 Dayton Building contest.

In the past we have selected a previous design, or commissioned one. But this year we would like to see the talents that our members have. All designs will be considered for publication, but the winning design will be published in the January issue, in order to give the members time to build the design and enter the 1997 Building Contest. This should give us several construction articles for QRP Quarterly. Don't forget the deadline is Nov. 1, 1996.

You may contact Doug Hendricks for more information if needed. 209-392-3522 by phone or ki6ds@telis.org via the internet.

The full rules for the building contest will be in the January, 1997 issue of the Quarterly.

DEARTH OF TECHNICAL ARTICLES?

KU7Y mentioned in the last issue that some people wanted to see more technical articles. It's not that we don't like to publish them--we print what we get, and that doesn't seem to include a tremendous amount of technical articles. Of course, with the rise in the local and regional clubs there are many more outlets for QRP writers now, and that doesn't help. I already get many inputs for the Idea Exchange from USENET newsgroups and QRP-L, and we occasionally run reprints from other QRP journals, so the information is out there, but spread around.

We could reprint more of the good technical articles from other QRP journals if you'd like to see them. This is always a touchy subject; a year or so ago there was some discussion on QRP-L about people having to read the same thing in more than one publication, complaining that they wanted to see new material, not something they already read. One answer to that is that not everyone gets a large number of QRP journals, and informal surveys seem to support that; the actual number of people getting, say, both the QRP Quarterly and QRPp appears to be only a couple of hundred, out of well over a thousand subscribers for each. There are probably a lot more people who would love to see us run the best of the QRP press.

I realize this is a very unscientific poll and will probably be statistically unreliable, but please let the editor know how you feel about this--would you like to see more technical articles reprinted from other QRP journals, or do you prefer to see only original material? Keep in mind that sticking to purely original materialwill have a definite impact on the size of the Quarterly. If you write or send e-mail to KU7Y (ku7y@sage.dri.edu), be sure to tell him which QRP journals you get Technically minded QRPers: be sure to share YOUR expertise with the rest of us! Don't worry if you're not a professional writer (few of us are), since we can rewrite and edit as required. Just get it down on paper (or computer disk) and send it to Ray Anderson, the technical editor, or to me if it's a shorter item more suited to the Idea Exchange, and we'll work with you on it. --qrp--

THE NEW SQUARE VIBROPLEX BRASS RACER

QRP Quarterly Interview with Bob Gobrick VO1DRB/WA6ERB (email: rgobrick@nfld.com)

QQ: Bob, we've been told that you recently tried out the new Square Based Vibroplex Brass Racer Key - a "hot" new item in the QRP CW world. What's your opinion?

V/W: Well the word I will use to describe this new key for the QRP Quarterly readers is "square". Yes, "square" in the true 1960's terminology - "not fitting in with the times". Why, here we are in the 90's and we're regressing to the way things used to be - everything square and boxy.

QQ: Geez, that's a little harsh since it seems like everyone is talking about this new Square style base over the traditional triangle based Brass Racer.

V/W: That's the point - the triangle base Brass Racer is not traditional - it's **radical** and unfortunately it was ahead of it's time - just like everything else that came out of the 60's.

QQ: What do you mean?

V/W: Well if I may take a few moments to cover the history of the Brass Racer for the QQ readers it will help put things in perspective. After doing a little research with my best "search" engine, "From Beverages Thru Oscar" by Rich Rosen, I found that the Brass Racer heritage starts with the famous W8FYO "yoke and long spring" paddle of the sixties - the paddle later re-incarnated as the HAL FYO Key and finally as the Bencher Paddle of the late 70's. It was when HAL sold out it's production of the FYO paddle that a small company called HAMCO, in the redwoods of Northern California, bought the inventory, jigs and rights for the FYO design. Try to imagine what this small little ham run HAMCO did. Instead of coming out with a copy of the HAL FYO they threw away the base, the springs and the tradition and introduced the HAMCO Scotia, a triangle shaped key with a brush-finished solid brass and hardwood base with MAGNETIC tensioners. This was so radical that it was almost sacrilegious. Gone in one fell swoop was the black and chrome square boxy key with it's finicky mechanical spring which always seemed to get launched at a moments notice. What debuts was a beautiful brass (like pounding the brass) and furniture-like hardwood base, a material efficient triangle design that was "green" way ahead of it's time and space-age magnetic type tensioning. This key was beautiful and very functional - a candidate for the MOMA - Museum of Modern Art. And furthermore it played wonderfully. You guessed it - I am biased - I own one of these cherished HAMCO Scotia's.

QQ: So where's this going Bob?

V/W: OK - fast forward. 1980 - Here's Vibroplex still plugging away with it's nice old beautifully machined Bugs and paddle keys in need of some new designs to fend off the likes of HAMCO and Bencher. Vibroplex buys the HAMCO key and christens it the "Brass Racer Iambic" - definitely a new and radical looking key for it's line. Over the years Vibroplex pretty much leaves the design of the Brass Racer alone and the fine craftsmanship remains intact. Along the way some minor tweaks are made to the ABS plastic paddles and the set screws for the magnet stops. One noteworthy option was a Curtis 8044 keyer hidden in the wooden base. The Curtis option was a little pricey but Vibroplex now had one of the only quality keys on the market to offer an excellent built-in keyer.

QQ: Geez, that's a little harsh since it seems like everyone is talking about this new Square style base over the traditional Triangle based Brass Racer.

QQ: So where's this going Bob? (getting a little impatient - **ED**)

V/W: I'm getting there.. More changes - a few years ago Vibroplex is sold and moved from Maine to Alabama. The new owner Mitch Mitchell WA4OSR vows to keep the Vibroplex tradition alive. One of the first "new" products out of the chute is this new Square based Brass Racer. And what a stir it is causing - it's like something new and innovative has come to the market. All I have to say is that after playing a while on the "new" Square base Brass Racer and my old HAMCO Scotia there is NO difference in how the keys play. They both have the heavy non-skid brushed brass and polished hardwood bases, they both have the innovative magnetic tensioning that incorporate nicely machined components, they both allow individual tensioning of each paddle and they both "play" great. The only difference I can see (feel) is that one is definitely "Square".

QQ: So who's going to buy this new Square based Brass Racer?

V/W: Well all I can say is that this is one heck of a Vibroplex marketing coup for the pre and post 60's ham baby-boomers. The pre baby boomers want to go back to the roots of the old square boxy units and the post baby boomers just hate that the 60's generation got away with introducing a triangle based space age key to the staid ham market. This key is definitely for a "niche" market. Me - I'm a "triangle" sort of guy!

QQ: So Bob it sounds like you're not going to buy one of these next generation Square based Brass Racers?

V/W: That's correct - I have my principles - I'm from the 60's generation you know. But if, just if, Vibroplex could figure out a way to incorporate one of those neat Idiom Press Super CMOS II memory keyers or a retrofitted MFJ memory keyer on top of the Square based Brass Racer base THEN maybe I'd be interested. Oh by the way - I just happened to loosely fit one of the MFJ 490 keyers to the Square based Brass Racer and it looks like a go. Now will Vibroplex talk this over with Idiom Press or MFJ? Will see.

QQ: Well that concludes our interview with another one of our biased and opinionated QRP members. If you would like to comment on the subject matter of this interview please send your thoughts to the QRP Quarterly editor for inclusion in the "Incoming Mail" column. (It's a wrap - 72 **ED**). □

Members' News

Richard Fisher, KI6SN
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Riverside, CA 92506
(e-mail: KI6SN@aol.com)

FDIM: Reflecting QRP's best

Four Days in May — the QRP symposium held this year at the Dayton Hamvention — was, by all accounts, a huge success. Great turnout. Great camaraderie. Great speakers. Great activities. Great technical papers. Great debuts of new gear — all the ingredients for a great experience.

KI6SN
. . .Richard Fisher

But there's another crucial ingredient often overlooked or underappreciated when such good things happen. The QRP community would be sadly remiss in failing to properly recognize the people whose untold hours of planning, pieces of e-mail, telephone calls, and other communication went into putting such an ambitious program together.

Bob Gobrick, VO1DRB/WA6ERB, Paulette Quick, N9OUH, Bruce Muscolino, W6TOY/3 and Preston Douglas, WJ2V, were principal movers behind FDIM.

Pete Meier, WK8S, did a great job coordinating Friday evening's QRP ARCI Banquet. There are others, to be sure.

When considering how many disparate elements had to be drawn together from around the country and world, then managed and choreographed, it is truly mind-boggling.

The fact that FDIM went so very well is testimony to the dedication and determination of the coordinators who worked so hard to *make* it happen. FDIM wasn't a fluke. And its success didn't come about by accident.

The QRP community in attendance, and the QRP community at large owes a tremendous debt of gratitude to the FDIM coordinating committee. Its work reflects the best in QRPers. It also reflects the best of a revived and rejuvenated QRP Amateur Radio Club International.

A heartfelt '72' to all the forces that pulled FDIM together. They've created a forum from which legacies are made.

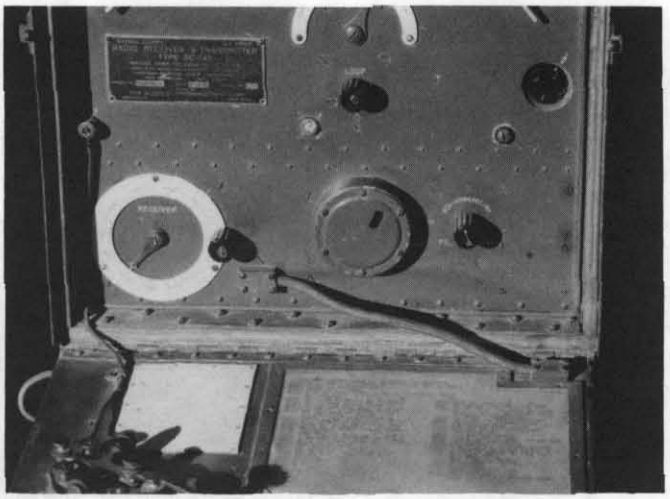
— R. E. F.

Pure, 90-proof QRP nostalgia

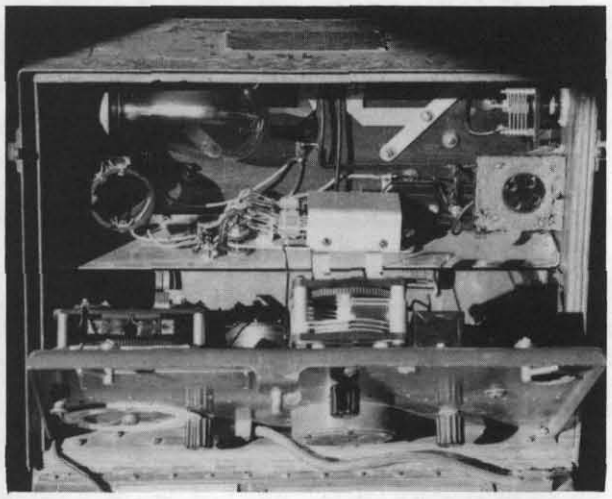
Richard Smith, N7CTJ, writes from Reno, Nev., that he was "really surprised to see something on the old BC-151 or 156 Signal Corps field radio in the January QRP Quarterly (Members' News). I have owned one of those rigs since the late '40s. I found mine, a BC-148, in a surplus store when I was just a kid in Pomona, Calif.

"It wasn't until 1980 that I ran into someone on the air who actually knew what it was and sent me a one-page schematic. At the time I found it I didn't know that it required a 400-volt hand crank generator, or I would have picked that up also.

"I remember I paid $7 cash. Over the years I just kept it in the garage, not wanting to let it go. Other than the generator and loop antenna, it is complete.



This BC-148 transmitter/receiver was purchased from a surplus store by Richard Smith, N7CTJ, when he was a kid in Pomona, Calif. A peek inside the radio's mahogany plywood case (below) shows the fine workmanship that went into the design and construction of the simple three-tube regenerative receiver and single-tube transmitter.



"I have toyed with the idea of getting it working and on the air, but that would be a major project. All the oil-filled capacitors have long since leaked out. I don't feel comfortable about cobbling it up with modern components.

"My BC-148 was built in June of 1931. It was designed to use only the tubular loop antenna. It operates at 3.960 to 4.360 Mhz. The workmanship is quite beautiful. The case is fine mahogany plywood, varnished on the inside and painted Army green outside.

"The circuitry is quite primitive, but well laid out. The three-tube receiver is a very simple regenerative circuit without any BFO. The receiver was in the bottom half of the vertical department. The single-tube transmitter is rated at about 10 watts.

"Its plate and filament voltages are supplied by the hand crank generator. The receiver was powered by batteries housed in the bottom case where the headphones were also stored. The variable tuned receiver was switched on by

simply opening up the case which closed a filament supply contact.

"The transmitter frequency was preset by a trimmer cap that was accessed from the back of the case.

"Antenna loop loading was done by the loop capacitor knob. There is a small lightbulb just to the left of the loop knob. That lit when you keyed down.

"I assume that the operator would tune the loop by peaking the brightness on the bulb. A round assembly just below the loop knob was a filament volt meter. The meter needle would line up in the small window at the proper voltage.

"A four-prong socket upper right was for the hand crank 400-volt and 10-volt supply. This is also a fairly large keying relay in the circuit that just looks like it has to be slow — 5 to 10 wpm maximum, I would guess.

"Why did I keep this old klunker, you might ask? One can only imagine about that era when radio was still very new and very magic.

"In 1931 most home radio sets still had individual interstage tuning knobs like those first Atwater Kents.

"Television and radar were still off in the distant future. This rig even predates the heterodyne circuits. Portable receiving sets were almost unheard of in 1931. To conceive of, and build a complete, portable transmitting and receiving station — that just had to be the ultimate in radio genius at that time.

"This old rig brings back that magic I felt when I built my first one-tube receiver. It wasn't much better than a crystal set, but it sure was pretty to me. Glowing electrons in a glass tube is like pure 90-proof nostalgia."

The joys of QRPp

John H. Shannon, K3WWP, submitted this dispatch via e-mail from Kattanning, Pa.

"I have been having a lot of success with QRPp lately, and I thought I would share my accomplishments with the membership to encourage them to give QRPp a try.

"Most of the articles about QRPp mention that a super antenna system is needed to make it work. I say that ain't necessarily so. Of course it helps if you have a high gain antenna to boost your radiated power, but then are you really doing it with QRPp or not?

"As I have mentioned in many letters and in all my contest reports, I use simple wire antennas on all bands. I have 3 antennas, a random wire that resides mostly in my attic about 30 feet above ground at the peak, a ground mounted vertical dipole cut for 20 meters that I also use on 17 and 12 meters, and a 10 meter sloping dipole up about 20 feet at the center. That's it.

"To make matters even more difficult I live right in the middle of my town which is located along a river down in a valley.

"With those antennas and 500 milliwatts output from my transmitter, I have worked 29 states so far this year, and 21 countries going back to September of last year. I guess my most distant QSO has been with The Balearic Islands, and the most distant state so far is Colorado.

"To make it even more of a challenge, I never sign '/ QRP' with my call, and most of my states have come from answers to my CQs.

"I am not writing to brag, because my success depends more on the ham on the other end copying my signal than anything I do, but to encourage others who don't have the best location or antennas to give (QRPp) a try anyway.

"Just make sure that your antenna is matched to your transmitter output. I hear so many stations running 100 watts with such puny little signals that I just know they are not radiating much of that 100 watts, but using it up in a mismatched feedline or using it to heat up their tuning circuits, etc.

"Also remember that today's receivers are so much better than those from years ago. I find that I am actually doing better today with 5 watts than I did back in the 60's with 75 watts of power, and I think that is largely due to the better receivers with the DSP filters, lower noise figures, etc.

"I read an article somewhere recently about the coastal stations (WCC, NMN, etc.) that said the coast stations have all cut back their transmitting power because of the better receiving equipment being used today."

Back into QRP — and loving it

Joe Mikuckis, K3CHP, writes from Riverdale, Md., that he "first joined QRP ARCI back in 1978 but let many years lapse since then. I did not neglect my QRP activity, however, and have made many FB contacts resulting in DXCC and WAS — the latter accomplished by using solar cells directly.

"Now I'm back with a new QRP Plus (CW/SSB transceiver), and am looking forward to the upcoming QRP ARCI contests. QRP is fun!"

Another Forty-9er fan

Frank Van Derpoel, K6UIZ, writes from Riverside, Calif.:

"I started (building) a Forty-9er on a Friday morning before work and finished it Sunday afteroon.

"It's not in a case yet; just hooked up with a mass of jumper leads. The first contact was with a fellow in El Dorado (CA) . . . I think he was running a NorCal-40. Then I heard a '7' and I thought 'Wow, Oregon?' Well, it turned out he was in Arkansas."

Franks says the receiver leaves a lot to be desired — "lots of AC hum when using a power supply. And there's a real loud Spanish-speaking foreign broadcast station — even with the (transceiver's) crystal removed."

Just the same, he's getting great satisfaction from this simple N6KR-designed transceiver. "My final contact Sunday evening was was an 'N3' near Baltimore. What a blast."

The Goodie Givewawy

Doug Hendricks, KI6DS, of the NorCal QRP Club and a member of the QRP ARCI Board of Directors, has generously donated a year's subscription to NorCal's excellent quarterly publication "QRPp."

It's one of the most anticipated club periodicals in the United States, and around the world. And for good reason. It is packed full of articles on low power operation, building and contests.

"QRPp" is also often the "first word" announcing club projects, kits and contests.

This quarterly's winner is **Richard Smith, N7CTJ,** of Reno, Nev. Many thanks for his submission to MN, and here's an invitation to all Quarterly readers to get in on the fun. Everyone who submits an item for MN is in the running for next quarter's givewaway. The address at the head of this column is all you'll need. Hope to hear from you soon.

AN UPDATE ON THE FORTY-9ER TRANSCEIVER

Larry East, W1HUE

The little "Forty-9er" transceiver designed by Wayne Burdick, N6KR, and described in the last issue of The QRP Quarterly has been a big hit with Northern California QRP Club (NorCal) members and the "Internet Gang" that subscribe to the QRP-L email reflector [1]. In fact, so much interest was generated that NorCal now offers a Forty-9er kit that consists of a printed circuit board, all board mounted parts including a 7.040 MHz crystal and six pages of assembly instructions. The kit costs $25.00 (plus $5.00 for shipment outside of the US) and can be ordered from:

Jim Cates, WA6GER
3241 Eastwood Rd.
Sacramento, CA 95821

Make checks and money orders payable to Jim, not NorCal. If you have a good supply of parts on hand and only need a printed circuit board, you can order one from Jim for $5.00.

So, you may be wondering, what is this thing that has generated so much interest? It is a simple direct conversion 40 meter transceiver that runs on 9 to 12V and uses a VXO oscillator that typically covers 5kHz. The transmitter puts out between 0.2 and 1.0 Watt depending on operating voltage and other factors. The design is extremely clean and simple. It was Wayne's goal to design a transceiver with better performance than the direct conversion rigs that so many of us have tried at one time or another with great disappointment, but still keep the parts count low. The simplicity of the design is probably what most people find so intriguing -- that and the fact that it really works! Its simplicity and lack of any "bells and whistles" also make it an ideal platform for experimentation -- and the "cost of failure" is much less than experimenting with your TS-450 (or even your OHR 400)!

Someone -- I can't remember if it was Wayne himself or Doug Hendricks, KI6DS -- mentioned on QRP-L that the PC board would fit nicely inside an empty Altoids® mint tin. Whoever mentioned this should get a sales commission from the makers of those little mints -- *everyone* on QRP-L immediately wanted to know where they could be obtained! For you who have never seen an Altoids® tin, one is shown in Figure 1 -- complete with a 40-9er inside! Those little "ears" on the sides are connectors for a battery and antenna; you might also be able to make out jacks for headphones and key on the right side. Another ideal, but not so novel, enclosure is a small plastic box complete with a 9V battery compartment and connector available from Radio Shack. This box measures 2¾ x 4½ x 1 inch (RS part number 270-211).

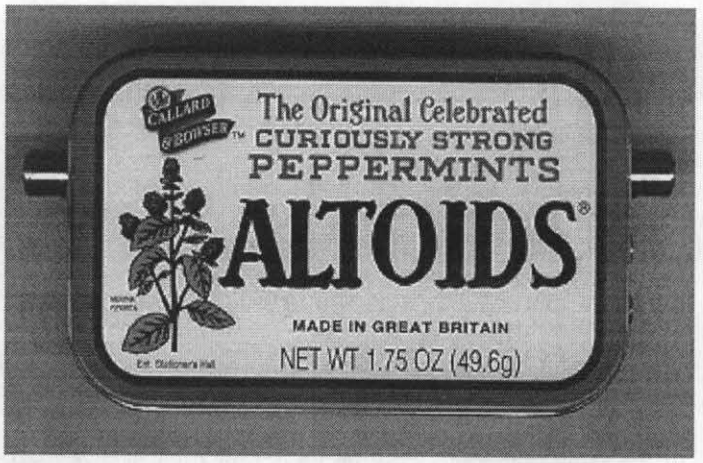


Figure 1. *Altoids® mint tin complete with a Forty-9er transceiver inside. (Digitized image from WB8ZJL.)*

Many improvements, additions and miscellaneous "tweaks" have been generated by builders of this little rig and posted on the Internet. My purpose in writing this is to summarize these for those of you without Internet access (I "volunteered" to do this one day when my resistance level was down). If you do have Internet access and a World Wide Web browser, complete information on the mods covered here plus a wealth of trouble shooting and other information can be found on the NorCal web site's "40-9er" page at http://www.fix.net/~jparker/40-9er.html.

Now for an overview of some of the modifications and enhancements that various folks have made. These were collected from many email postings and represent a lot of hard work by a lot of folks bent over their soldering irons. If I fail to mention your favorite mod and fail to give credit where credit is due, I apologize. But again, I refer you to the NorCal web page for complete details.

First of all, there are some minor component changes and additions that improve on the original design in various ways. These include, but are not limited to, the following:

- Change the values of C11 and C19 from 0.01µF to 0.1µF for better RF bypassing.
- For easier frequency adjustment, reverse the order of RFC6 and C6; make sure the "rotor" of C6 is grounded so that it is not affected by a metal adjustment tool (e.g., screwdriver).
- C20 should be 180pF rather than 150pF to insure that C2 "peaks" around 7 MHz.
- Use a toroidal inductor for RFC4 to prevent feedback to the driver stage via coupling to RFC3. Wayne, N6KR, suggests using an FT-37-43 core with eight to ten turns. I found that an FB-43-101 ferrite bead with seven turns of

[1] To subscribe to this informative group, send an email message to listserv@lehigh.edu with one line of text "subscribe <name> <call>".

#30 wire (the maximum number I could get through the hole) worked just fine and is very compact.

- Inductors with low resistance should be used for the various chokes. Toroids can easily be used for RFC1 and RFC5; 22 turns of #28 wire on a T30-2 or 23 turns on a T37-2 core will result in about 2.2μH.
- For better oscillator performance, use a 78L06 in place of a 78L05 for U3. You should also consider bypassing the output of U3 with at least 0.1μF, as some of these little voltage regulators tend to oscillate.
- If you plan to use an AC power supply in addition to or in place of battery power, add a 1μF to 10μF bypass cap from pin 8 of U2 (the LM380-8 audio amplifier) to ground.

A variety of different transistors can be used for Q2 and Q3. I have tried a 2N4401, 2N3904 and 2N2221 for Q2 and they all worked, but the 2N3904 produced the most output It should be noted, however, that there is a lot of variation among transistors of the same type and I only tested one of each. I have used a 2N3866, 2N3553, 2N4427 and even a 2N3053 (a switching transistor available from Radio Shack for about $1) for Q3. They all worked; the most output was obtained from the 2N3553 and the least from the 2N3053. A 2SC799 will also work -- I believe that NorCal is supplying this with (at least some) of their kits.

You must be very careful, however, in trying to substitute for Q1. A J309 is very well suited for this application due to its rather tight gate "pinch off" voltage range. Most 2N5484's will work, but some may not -- particularly SK or NTE "direct replacement" substitutes. Most 2N4416's will NOT work here; they will not completely turn off during keying resulting in loud "pops" (one might even say "crashes") in the audio output.

There was immediate concern expressed by many of the QRP-L group that the use of a simple three-pole output filter would not provide 30dB or more second and higher harmonic attenuation as required by the FCC. Indeed, the original filter design is a bit lacking in this regard; the second harmonic output has been measure at between 16dB and 22dB below the carrier level. Several alternate filter designs have been tried, and the most successful three pole design to date appears to have been one suggested by our own Mike Czuhajewski, WA8MCQ. His filter consists of two 1300pF capacitors to ground with a 0.68μH choke between them. This filter should come close to keeping the 14 MHz second harmonic 30dB below the carrier but may produce more attenuation at 7MHz (results vary depending on who is doing the testing).

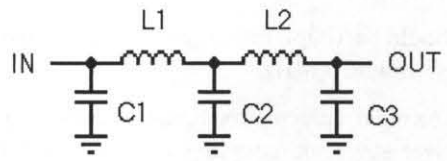


Figure 2. *Basic five-pole low-pass filter.*

To insure harmonic attenuation of greater than 30dB, a five pole filter of the type shown in Figure 2 is really required. The second inductor can easily be added from the "ANT" pad on the PC board to the antenna connector and the third capacitor mounted directly across the antenna connector. Several filter designs of this type have been suggested, and the most successful appears to be a design first described by John McKee, WB4OFT. His filter is configured as follows:

$$C1 = C3 = 470pF,\ C2 = 1000pF,\ L1 = L2 = 1.2\mu H$$

This filter should provide over 30dB attenuation at 14 MHz (and higher) and low loss at 7 MHz. Bob Kellogg, AE4IC, reported that he obtained 0.55W at 9V and almost 1.5W at 12V from his Forty-9er using this filter -- and the second harmonic was down over 40dB at both 9V and 12V. So, this one looks like a winner!

Many have complained about low audio output from this little rig. There are several possibilities for increasing the audio output:

- Use an LM386 instead of an LM380-8 for U2.
- Use both the positive and negative outputs of the NE602 and inputs of the LM380 for balanced coupling between these ICs.
- Use positive feedback to increase the gain of the LM380.

Replacing U2 with an LM386 requires some minor surgery to the PC board since this IC is not pin compatible with an LM380-8. A cap in the range 1 to 10μF must be added between pins 1 and 8 of an LM386 in order to obtain maximum gain. You can improve the audio response of an LM386 for CW signals by adding a 1.8K resistor in series with a 0.022μF cap between pins 1 and 5. This will reduce the response at 3kHz by about 8dB relative to 500Hz (thanks to AC6AN for this tip).

Using balanced coupling between U1 and U2 requires an additional JFET gating transistor and an additional choke (and possibly a cap) for an LP filter at the audio amplifier's second input. For one example of a design using balanced coupling (but no LP filter or gating), see "The Neophyte Receiver" described by John Dillon, WA3RNC, several years ago in QST and reprinted in the ARRL's QRP Classics. Balanced coupling is also used in the NorCal 40/40A transceiver design.

The use of positive feedback was suggested by Paul Harden, NA5N. The following fairly simple mod will increase the audio gain (when an LM380-8 is used for U2) by a factor of four:

- Cut the PC trace at U2 pin 2 (+IN) to isolate it from ground.
- Solder a 15K resistor from U2 pin 2 to ground (pin 4 or 5 can be used for a grounding point).
- Solder a 0.001F cap from U2 pin 2 to ground (across the 15K resistor).
- Solder a 1Meg resistor from the negative side of C13 (the audio output point) to U2 pin 2.

- You can optionally solder a resistor in the range 1 - 10K across the audio output (negative side of C13 to ground) to provide a DC path to ground when headphones are not connected.

Apply power, and you should notice a definite increase in the audio output (and hopefully no smoke!). You might be able to get a little more gain using different resistor values, but you are likely to end up with an audio oscillator rather than an amplifier! (For LM380 positive feedback design details, see the note at the end of application AN-69 in any National Semiconductor Linear Applications Handbook published after about 1972.)

Picking up strong short-wave broadcast stations by the receiver has been a common problem -- its severity depends on location, propagation and type of antenna used. Several things have been tried to increase the front-end selectivity of the receiver to reduce this problem with varying degrees of success. A modification offered by Charles Ludinsky, N1RXT, which completely eliminated his SW broadcast interference problem is as follows:

- Reduce C1 from 22pF to a value in the range 5-7pF.
- Remove C20.
- Change C7 from 22pF to 270pF.
- Add 470pF from pin 1 of the NE620 (U1) to ground.

The intent here is to improve the Q of the input circuit thus increasing its selectivity. Chuck found that it worked great for him; your results may vary depending on the transmitting frequency and signal strength of the interfering station(s).

Several folks have experimented with extending the VXO tuning range, again with varying degrees of success. The trick is to increase the inductance of RFC6 and/or the maximum capacity of C6 without "killing" the oscillator or turning it into a free-running oscillator. For higher values of inductance to work, the distributed capacitance must be kept to a minimum. One way to do this is to use multiple chokes in series; this been successful for some and not for others. You also run the risk of the oscillator stopping, or at least its output dropping drastically resulting in low transmitter output power, if the minimum value of C6 is too small.

Experimenting with my Forty-9er, I discovered that adding a 4 to 6pF cap from the end of the crystal that connects to the series tuned circuit (C6 - RFC6) to ground would keep the oscillator output very constant over its entire tuning range with only a slight reduction in the tuning range. I was also able to increase the tuning range slightly (from about 4.5 kHz to about 6 kHz) by using a 25mH J. W. Miller sub-miniature "open winding" type choke for RFC6. It is interesting that a 22mH molded choke gave essentially the same tuning range as the original 15mH molded choke.

Since the Fotry-9er receives and transmits on essentially the same frequency (receive/transmit offset is less than 100 Hz), it may transmit outside of a potential receiving station receiver's filter passband. A couple of folks are working on a reliable way to obtain a 500 - 700 Hz frequency offset between receive and transmit. This is not too difficult to do for a fixed frequency crystal oscillator -- you simply "pull" it slightly off frequency during receive of transmit to get the desired offset (a method used in many receivers). However, with a VXO, the amount of frequency shift will change drastically over the tuning range. As far as I know, no one has come up with a completely satisfactory solution to this one.

A "deficiency" that is easily solved -- in principle at least -- is correcting the lack of a sidetone oscillator. (Gee, I can remember the days when we didn't know what a sidetone oscillator was! But I guess I'm showing my age...) There are a lot of circuits that can be used, perhaps the simplest being a simple "sawtooth" oscillator using a unijunction transistor (such as a 2N6027). The ARRL handbook describes the basic circuit of a unijunction "relaxation oscillator". For an example of a sidetone oscillator using this circuit, see the article by Mike Agsten, WA8TXT, in the January 1996 issue of 73 Amateur Radio Today.

Other possibilities include a square-wave oscillator using a 555 timer and a sine-wave oscillator using feedback around an op-amp. Examples of these and other circuits can be found in the ARRL handbook. Note that the trick of allowing some "feed through" around the gating JFET(s) as used in the NorCal 40 will *not* work with a DC receiver -- even if you provide a transmit/receive frequency offset .

The *real* problem in adding a sidetone oscillator is figuring out where to put it!

One last item that should be mentioned: the type of battery (or other power supply) used can make a difference in the stability of the receiver and/or transmitter. If the "effective impedance" of the power source is too low, things can get a little strange in a DC receiver! If you experience receiver oscillation, first bypass the output of the voltage regulator IC with a 1µF cap; if that doesn't fix it, try a different battery. If you still have problems, then try increasing the size of C12 to 470µF or so.

That pretty much covers the major modifications and enhancements that I know about. If I have missed your favorite one, or you have a new one that you think would be of interest, be sure to write it up and submit it to The Quarterly!

Enjoy experimenting with your Forty-9er, but don't neglect to put it on the air and make some contacts -- you will be amazed by what you can achieve with this little rig!

I hope to work you Forty-9er to Forty-9er real soon; 72 and good luck! ...*de Larry, W1HUE.*

QRP CLUBHOUSE

Bob Gobrick, VO1DRB/WA6ERB
31-L'anse Aux Meadows Crescent
St. John's Newfoundland
CANADA A1E 5C2
(email: rgobrick@nfld.com)

New QRP Quarterly Column

Ron Stark KU7Y, our QQ Managing Editor and I have been trading email on putting together a special QRP Quarterly news column for the many new regional QRP Clubs sprouting up around the country. It wasn't until the annual QRP ARCI Board of Directors (BOD) meeting at the 1996 Dayton Hamvention that things began to gel. The BOD approved a change in the Bylaws that basically says that the QRP ARCI is an organization dedicated to increasing world-wide enjoyment of Amateur Radio by the promotion and support of QRP equipment designing, building, and on-air operation and regional QRP Club growth. The promotion and support of regional QRP Club growth is an exciting change to our organization.

We all know about the phenomenal growth of regional QRP clubs. We ourselves probably belong to at least one regional club in addition to our QRP ARCI membership. So why the need for a "QRP Clubhouse" column. In a word - Information. There is so much good QRP technical articles, regional operating events and regional building projects being covered in the regional QRP club newsletters. Yet so little of this information reaches us. It's a shame that this QRP information isn't getting wider circulation throughout the QRP community. The "QRP Clubhouse" column will hopefully improve this situation. The focus of the "QRP Clubhouse" will be a quarterly report on what QRP clubs have projects "on the go" so that other QRP regional clubs can share these ideas with their membership. This, in turn, enhances every QRPers' growth.

The "QRP Clubhouse" format will be styled after Richard Fisher KI6SN wonderful QQ "Members News" column. We hope to do as good a job reporting club news as Richard does reporting members news. So please check out the footnote at the end of this column for where to report your QRP Club activities and projects. We want to hear about YOUR local QRP club.

New Jersey QRP Club invades New England QRP Club

No, this is not a re-enactment of the American Revolution, but as reported in the April 1996 issue of the NEQRP "72" newsletter, (ably edited by Dennis Marandos K1LGQ - email k1lgq@dennis.mv.com), a sizable regiment of New Jersey QRP volunteers marched up to the annual New England QRP meeting held at ARRL League Headquarters. QRP toys and design ideas were exchanged and headquarters lab tours where conducted by QRP technical guru Zack Lau KH6CP/1. A good time had by all and a nice way to get the regional qrp clubs working together and exchanging ideas.

The April 1996 issue of "72" also had some outstanding technical articles by L.B. Cebik W4RNL, on the L-C-L Tee Antenna Tuning Unit (it won't be long before we have an "LB Tuner" design), a follow-up article by Sam Ubling N4UAU on his "s-m-a-l-l" (Surface Mounted Amplifier that's Little and Loud) that is highlighted in the June 1996 issue of QST (finally a QRP surface mounted kit project), L.B. (again) on "The Wouff-Hong and Rettysnitch Lost Traditions?", Joe Everhart N2CX on a QRP Beer Can Antenna (no kidding?), Sam N4UAU (again) on the design of "The Super CW Station" keyer that translates and displays morse code and finally lots and lots of good local QRP Club news and ideas.

New QRP Club Kit Offering

Many are familiar with the great QRP kit club offerings that have appeared in the Northern California (NorCal) QRP Club newsletter "QRPp" (edited by Doug Hendricks KI6DS - email dh@deneb.csustan,edu). Well not to be outdone, the patriots of the New England QRP Club (membership 459) have announced QRP Club Kit #3 for it's members - "The QRP AFIELD 20-30 Portable PVC Mast Kit". Every QRPer will want one of these portable masts for those QRP afield events. Designed by Joe Everhart W2CX, the $15 semi-kit consists of all the hardware needed (minus about $15 of PVC plumbers pipe) to build an easy up 20 foot portable mast for those massive QRP field contest antennas. The semi-kit includes a 20 page illustrated manual - how can you go wrong. Want QRP Club Project info? - send SASE to Bob Baker K1BKL, NEQRP Club Kit #3, Box 6497, Nashua, NH 03061. Note PO Box correction from "72" article.

40-9er NorCal QRP Club Kit Hits Gold

Yes, it's only been a few months since the NorCal QRP Club kitted the Wayne Burdick N6KR "transceiver in a tin (Altoids Mints tin)" rig and over 1000 of these puppies are out there in QRP land. Another technical marketing success for NorCal QRP and their great contributions to the QRP community. The 40-9er is already an old classic design with over 1000 mods and enhancements to the unit detailed in the June 1996 "QRPp" newsletter. If you want info on the 40-9er for a QRP Club project send SASE to: Jim Cates WA6GER, 3241 Eastwood Rd, Sacramento, CA 95821.

Colorado QRP Club Sponsors QRP Tutorial Session

The Colorado QRP Club (CQC membership 272) along with the NorCal QRP Club sponsored a very special QRP technical tutorial session at the QRP ARCI sponsored 1996 "Four Days in May (c)" QRP Symposium. Paul Harden NA5N, one of the top writers for the CQC bi-monthly newsletter "The Low Down" presented a technical session on design criteria for many of the popular QRP rigs out today (MFJ, Wilderness

Radio, Small Wonder Labs, Kanga US - Hands kits). The material presented came from Paul and Rich High W0HEP (President CQC - email W0HEP@aol.com) great new book "Electronic Data Book for Homebrewers and QRPers including QRP Yellow Pages".

The May 1996 issue of "The Low Down" has some great articles including Paul NA5N's tutorial on CW Audio Filters for QRP rigs, Marshall Emm AA0XI/VK5FN article on "standardized" power connectors for field day (and everyday) rigs and lots of great local QRP news articles. Want information on "The Low Down" for club newsletter exchange? Then drop Rich High an email at W0HEP@aol.com

Inexpensive 10 Meter QRP Rigs

The April 1996 issue of "The NWQ Newsletter" from the NorthWest QRP Club (membership 410) has some nice articles for QRP folks who want to get on to 10 meters during this "Sporadic E" summer. Duffy KK6MC/5 has an article on "10 Meter Sporadic E" and Bill Launer WB0CLD has one on "Inexpensive 10 Meter QRP Rigs". For more information on QRP Club 10 meter projects drop a note to NWQRP President and Publisher Bill Todd N7MFB at his email address bill@techline.com

MFJ 90's Newsletter

A little plug for a great effort by Dave Luscombe AB5JE (email 73150.301@compuserve.com) in revitalizing the "MFJ 90's Newsletter". The April 96 issue has a nice writeup on the new MFJ 9406 QRP 6 meter SSB rig. The Amateur Radio News Service gave the newsletter an "excellent" rating in it's last review - Congratulations Dave. Drop Dave an email for subscription info.

North Georgia QRP Group Competes For the "Ben Franklin" Award

The North Georgia QRP Group was the gracious sponsor of all the hospitality suite antennas for the 1996 QRP ARCI Annual Meeting at the Dayton Hamvention. In addition to a huge GAP vertical erected right outside the hospitality suite room, the NGQRP gang went and flew a kite. Yes, in the tradition of Ben Franklin a big box kite was launched with a light weight long wire attached to the tether line (is that the correct term?). All went well until a passing storm seemed to "super-charge" the antenna and cause a few sparks down at the antenna tuner. The gang was just lucky that the Index Labs QRP+ didn't get it's front-end crispy fried. But all went well, the kite was "grounded" and safety and harmony returned to the hospitality suite (maybe it was the Georgia Coca-Cola and pizza that returned the harmony). For more information on the North Georgia QRP Group drop Jim Stafford W4QO, email w4qo@america.net, a note.

Michigan QRP Club Investigates Propagation

Yes the Michigan QRP Club (over 1500 members) "The Five Watter" quarterly newsletter has tackled the issue of 100% predicting the propagation forecasts for QRPers. C. F. Rockey W9SCH, recently inducted as a QRP ARCI "QRP Hall of Fame" member penned a nice article on "And What About the Sun? with drawings of the sun etc. (dark 3-D glasses are needed). Also there are some short articles on "A Simple Antenna for 160 Meters" by Greg Weinfurtner and a review of Sam Ulbing N4UAU (you've seen that call before) "The Super CW Station" by Peter Meier WK8S (QRP ARCI Banquetmeister). For QRP Club newsletter exchange contact Mich QRP President Lowell Corbin KD8FR at email KD8FR@aol.com

So that's our first installment of the "QRP Clubhouse". The material comes from a review of many regional QRP Club newsletters. If you have a regional QRP Club publication, whether it be printed or electronic, please drop me an email (address above) letting me know about your QRP club activities. I would like to see this column, in the spirit of the new QRP ARCI Bylaws, promote and support regional QRP Clubs. We would like to help spread the good things that your regional QRP club does for it's members so that other QRP clubs can benefit. Thanks for your assistance and we'll be looking forward to hearing from you all. Send club news and pictures so we can share the information at the QRP Clubhouse. Wanted: QRP News reporters from the AZ QRP ScQRPions, Maryland Milliwatts, NorthEastern Illinois QRP Society, North Texas QRP Club, No Rules QRP Club of Calgary, Oklahoma QRP Club, QRP Club of British Colombia, QRP Society of Central Pennsylvania, QRP Society of Western New York, St. Louis QRP Society, and any new QRP club ventures that needs nurturing.

73/72 Bob VO1DRB/WA6ERB - "QRP ClubHouse" □

COMPARISON BETWEEN "NEW" AND "OLD" QRP-PLUS TRANSCEIVERS

Larry East, W1HUE, 1355 Rimline Dr., Idaho Falls, ID 83401

I own an "original" Index Laboratories QRP-PLUS and have been trying to decide if I should send it in for an upgrade. I have been following with great interest comments made on the Internet and elsewhere by owners of the "New Improved" version. Impressions seem to vary from "a great improvement over the old model" to "I liked my old one better." To further confuse matters, problems experienced by some with their new or updated QRP-PLUS are not experienced by others. I therefore jumped at the chance to borrow a New and Improved QRP-PLUS (hereafter referred to as "QRP++") from a local ham for a weekend for comparison tests with my modified "original" QRP-PLUS (hereafter referred to as "QRP+"). I was also able to borrow an IFR-1500 service monitor to use in getting data on spurious emissions, receiver sensitivity, etc.

I have made many modifications to my QRP+, so some of the comparisons may not apply to a "stock" QRP+. The mods I have made include:

- Additional grounding and bypassing in an attempt to reduce internal receiver noise (not sure how successful this has been).
- Added a 22 pF cap across the middle inductor in the first mixer LP filter for better rejection between about 32 and 70 MHz (this is an input filter during receive and a mixer output filter during transmit).
- Made the buffer amplifier between the 50 MHz crystal filter and mixer (in the transmit path) resonant at 50 MHz to reduce transmitter spurious emissions.
- Replaced the transmitter LP filters used for 30M through 10M with elliptical filters to improve harmonic rejection.
- Added an audio limiter to reduce the effect of the SCAF (Switched Capacitance Audio Filter) delay on the AGC (infamous "AGC thump problem" on strong signals).
- Other mods for "operational convenience" -- such as an LED to indicate when SHIFT or RIT is on, a "tune" switch, etc. -- which should not affect actual performance.

I am in the process of writing a description of all of these mods that I hope to publish in The QRP Quarterly, so please be patient!

Now for the comparisons between my "Super QRP+" (Serial No. 616) and the "QRP++" (Serial No. 1353).

Receiver

First impressions: I did *not* like the receiver on the QRP++ as well as my QRP+. In my opinion, it has *way* too much IF gain which compounds the "AGC thump" and strong adjacent signal leak-trough on narrow settings of the audio filter. It is, however, somewhat more sensitive, has less "internal noise" and can do a little better job of pulling in very weak signals on a quiet band. On the other hand, I was able to copy weak SSB signals on a noisy band (75M) slightly better on my QRP+ -- probably due to my audio limiter clipping the noise peaks.

Many QRP++ owners claim that it does not have the AGC thump problem on strong signals that is so annoying in the original model. Either those folks have rigs that are vastly different than the one I tested or they were using rubber ducks for antennas! In the one I tested, the strong signal "thump" is as bad or worse as in an original QRP+ (without the audio limiter -- I disabled it for comparison with the QRP++). It is not as severe when the SCAF is at its widest setting, but it is certainly there. The high IF gain of the QRP++ makes the thump much worse on strong signals and also makes the 20dB input attenuator less effective in reducing the thump.

Adjacent strong signal interference when the SCAF is narrowed up for CW operation was also worse in the QRP++ than in my QRP+. This an "aliasing" problem in the SCAF and *not* a problem with the receiver front end or IF. The higher IF gain and higher LP filter roll-off in the QRP++ probably both contribute to the problem.

Receiver sensitivity: I attempted to determine the "minimum detectable signal" using the calibrated RF generator in the IFR-1500. By "minimum detectable", I mean a signal that can be clearly heard above receiver noise and could be copied if CW (probably could not be copied if SSB). My somewhat subjective results using a filter width of 0.5 kHz are as follows:

QRP+ (modified): Between 0.15 µV and 0.3 µV, depending on band. Best on 160, 12 and 10M (0.15µV) and worst on 40, 30 and 20M (0.3µV). About 0.2µV on the other bands.

QRP++: 0.1 µV or slightly better on all bands.

I could definitely copy very weak CW signals on 20M better on the QRP++.

S-meter: The S-meter on the QRP++ acted very strangely; it would register zero on all receiver signals below about 15µV and then suddenly jump to S-5 or S-6. This was not a problem with the AGC; output audio level remained very constant for all signal levels above about 1µV. Maybe a malfunction in this particular unit? (The owner balked at me removing boards from his new "pride and joy"...) S-meter sensitivity is also too high in my opinion: S-9 corresponded to input signal levels of 45 to 50 µV on all bands except 80 where it was only 32 µV. On the

other hand, my QRP+ requires an input signal level of between 200 μV (160M) and 250 μV (30M on up) for an S-9 reading.

Transmitter

The QRP++ includes an internal speech processor for improved SSB performance. Mike gain and compression level are automatic and cannot be changed without changing component values. The speech processor makes use of an op-amp with an FET in the feedback loop to control the gain; it is similar, in concept at least, to the $9.00 speech processor kit sold by Ten-Tec. (That has to be one of the best buys around!). The Ten-Tec kit, by the way, should work well with the QRP+ as an external add-on; I doubt that you could find room for it inside the already pretty full QRP+ box. I did not make any SSB tests on the QRP++ for two reasons: my main interest is CW operation and I did not have the time.

The QRP++ uses an ALC circuit (automatic level control, not be confused with the receiver AGC, automatic gain control) to control the output power on CW as well as SSB. (The QRP+ uses ALC on SSB only.) This has the advantage of keeping the output level quite constant from band to band, unlike the QRP+ which can change by as much as 2 or 3 Watts between bands. The maximum output power of the QRP++ I tested was about 5.5W on the low bands, dropping to about 5W on 10M.

Keying: First the good news:[1]

You don't have to put up with "enforced spacing" with the QRP++ keyer.

The QRP++ can follow an external keyer to at least 42 WPM, whereas an external keyer can't be used above about 28 WPM with the QRP+.

The new rig is also closer to "full break-in" when operating from an external keyer.

The bad news is that the keying in the QRP++ test rig is very "hard"; the transmitter output has a rise time of about 0.5ms and a fall time of less than 0.25ms! It did not sound as bad as I expected when monitored on another receiver, but there was a definite key-up click. My QRP+, on the other hand, has rise and fall times of about 2.5 ms at 5W out and the keying sounds very clean (none of my mods should have affected keying characteristics). My QRP+ output rise-time shortens up somewhat at higher power levels, but the keying still sounds clean.

Some QRP++ owners have reported various degrees of keying "chirp" when operated on 20M and above. I listened to my test rig on 20, 15 and 10M and heard no indication of a "chirp", either with or without the RIT engaged.

Harmonic output: The FCC requires that spurious output from amateur transmitters operating below 30 MHz be at least 30dB below the carrier for 5W or less carrier output and at least 40dB for greater than 5W output. The three transmitter output LP filters used for 30 through 10M in the QRP+ are barely adequate to provide 30dB second harmonic attenuation on 30, 17 and 12M. Index claims that the filters are "quite adequate" and did not change the design for the QRP++. They are perhaps adequate for the QRP++ which (without modifying the ALC circuit) has a maximum output of about 5W. However, most (unmodified) QRP+'s are capable of 7 - 8W out on bands where the harmonic attenuation is likely to be less than 40dB...

Second harmonics measured made with an IFR-1500 spectrum analyzer are shown in the following table. The "Std. QRP+" column lists measurements made on my QRP+ before filter modifications, and "Mod. QRP+" is after my new filters were installed for 30 through 10M. All measurements were made at 5W carrier output. Third and higher order harmonics were more than 50dB down in all cases. Differences between the QRP++ and standard QRP+ are due to component tolerances and relative measurement errors. I estimate my relative measurement errors (do to "eye-balling" the scope, etc.) to be about 3dB.

Carrier Freq. (MHz)	Second Harmonic -- dB Below Carrier		
	New QRP++	Std. QRP+	Mod. QRP+
1.820	48	50	52
3.560	55	55	55
7.040	55	52	55
10.116	31	34	50
14.060	45	50	55
18.070	32	40	53
21.060	38	37	48
24.900	33	36	58
28.060	38	48	58

Spurious emissions other than harmonics: An unmodified QRP+ has several "spurs" that are less than 30dB below the carrier on all bands from 20M on up, but no spurs within 40dB of the carrier on lower bands. The spurs on my modified QRP+ are all more than 40dB down -- except for 12M (see below). All spurs from the QRP++ were at least 40dB down except for one about 6 MHz below the operating frequency on 10M that was 30dB down, and 12M where spurs were 32 to 36dB down depending on frequency.

12M has a special problem: Higher order mixing products can result in spurs very close to the 12M carrier frequency! Using the spectrum analyzer, I observed spurs that appear to be related to the carrier, IF and local oscillator (LO) frequencies as follows:

$$F_0 \pm N \times \left(2 \times IF - \left(LO + F_0\right)\right)$$

where:

[1] Late breaking news: Index Labs. has an EPROM update that will make the QRP+ internal keyer operate the same as the the one in the QRP++. If you haven't received information from Index, giive them a call for details.

F_0 = carrier frequency = $LO - IF$,

IF = 50 MHz,

LO = Local Oscillator frequency,

N = 1, 2, 3, ...

With some (two or three pages of) manipulation, this turns out to correspond to the following mixing products between the carrier injection (IF) and local oscillator (LO) frequencies:

$$(3N-1)\times IF-(2N-1)\times LO$$

and

$$(2N+1)\times LO-(3N+1)\times IF$$

For example, at a carrier frequency of 24.9 MHz, mixing products can cause spurs at +/- 200 kHz, +/- 400 kHz, etc. from the carrier (decreasing in amplitude with increasing multiples of the LO and IF frequencies).

In my QRP+ running 5W out, the "first order" (N = 1) spurs due to this mixing are quite strong; only 28dB down at Fo = 24.900 MHz and 15dB down at Fo = 24.980 MHz (where the spurs are only 40 kHz from the carrier)! If the output is reduced to 3W, these spurs are 34dB and 20dB below the carrier, respectively. The strength of these mixing products is related in a non-linear way to the carrier injection level (the 50MHz IF) for a fixed LO level. Thus when the carrier injection is reduced to give an output of only 3W, the mixing products are drastically reduced.

In the QRP++ I tested, the situation is much better; the spurs are down 36dB at Fo = 24.900 MHz and 32dB at Fo = 24.980 MHz (just barely below the "legal limit", but below never-the-less). This improvement is due, apparently, to added gain in the transmitter RF chain resulting in less carrier injection into the mixer for a given transmitter output. An MC1350 amplifier IC is used as the "pre-driver" in the QRP++ rather than the two stage desecrate amplifier used in the QRP+. A different mixer is used in the QRP++ which may also affect the level of the mixing products.

I don't know if my QRP+ is typical or not. I have seen spectrum measurement results posted on the Internet by a few other QRP+ owners but 12M results have been conspicuously absent; maybe they couldn't believe the 12M results they got or were too embarrassed to show them! Measurement results that have been presented for other bands agree very well with my measurements.

It appears that adding some gain in the QRP+ transmitter pre-drivers would improve the situation. Maybe I can come up with a way to do this without requiring a major redesign effort. In the mean time, I'll keep the power level at 3W or below on 12M and operate below 24.950 MHz -- if, indeed, I operate on 12M at all!

Nit-Picking Stuff

I didn't like the QRP++ S-meter; besides being too sensitive it was harder to read than the one on my rig.

The QRP++ had a slightly smaller tuning knob; I like the old one better.

The QRP++ is supposed to have a varistor to protect the receiver mixer. However, in the rig I tested, there were pads on the RF board marked "VR1" but nothing was there. Sure makes one wonder...

Summary

Good points about the QRP++ I tested relative to an unmodified QRP+:

- It has less receiver noise and greater receiver sensitivity.
- Power output is relatively constant from band to band.
- Transmitter output is cleaner (but it still suffers from marginal harmonic reduction on some bands).

Things I don't like about the QRP++ that I tested:

- Its receiver IF gain was too high.
- "Thumping" on strong signals was very severe (could be improved by adding an audio limiter after the filter).
- Strong signal "bleed through" at narrow filter settings was worse than with my QRP+.
- Keying was too "hard".

Final Notes

It is not my intention to "knock" Index Labs or the QRP-PLUS. On the whole, the QRP-PLUS is a pretty nice little rig and somewhat of a bargain compared to other commercial rigs available. However, there can always be improvements -- and Index should *really* be embarrassed about those 12M spurs! (I wonder if the ARRL performed the "product testing" that they claim to do before they accepted ads from Index...)

When I compare my measurements and impressions with comments from other QRP++ owners, I can only conclude that the QRP++ design is still undergoing changes even though it is supposed to be a production item. It's good that Index is trying to improve their product, but it is too bad that you can't be sure that the rig you tried out in a friend's shack will be exactly what you will get when you place your order. Hopefully Index will soon get the production kinks worked out and start providing a "reproducible" product.

Am I going to send my QRP+ back to Index for an upgrade? No, thank you; I have put too much time and effort into modifications and I don't want to start all over again! Except for the 12M spurs -- which I *will* cure someday -- I like my little rig just fine!

IDEA EXCHANGE

Technical Tidbits for the QRPer

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IN THIS EDITION OF THE IDEA EXCHANGE

NEW E-MAIL AND PACKET ADDRESSES

Please note that I have two new on-line addresses. Due to a major crash at my Internet provider the ham radio BBS portion of it was put out to pasture, and I was forced to upgrade to a "real" account. My address is almost the same as it was before, which was wa8mcq@bbs.abs.net, but the "bbs" has been removed--it's now wa8mcq@abs.net. You may see e-mail from me which has wa8mcq@u1.abs.net in the header; that will work too, but don't put the "bbs" in or it will bounce.

Due to deteriorating service on WB3FFV.MD, I moved my packet home to **KA3RFE.MD**.

DANNY STEVIG IS BACK

Danny Stevig, KA7QJY, of **Dans Small Parts and Kits** stopped operating his business for a year, but is apparently back in operation now. **Preston Douglas, WJ2V**, reported via qrp-l that he just received a four page catalog of parts from Danny. He said the address is Box 3634, Missoula, MT 59806-3634. Preston also included the phone number (voice and fax): 1-406-258-2782. Usual disclaimers apply--"neither WJ2V, the Idea Exchange, the QRP Quarterly or QRP ARCI indorse this offer."

BRIDGE FOR SMALL INDUCTORS

*From **Frank Brumbaugh, KB4ZGC** of Salinas, PR, a simple inductance bridge for measuring small coils*--The bridge in Figure 1 covers from below 1.5 uH to about 20 uH. It can be calibrated with miniature RF chokes, singly, in series or parallel. Most of these chokes are 5% tolerance, which is about the best accuracy this bridge is capable of. Because of wiring lengths and stray capacitance, it is impossible to measure down to 1 uH, but it covers the range of VFO coils used in many homebrew rigs, and is handy to check unknown small inductors.

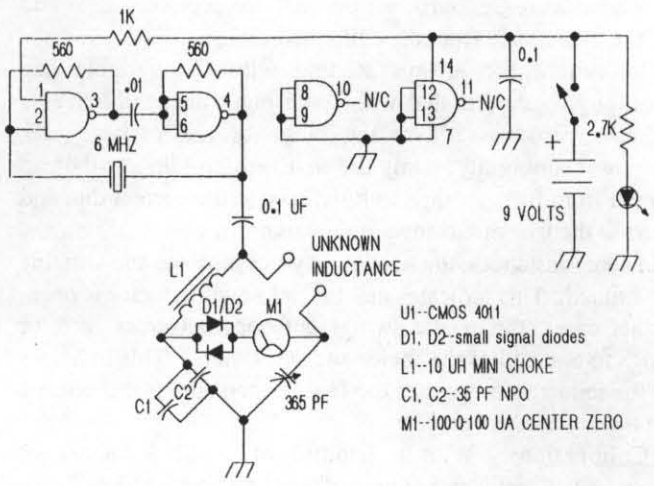


Figure 1

The 6 MHz crystal is a surplus microprocessor unit. The series resonance of L1 and the C1/C2 combination is 6 MHz, or very close to it. [You can use a single cap instead of 2 if you have the proper value, or perhaps use a trimmer in place of one for fine adjustments. --WA8MCQ] Other crystal frequencies can be used, but L1 and C1/C2 must be changed to be close to resonance at the new frequency.

Theory of Operation--Two CMOS NAND gates, one half

of a 4011 chip, form a crystal oscillator. Inputs to the unused gates are grounded. RF from the oscillator is applied across the bridge. The series circuit of L1 and C1/C2 is resonant at or near the crystal frequency. The RF voltage at the junction of L1 and C1/C2 is considerably higher than the voltage applied across the bridge, due to voltage rise at resonance, providing the center-zero microammeter with as much working voltage as possible.

The parallel back to back diodes may be small signal types, germanium or silicon, such as 1N34A, 1N60, 1N90, 1N914, 1N4148, etc. They are necessary to allow the meter to swing to both sides of the center zero.

With the unknown inductance connected to the binding posts (UNKNOWN INDUCTANCE on the schematic), tuning the 365 pF variable cap will enable the meter needle to cross the center zero. Setting the cap so the meter needle is at zero indicates that the bridge is balanced--the series resonance of the unknown inductance and the variable capacitor is at the crystal frequency. Inductance can be read off a calibrated dial attached to the variable cap.

There is a "bobble" at the diode conduction knees which will probably be difficult to see. Because it occurs only at center zero on the meter, it does not affect either the operation or accuracy of the bridge.

Operation: Attach the unknown inductance. Set the variable cap so the plates are fully meshed, which is the lowest end of the calibration dial (smallest inductance indicated). This is most important, as will be shown later.

Apply power and slowly adjust the variable cap from the low towards the high inductance end of the dial. When the meter needle crosses zero, set the dial for precisely zero and read the inductance from the calibrated dial.

The reason for always starting with the variable cap plates fully meshed is that with some inductances, the needle will cross zero twice over the range of the variable cap, resulting in ambiguity. Only the first zero crossing as the cap is tuned from fully meshed to fully open is the correct dip, and occurs at the true inductance of the unknown coil.

In some instances, the needle may not move as the variable cap is tuned. This indicates that the unknown inductor is open. In other cases, the needle swings but does not cross zero, or swings to one end of the meter and stays there. This indicates that the inductance is either too large or too small, and outside the range of the bridge.

[**Calibration**: With a handful of small inductors of known values, perhaps a couple of 5 uH and several 1 or 2 uH, connect them one at a time to the bridge and observe the point where the needle crosses zero, and mark the dial appropriately. Repeat to calibrate the dial from end to end. Use coils in series and parallel to get additional calibration points. --WA8MCQ]

Comments: Other chips can be used if a 4011 is not available. As long as a chip contains either two NAND gates or two inverters, either CMOS or 74-series TTL, it can be used. Pinouts will be different, and TTL chips must be operated at +5 volts--include a 7805 or 78L05 regulator (and bypass its input and output pins with 0.1 uF caps to ground).

Other crystal frequencies or different oscillator circuits can also be used, but the values of L1 and C1/C2 must be such that they are close to resonance at that frequency. Generally, crystals in the range of 1 to 13 MHz will oscillate with these chips.

If a different frequency is used, the measurement range will be different. Also, if other than a 365 pF variable cap is used, the range will be different. With this frequency and 365 pF variable cap, my unit measures well below 1.5 uH (but not quite down to 1.0) and up to a bit above 20 uH.

Center zero meters are relatively scarce and can be expensive. I used a tiny edge reading meter about 3/4" wide and 1/2" high, purchased for $1.50 from Fair Radio Sales (Box 1105, Lima, OH 45802). The catalog number was 50-88.

This was a junk box project, though I had to buy the box. The old single section 365 pF variable cap had been sitting around for years. Sometimes other variable caps with more than one section are advertised in parts catalogs at reasonable prices; but the minimum and stray capacitance may be so large that the lowest inductance measurable may be higher than with my unit.

Calibration will be spread out at the low inductance end of the dial and crowded at the high inductance end, especially above 10 uH. This is an advantage, though, because most VFO inductors are smaller than 10 uH.

--DE KB4ZGC

ADAPTING TO YOUR RIGS

*From **Joe Everhart, N2CX** of Brooklawn, NJ, Joes Quickie #18*--As a ham accumulates more and more rigs, through either acquisition or building, he begins to appreciate the number of possible connector combinations. The most common coaxial connectors are "UHF", BNC and phono; headphones and keys can be either 1/8 inch or 1/4 inch, either mono or stereo (and sometimes phono with Ten-Tec); and dc power connectors can be any of a number including binding posts, bare wires, phono "coaxial" (in several different sizes and polarities), Molex and a number of non-standard manufacturer-specific connectors.

For permanent installations this is not a problem. But many of us like to compare rigs even in home installations or, like myself, operate portable from changing locations. It can get very frustrating trying to adapt (pun intended).

To bring some order to this chaos, I've more or less standardized on the following:

*Antenna - BNC or UHF male

*Headphones - Radio Shack Nova with 1/8 inch mono and stereo male

*DC Power - "cigar lighter" female

*Key - 1/8" mono

And for each rig, I have a set of adapters to go from the rig's connectors to the "standard" set. For example, the ones for a few of my rigs are:

*NC-40A and NE30-40 adapters Antenna - BNC male to UHF female; Headphones - none, has 1/8" stereo on panel;

Key - none, has 1/8" mono on panel; DC power - 5.5x2.1 mm "coaxial" male to cigar lighter male (built-in fuse)

* Argo 509 adapters: Antenna - phono male to BNC female (and extra BNC male to UHF Female); Headphones - 1/4" male to 1.8" mono female; Key - phono male to 1/8" mono female; DC power - phono male to 5.5x2.1 mm "coaxial" female and 5.5x2.1 mm "coaxial" male to cigar lighter male (built-in fuse)

*MFJ 9040 adapters: Antenna - UHF male to BNC female; Headphones - none, has 1/8" mono on panel; Key - none, has 1/8" mono on panel; DC power - 5.5x2.1 mm "coaxial" male to cigar lighter male (built-in fuse)

Obviously there's nothing special about the lists. However to make sure I always have the adapters I need with the rig that uses them, I bought enough that I have a set with each rig. And when they aren't being used, I always (well almost always) store them in a zip-lock bag that stays with the rig. I have to admit, though that, in spite of my best efforts, to keep the needed adapters with the rigs, it's always best to keep a set of oddball adapters along in - guess what - another zipper bag.

Beyond keeping things where they belong, the zip-lock bags keep them dirt-free and dry, two attributes that mean a lot at Field Day.

Furthermore each baggie has a 3x5" index card in it with the name of the rig and inventory to be sure that the adapters go back where they belong, and if they don't I'll be able to tell what's missing. For the extra protection needed in the field, I write everything in large block letters (easier to see in the dark) in indelible ink (for when the dark is cause by a sudden thunderstorm).

I've found, too that it's a good idea to store cables in their own separate, labelled gallon-sized bags to keep them clean and untangled. And to carry things to their anal-retentive ultimate, I've started putting even my wire antennas in the same kind of bags. See what camping has done to me? I'm a polyethylene fanatic!

--DE N2CX

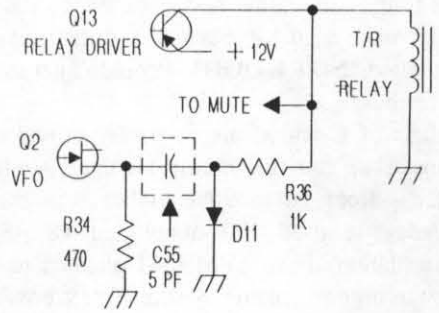
VARYING HW-8 T/R FREQUENCY OFFSET

From me, **WA8MCQ**--John Shuster, KC7CKP, recently asked for help via qrp-l with the receive offset on his HW-8; it was greater than he was comfortable with and wanted to reduce it. The solution is simple enough; there is no adjustment, but there is a part you can vary to change it a bit.

Figure 2 shows the VFO JFET, Q2, and relay driver Q13 which handles T/R switching. When in transmit, Q13 passes voltage to the coil of the antenna relay and MUTE circuit, and also causes diode D11 to conduct via R36. That connects 5 pF capacitor C55 to ground, adding it to the drain circuit of Q2 and shifts the VFO frequency slightly. In receive there is no voltage from Q13 and D11 sees ground through R36 and the winding of the relay; it no longer conducts, so the 5 pF is out of the circuit and the frequency goes back to normal. By changing the value of C55 a little, you can vary the frequency shift between transmit and receive.

How much to vary it? Remember that it's 5 pF and pulling the frequency by a few hundred Hz, so you probably don't need much. Try changing it by a couple of pF. Depending on how far off your own shift is, you might even be able to get by with replacing it with several different 5 pF (or 4.7 pF) caps, since they will all vary slightly from each other by whatever their tolerance is. Or if you prefer, you could replace it with a low value trimmer capacitor like John eventually did, and vary it to get the precise shift you want.

--DE WA8MCQ



VARY VALUE OF C5 TO CHANGE HW-8 T/R OFFSET

Figure 2

INEXPENSIVE SOCKET FOR TINY CRYSTALS

From qrp-l comes this recent posting by ***Doug Hendricks, KI6DS@telis.org*** *(though I take credit and blame for the drawing)*-- Denis Englander, KD6ETI, came up with a great idea at the February 1996 meeting of the NorCal QRP Club. He had made a dual band Pixie in an Altoids box, but that's not the great idea. What he came up with is so simple and so obvious, I don't know why I didn't think of it long ago. He used an IC socket, or part of one, for a crystal socket for HC49 crystals, which are tiny units with wire leads.

How? As shown in Figure 3, use one of the machined sockets (A), cut it in half (B), then trim it until there are 3 pins left (C). Use this as the crystal socket! The pin spacing is .1" and the crystal (in an HC49 holder) has pins with .2" spacing. So all that you have to do is clip the middle pin of the 3 on the socket (D), and voila, an instant crystal socket (E)!

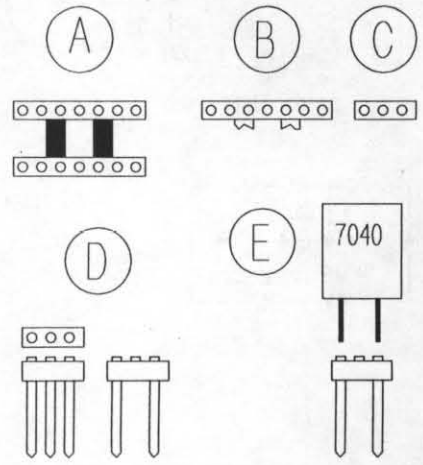


Figure 3

Those of you who have been playing with the Pixie and the 40-9er take note. Now you don't have to solder that $3 crystal

in the rig! Use the same rock in several rigs. Thanks to Denis for teaching me a neat new trick. (Permission is granted for anyone to reprint this in any club or non-profit publication. Please give Denis, KD6ETI, the credit for a great idea.)

--DE KI6DS

TTL CRYSTAL OSCILLATOR FOR ABOVE 13 MHZ

More from ***Frank Brumbaugh, KB4ZGC***--I've been trying for a long time to get a cheap TTL chip to be crystal controlled at a higher frequency than the usual 13 MHz or so. I even went so far as to try out a rather peculiar circuit I found which PURPORTS to make a 20 MHz crystal oscillate. It's the one in Figure 4 labelled "**NOT GOOD**"--I couldn't get satisfactory performance from it.

Actual values of C and R are relatively unimportant and should be chosen so that the circuit oscillates --without the crystal installed-- from 70 to 90% higher than the desired crystal frequency. I used 100 ohms and 18 pF for the crystal-less oscillation above 25 MHz--I planned to use a 15 MHz crystal, the highest frequency in my junk box. It could NOT be made to crystal-control the oscillation. I used a 74LS00, which is the same as 54LS00 except that the latter has a higher, military temperature range. With other values of R and C the crystal will control the oscillation below 8 MHz but not at 15.

I tossed the fancy circuit out and developed my own with a couple of inverters in a 74LS04 chip and it easily fires up on 15 MHz with either of my two crystals. (See Figure 4, "THIS WORKS".) It might be crystal controlled with higher frequency crystals but I didn't have any to test. (The crystal starts right away when power is applied, with no sluggishness.)

--DE KB4ZGC

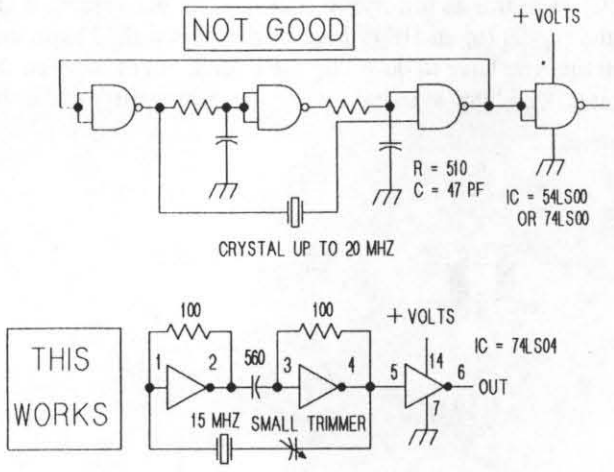


Figure 4

UPDATE ON OHR EXPLORER II VFO NOTES

From our Features Editor, ***Larry East, W1HUE*** *of Idaho Falls, ID, a followup from his item in the April issue (this originally appeared on qrp-l)*-- In the April Idea Exchange I mentioned that I had improved the VFO tracking of my 30M Explorer II by adding some additional capacity across C62. I also made some comments on temperature drift and on the mechanical instability of C62 and was going to check its temperature stability when I got "a round tuit". Well, I got "a round tuit" recently, and here is my follow up:

Although the original C62 suffered mechanical instability which made adjustment difficult, it did not appear to add significantly to temperature drift. The primary sources of temperature drift appear to be the NE602 IC itself and the VFO inductor. (Oak Hills has replaced C62 with a fixed capacitor in its latest production of kits; this makes VFO alignment easier but does not allow for any change in the VFO bandspread.)

My final solution to the temperature drift problem and attempt to improve VFO tracking was as follows:

C62 was replaced with a 2-12pF NPO trimmer.

62pF NPO and 75pF N750 caps were added in parallel with C62 on the bottom of the board.

VFO calibration was performed from 10.100 MHz to 10.145 MHz (rather than to 10.150 -- the low end of the tuning cap is very nonlinear).

VFO tracking: Output frequency now agrees to within +/- 0.5 kHz with the dial markings over the calibration range.

Drift: Initial warm-up drift is now minus 150 to 200 Hz over the first 15 minutes from a "cold start". Long term drift over many hours is less than 100 Hz/hour (typically no more than 50 Hz/hr), even when room temperature varies by a degree or two. I believe that most of the initial warm-up drift is caused by the NE602. (I swapped NE602's; this required slight VFO recalibration, but did not seem to change the drift significantly.)

--DE W1HUE

HOME MADE COIL WINDER

Although we use toroids for the most part now, there are still times when we might need a solenoidal coil, such as for an antenna tuner. From **Stuart Rohre, K5KVH (rohre@arlut.utexas.edu)**, comes this drawing of a home made fixture to wind them. As shown in figure 5, it consists of two pencil sharpeners (A) screwed down to a board (D), with a pair of 1/4 inch wood dowels (B) inserted into them. He didn't specify if they were jammed into place or glued, but that's up to you, and whether you want to ever use them to sharpen pencils again! A pair of rubber chemistry stoppers (C) are attached to the dowels and they press into the ends of the coil form.

Also not specified was how to insert and remove the coil form. If you only use it rarely, you would mount one sharpener on the board, put the coil form into place, then position the other sharpener and screw it down. For more frequent use you could put a couple of long slots in the board under one of the sharpeners to allow it to easily be used with a variety of form lengths. Mount that sharpener with machine screws and nuts; leave them loose, slide it into place on the form and tighten it down.

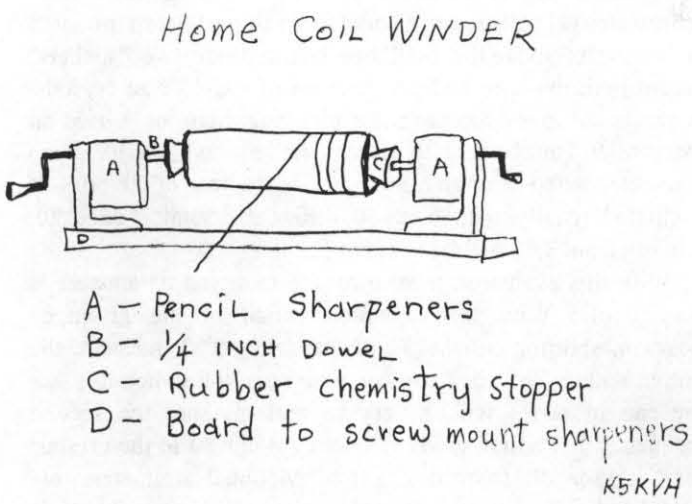


Figure 5

STEREO TO MONO PHONE ADAPTER

Some rigs, such as the QRP Plus, have miniature jacks wired for stereo phones of the "walkman" type, with both the tip and ring of the miniature jack shorted together. This won't work with mono phones, which some folks like to use, since the grounded sleeve of a mono plug will short out the ring contact to ground and kill the audio (Figure 6).

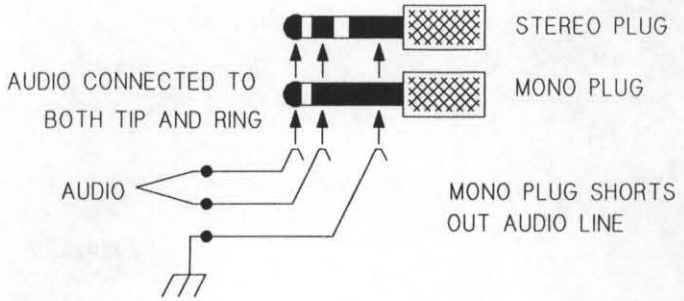


Figure 6

You also can't use phones with the larger 1/4" plugs unless you have an adapter--and those can be rather large and clumsy. The April Idea Exchange had a tip from KB4ZGC on modifying the wiring of the jack in the QRP Plus to allow use of mono phone plugs, but **Paul Taylor, WB2GIN** prefers to use an outboard adapter (figure 7). He says, "This requires no internal wiring change, and lets me use my regular phones (with 1/4" plug). There is no strain on the socket in the rig from the headphones. Of course, Rube Goldberg would have devised something more elaborate."

For added flexibility, you could put both 1/4" and 1/8" jacks in the bottle (if space permits).

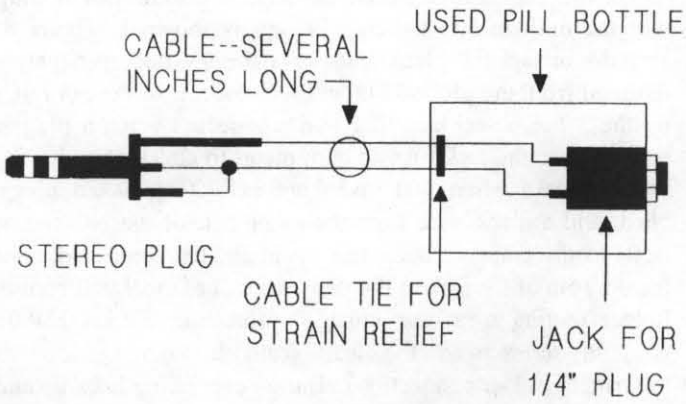


Figure 7

EASIEST OHR WM-1 QRP WATTMETER MODS

*From **Bob Gobrick VO1DRB/WA6ERB** of St. John's Newfoundland, via e-mail*--I got ambitious and finally modified my OHR WM-1 so I don't keep running the battery down. Although this topic has been covered before I don't think I've seen in print this simplistic approach for making the mods. I also tried to write so a beginner can make the mods.

In the January 1995 issue of QQ, Larry East W1HUE wrote up some mods for the great Oak Hills Research WM-1 QRP Wattmeter. I'd like to expand on his article and add some information that was on the QRP-L from **Arjen Raateland, OH2ZAZ** about some easier mods for the WM-1, namely adding a front panel LED and a back panel external power jack.

You'll need 3 parts: one low current (2 ma) LED (Radio Shack RS 276-044), one Snap-in Panel Mount LED Holder for the T 1 3/4 LED (RS 276-079) and a 2.1mm/5.5mm coaxial power jack with NC (Normally Closed) switch built in (Mouser 163-4304).

Drill two holes - a 1/4" hole for the LED holder centered between the two front panel switches and a hole for the power connector centered above the battery holder on the back panel. Install the LED in it's holder (looks neat and appears as if it always belonged there); solder the anode (longer lead) via a 3k (or 2.7K or 3.3K) resistor to the power line on SW 2-4 and the cathode lead to ground.

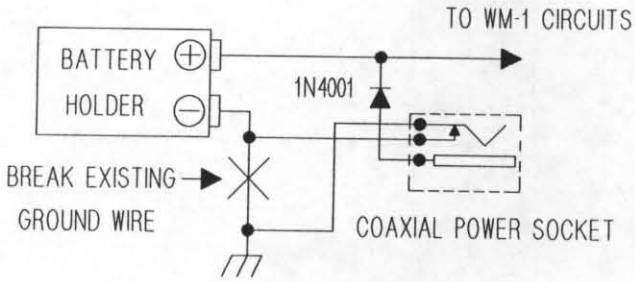


Figure 8

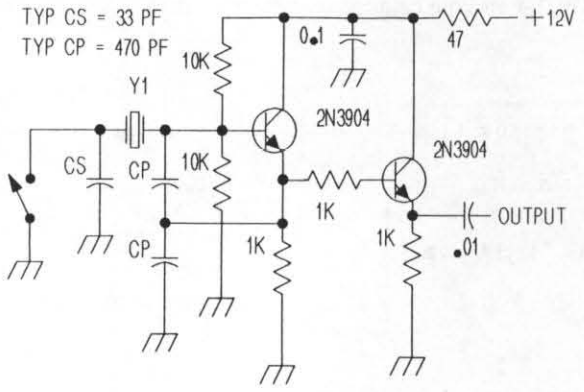
On the back panel, install the special coaxial power plug with the built in NC switch. Wiring is shown in Figure 8. First disconnect the black lead from the 9V battery negative terminal from the ground lug and reconnect it to the pin (NC) on the 3 pin power jack that is disconnected when a plug is inserted into the jack (use an ohm meter to check how the NC switch works when you insert and extract a coaxial plug). Next, add a black wire from the other pole of the NC switch (left) to the empty ground lug. And finally, connect the hot (center) pin of the jack to the plus terminal of the 9 volt battery holder putting a"reverse voltage" protection diode (1N4001 etc.) in series with the lead (cathode pointing towards the battery holder connection). Button everything back up and you now have some neat and simple features for your WM-1.

What's nice about using the power jack with the NC switch is that you are actually switching the negative legs of the battery and the external dc supply and there is no need for a separate switch. Plug in an external 12 volts power supply and the battery is automatically disconnected. Also, according to Dick Witzke, KE8KL at OHR, there is no need to recalibrate the meter with different supply voltages thus eliminating the need for a voltage regulator. And the best feature is the low current LED that just makes the unit look so professional and is there to remind you to shut the meter off when it's not in use. Go ahead - get that soldering iron hot and start making mods - it's fun.

--DE VO1DRB/WA6ERB/VE2DRB rgobrick@nfld.com

FILTER CRYSTAL EVALUATOR

From fellow Maryland Milliwatter ***WA4KAC, Walt Thomas*** *of Laurel, MD*--I constructed the crystal evaluator from Wes Haywards recent QEX article [1] to measure the motional parameters of crystals used in filters. He credits G3UUR, Dr. David Gordon-Smith, with the two transistor circuit (2N3904's) shown in Figure 9, and with the technique presented here. I built the circuit "ugly style" on a small piece of circuit board mounted in the bottom of a 2 1/4 X 1 5/8 X 1 1/8 inch Pomona box. A BNC output connector is on one end of the box, the capacitor grounding switch (SPST mini-toggle) is on the output end, and an ON/OFF slide switch is on the rear.



CRYSTAL EVALUATOR (BY G3UUR)

Figure 9

A "dual crystal socket" was made using Mill Max receptacles [2] soldered to a small piece of perf board mounted on standoffs above the oscillator board; these two "sockets" accept both the wire and pin versions of HC-18 size crystals. A slot is cut in the top cover for plugging them in. I used an external 9 volt battery to power the unit, with a 9V snap connector wired through a grommet on the rear of the box. It oscillated readily with over 40 different crystals I checked, ranging from 3.58 to 16.11 MHz.

With this evaluator, measuring the motional parameters is very simple: With the capacitor switch in the grounded position, shorting out the 33 pF capacitor (Cs), measure the output with a frequency counter, then open the switch to place the cap in series with the crystal and measure the second frequency. The first, lower frequency is closest to the crystals series resonant frequency [3]. Motional parameters are calculated from the two formulae given in Haywards article (see figure 10); I programmed them into an HP-15C calculator. Using the calculator, one enters the lower frequency (Fo, in Hz) and the frequency shift (delta-F, in Hz), and by pressing two keys Lm (motional inductance) and Cm (motional capacitance) are displayed (in Hy and pF, respectively). NOTE: The delta-F used in these calculations is NOT the same delta-F that Hayward used in his 1982 crystal filter design article [3, 4].

If $Cs << Cp$, then

$$Cm = 2\,Cs\,\frac{\triangle F}{F}$$

UNITS: Lm in Hy
F in Hz
Cm in same units as Cs (usually pF)

and

$$Lm = \frac{1}{(2\pi F)^2\,Cm}$$

Figure 10

Using this crystal evaluator I matched a set of four 4.915 MHz (nominal) crystals to within 2 Hz for Fo, 0.005 Hy for Lm and 0.001 pF (or 1 femto Farad). Crystal parallel capacitance was measured using the capacitance function on a digital multimeter; these averaged 3.5 pF. I also measured the RF output voltage for each crystal using an RMS voltage probe at the oscillator output; Wayne Burdick, N6KR [5] suggested checking crystal activity when matching crystals for a filter and the oscillator output is a good indicator of this. The above crystals averaged 0.64 Vrms; there were two in the group of 25 which were only 0.50 Vrms. The four matched crystals were installed in my latest NorCal 40A and this filter sounded much "sharper and cleaner" than the other four similar Cohn filters I've constructed--the other four were matched only for crystal Fo.

For those experimenting with crystal filters, this is a very simple test unit to get up and running to match crystals for frequency and to measure their motional parameters. Be

sure to measure the capacitance of Cs accurately before soldering it into the circuit; the calculations use Cs so knowing it precisely will assure accurate Lm and Cm values.

Thanks to West Hayward, W7ZOI, for his helpful comments on my experiments and to L. B. Cebik for supplying the QEX article and suggesting I share these results.

Notes:

[1] W. Hayward, "Refinements in Crystal Ladder Filter Design", QEX, June 1995, pp. 16-21. The crystal evaluator is attributed to Dr. David Gordon-Smith, G3UUR.

[2] Mill Max receptacles for 0.015-0.025 and 0.032-0.047 inch diameter pins available from DigiKey as part numbers ED5044ND and ED5016-ND, respectively.

[3] W. Hayward, private communications, 1996

[4] W. Hayward, "A Unified Approach to the Design of Crystal Ladder Filters", QST, May 1982, p. 21

[5] W. Burdick, posting to QRP-L, 1995

--DE WA4KAC

ALC MODIFICATIONS FOR KENWOOD TS-130V

*From long time QRPer **N4BP, Bob Patten**, the self-proclaimed "Bashful Pervert", comes this modification to the ALC circuit of the Kenwood TS-130V. He mentioned something about it on qrp-l so I pumped him for more info and here it is. For you newcomers, this is the only -V series transceiver that Kenwood marketed in the US, being a low power (10 watt) version of the TS-130S, identical except for the final amp. I've heard that they made a QRP, -V version of every HF rig they ever produced and still do, for their domestic Japanese market, but do not export them. The TS-130V is highly prized by many QRPers. Says Bob*--This mod was made about 15 years ago. It gives easy access to the ALC threshold adjustment, by moving the internal control to the rear panel, and can extend the ALC range down to about 1.5 watts. Some butchering of existing components is required, so approach this cautiously!

Remove the six screws that fasten the rear panel (which contains the final amp heat sink) to the main unit. Swing the panel down to a horizontal position to gain access to the filter unit and inside of the panel. Drill a hole in the upper left corner of the panel (viewed from the back) and mount a 50K linear taper carbon potentiometer with suitable knob.

With a pair of cutters, break up trimmer pot VR3 on the filter unit, leaving enough metal protruding from the board to attach wires to the two ends of the now missing pot. The wires go to the corresponding ends of the newly installed pot. A wire from the arm of the new pot can be soldered directly to the exposed base lead of transistor Q3. (Purists can lift the PCB from the chassis and unsolder VR3 for a neater job.) Figure 11 shows a portion of the schematic.

You may stop here if you wish. You have simply moved the internal ALC pot to the rear panel for easier adjustment. With no further changes, the control will set the ALC threshold for the '130V to produce from a minimum of five watts to a maximum of over 10.

If you want to lower that, connect two 1N4148 diodes in series. Connect the cathode end of the pair to TP2 on the filter unit (a source of -6 volts) and connect the anode end directly to the exposed cathode lead of "D5". Note the quotes; my notes indicate that my added diode attaches to D5; actually, the PC board labels it as D5 while my schematic shows it as D3! The two diodes have a forward drop of about 1.4 volts, providing about -4.6 volts at the emitter of Q3. (The diode which the schematic labels as D5 is associated with Q4, in a completely different circuit.) The original diode may be left in place on the board.

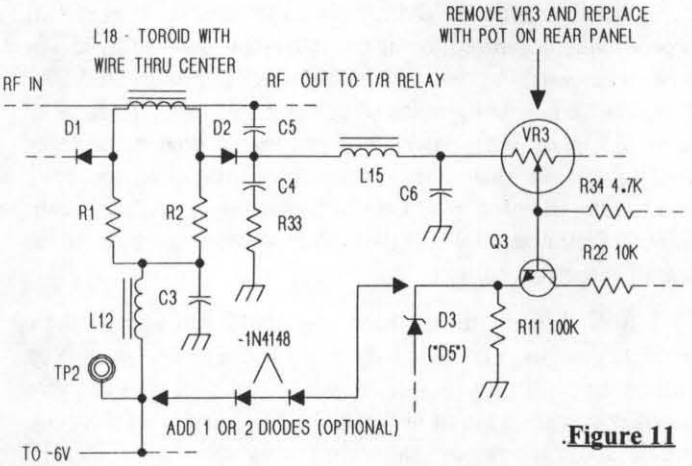


Figure 11

I did some more experiments, and found that if only one diode is added instead of two, applying -5.3 volts to Q3, the ALC threshold can be reduced to 1/2 watt. My notes also show that if TP2 is connected directly to the cathode of D5, applying the full -6V to Q3, the minimum output becomes 1/4 watt.

This completes the mod. Swing the rear panel back up into position, being careful not to pinch any of the leads from the new ALC threshold control. Replace the six screws to hold the panel in place.

To check your work, choose the power level at which you want to set the ALC threshold. Monitor your ALC on the front panel and your power output on an accurate wattmeter. Close the CW key and alternately adjust the front panel CAR control and the new pot on the rear panel so that your chosen power level is set with the '130V meter reading mid scale for ALC. Once set, the power level should remain constant when changing bands (assuming a 1:1 SWR at the output of the rig) and with varying power supply voltages (ie, battery vs. AC supply).

--DE N4BP n4bp@bcfreenet.seflin.lib.fl.us

THE FINE PRINT: Any serious errors or omissions? If it's something I blew, let me know and I'll print corrections. If it's something that a contributor said that you disagree with, or what he said doesn't work or is wrong, that's between you and him! Hash it out and let me know, and I'll print that correction, too. Curious about the (free) QRP mail reflector on Internet, qrp-l? I like to call it the QRP Daily--a continuous flow of QRP information, and plenty of it. If interested, send me e-mail and I'll tell you about it and how to subscribe. Keep those tidbits coming to Severn, by e-mail or Snail Mail--handwritten, ASCII files on MSDOS disks, or word processor files--anything that I or my machines can read! Help keep the idea Exchange large!

--qrp--

THE ARRL "VERTICAL ANTENNA CLASSICS"

A Review and Comments

Fred Bonavita, W5QJM, PO Box 2764, San Antonio, Texas 78299

Vertical Antenna Classics, Edited by Robert Schetgen, KU7G. Published by The American Radio Relay League, Newington, Connecticut 1995.

This is the second time the ARRL has trotted out a collection of articles about "classics," and it makes one wonder whether the editors there understand the word yet. The first time was in 1990 when the ARRL published "QRP Classics," a book of articles from the pages of OST (some of them 25 years old). Many will remember how a red-faced ARRL had to rush out a second edition after the QRP community pointed out that the most classic article -- the W7EL Optimized QRP Transceiver -- was nowhere to be found in the first edition.

It is difficult to see how one could call any of these antenna designs "classic" as the word is defined. Good? Yes. Informative? Mostly. But classic? Think of it this way, whether you are a fan of verticals (as I am) or not: Is there one article about a vertical that truly stands out above others in your mind? Is there one that qualifies as the definitive work to which one and all point whenever the subject is the vertical antenna? In other words: Is there a vertical antenna piece that merits being called a classic in the same sense as the W7EL transceiver, which was published in OST for August 1980?

The editors admit at the outset this is a collection of reprints from various ARRL publications, some pushing 20 years of age, so there is no pretense that we are getting new stuff here. This bunch has been copied mostly from the four volumes of the successful ARRL Antenna Compendium series, which first appeared in 1985 and about every four years thereafter. The editors even brought along errors from the originals.

The pieces reprinted in this book are a curious collection dating from a 1977 article on modifying the discontinued HyGain 18AVT/WB; a helpful 19768 piece on designing verticals; some 1980's era antenna for 2m hand-help transceivers; and a look at the evolution of the short, top-loaded vertical (c. 1990).

Perhaps the best is Chapter 4 which deals with directional arrays, phased verticals and steering. All of these are fairly new and worth a second or third reading.

Wouldn't it be refreshing if the ARRL were to put out a call for original pieces on verticals for a book? The response would be good, I'd wager. The articles could be mixed with these reprinted pieces, a fresh title -- minus the "classics" tag, thank you -- could be found and the thing offered to the public. And it would sell. The risk is that it might hurt sales of the compendium series. But if the ARRL is going to persist in this short-cut approach to grinding out books, perhaps it ought to change its name to something like **Deja Vu Press** in the interest of truth in labeling. There's such a thing as carrying recycling too far, and the ARRL is turning out some "classic" examples.

All-Band Dipoles: 135'-102'-67'

L. B. Cebik, W4RNL, QRPARCI #2572 1434 High Mesa Drive, Knoxville, TN 37938-4443 e-mail: cebik@utk.edu

EDITORS NOTE: LB mentions the many patterns printed for the antennas done in this article. In the interest of space, I must leave most of them out. While the patterns do change with each different antenna, the patterns included have one thing in common with all the others; They support the conclusion that LB reaches. ***Ron, KU7Y***

Simple dipoles fed by parallel lines to an ATU make excellent inexpensive all-band antennas. However, they do require some planning that many of us overlook. As we move upward in frequency, the classic figure-8 pattern gives way to a many-lobe pattern typical of antennas longer than a wavelength. The result is major lobes in angular directions relative to the face of the dipole. Equally important are the nulls.

As a guide to planning an all-band dipole, the following pages show the elevation and azimuth patterns for three common types of all-band dipoles: a 135' model (about the length of an 80-meter dipole), a 102' model (the antenna part of a G5RV), and a 67' model (about the length of a 40-meter dipole). Since antenna patterns are a function of the antenna length in wavelengths, the pattern of lobes and nulls changes as we change the length of the antenna.

Each pair of pages contains 8 pattern pairs, one set for each HF band from 80 to 10 meters, for one of the three basic antennas. Each pattern pair includes an elevation and an azimuth pattern for antenna heights of 35 and 70 feet. You can interpolate gains and other factors for intermediate heights by splitting the difference in each case.

Elevation patterns for each band are taken along the lobe of maximum strength. Generally, the lobes for the same antenna at different heights closely coincide, but not in all cases. The pattern with the lowest major lobe is for the 70' antenna. Use the elevation pattern to compare maximum antenna gain between the two heights.

The azimuth patterns for both the 35' antenna and the 70' antenna are taken at the angle of maximum radiation of the 70' high antenna. For all azimuth plots, picture the antenna itself as running from left to right across the center of the pattern. Each azimuth pattern pair gives a picture of the comparative likely dx performance between the two heights. The outside or "stronger" pattern is for the antenna at 70' up. The gain of the lower antenna reaches maximum at a somewhat higher angle which you can extrapolate from the elevation patterns.

The exception to the above convention for azimuth plots is the 80-meter pattern. Even at 70' up, an 80-meter antenna is so low that its angle of maximum radiation is very high. Therefore, azimuth patterns were taken at an arbitrary 45 degrees.

What, in general, do the patterns tell us? First, the general rule that higher is better (within limits of construction and maintenance abilities) is clearly revealed. On all bands and for all antennas, the 70' antenna height yields a lower angle of maximum radiation (sometimes called the "take-off" angle). Although it is possible to place an antenna too high and miss the skip angle to a dx location, in this height range we want the antenna as high as we can get it. The result is more power radiated at angles that generally fall into the dx skip zones.

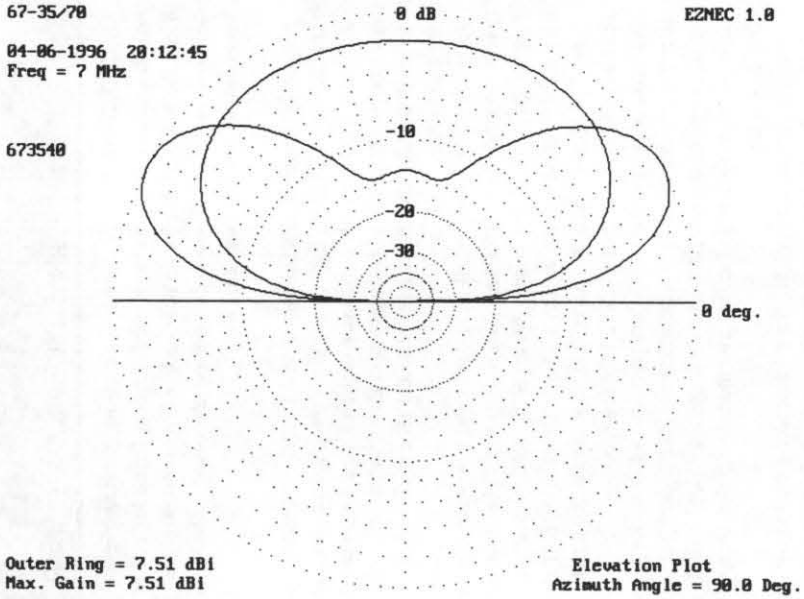
Note that the angles decrease as the frequency increases. This fact reflects both the operating habits of most hams (lower bands for domestic QSOs, upper bands for dx) and typical skip angles (which also tend to decrease as frequency increases).

Second, note that as the antenna becomes longer than a full wavelength at a particular frequency, the pattern begins to split into multiple lobes. The lowest band at which split lobes occur, of course, differs for each of the three antenna lengths. Above 1½ wavelengths, the number of lobes is no longer a simple function of antenna length, especially for the nonharmonic WARC bands (17 and 12 meters).

The general trend is that the maximum power lobe moves from perpendicular to the antenna wire toward the end of the wire. For the longest antenna model (135'), on 10 meters, the maximum power lobe has moved 53 degrees toward the end of what is essentially a 4-wavelength-long antenna.

Do not focus solely on the maximum power lobe, since many other lobes are only slightly less strong. Rather, plan the antenna to place one of the stronger lobes at each of your communications targets on your favorite band(s).

You may wish to photocopy the pattern pages and add them to your ready-reference book. **LB**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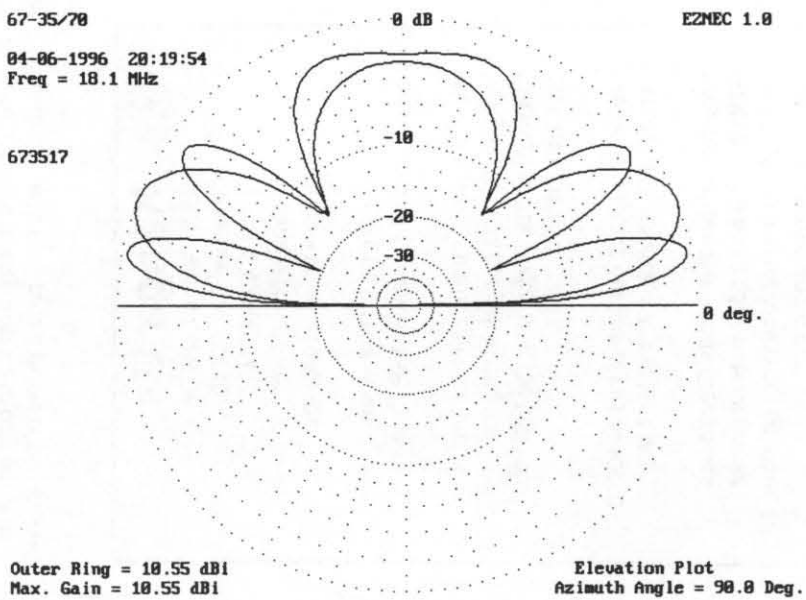
-10
-20
-30
0 deg.
Outer Ring = 7.51 dBi
Max. Gain = 7.51 dBi
Elevation Plot
Azimuth Angle = 90.0 Deg.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EZNEC 1.0
04-06-1996 20:19:54
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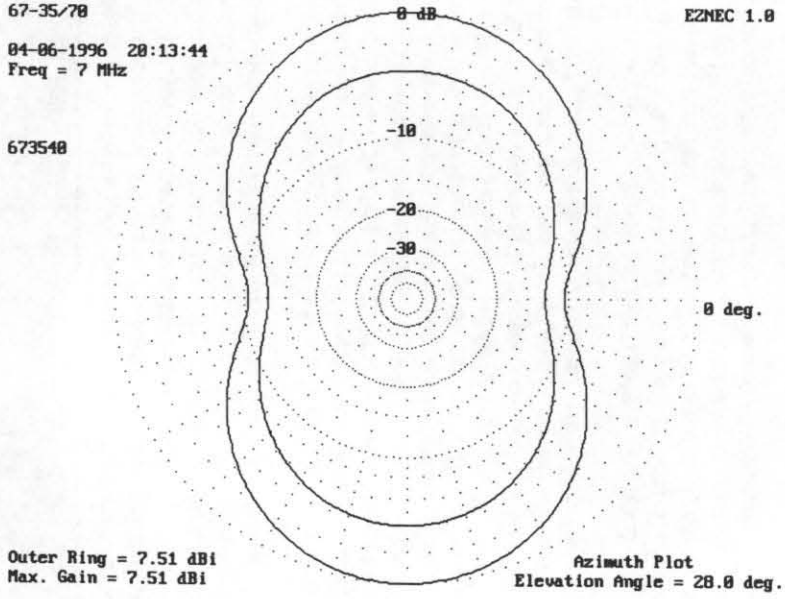
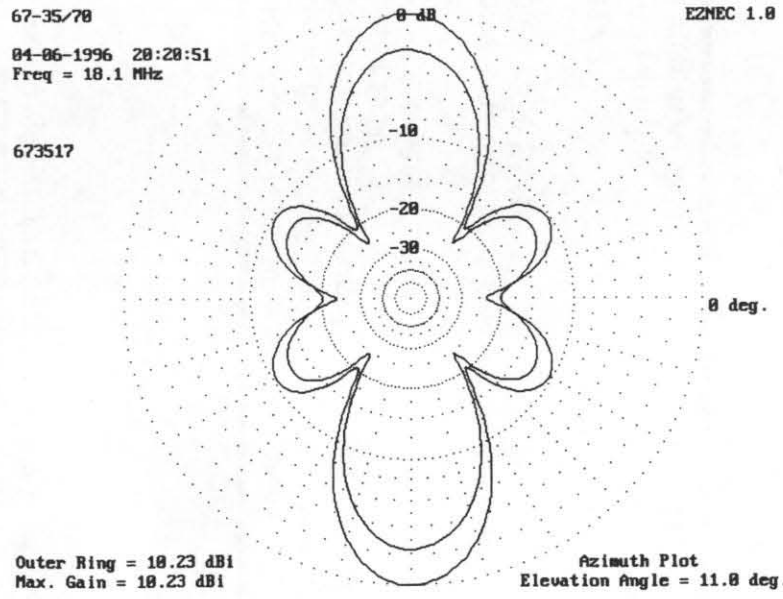
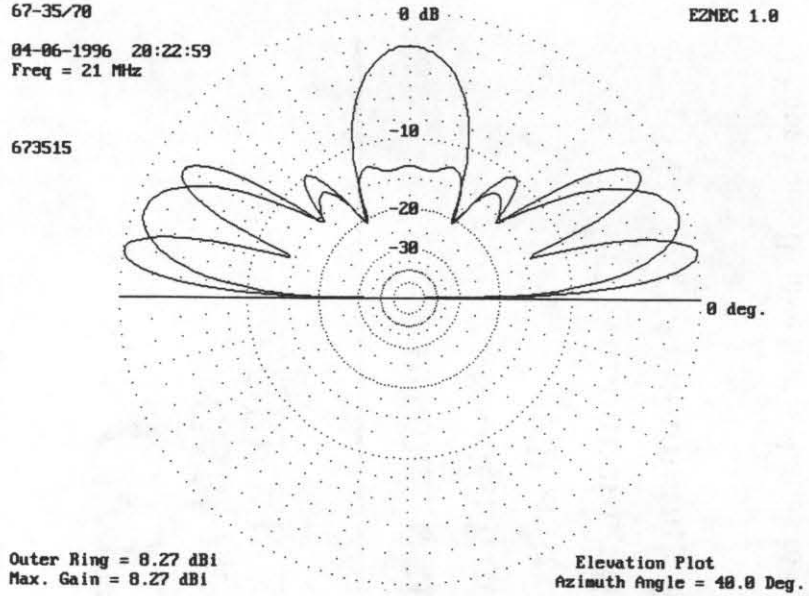
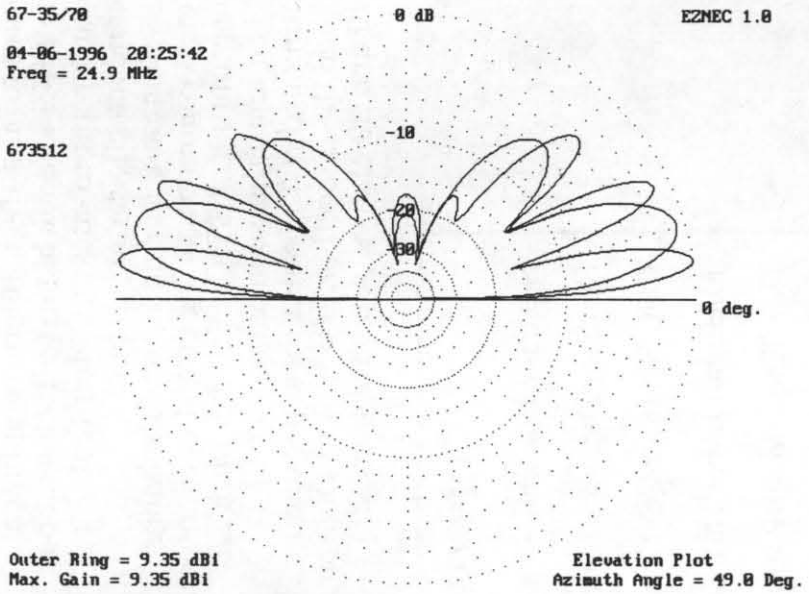
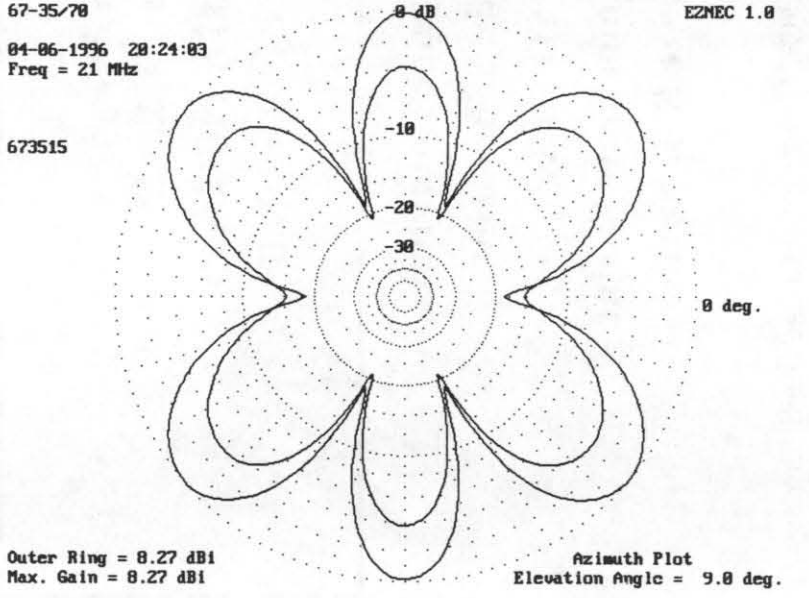
673517
0 dB
-10
-20
-30
0 deg.
Outer Ring = 10.55 dBi
Max. Gain = 10.55 dBi
Elevation Plot
Azimuth Angle = 90.0 Deg.

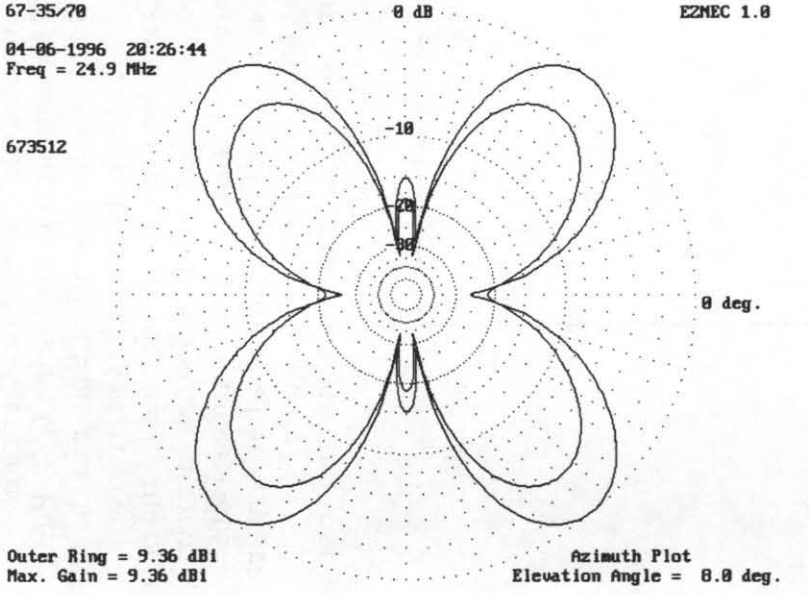

67-35/70
EZNEC 1.0
04-06-1996 20:13:44
Freq = 7 MHz
673540
0 dB
-10
-20
-30
0 deg.
Outer Ring = 7.51 dBi
Max. Gain = 7.51 dBi
Azimuth Plot
Elevation Angle = 28.0 deg.


67-35/70
EZNEC 1.0
04-06-1996 20:20:51
Freq = 18.1 MHz
673517
0 dB
-10
-20
-30
0 deg.
Outer Ring = 10.23 dBi
Max. Gain = 10.23 dBi
Azimuth Plot
Elevation Angle = 11.0 deg.


67-35/70
0 dB
EZNEC 1.0
04-06-1996 20:22:59
Freq = 21 MHz
673515
-10
-20
-30
0 deg.
Outer Ring = 8.27 dBi
Max. Gain = 8.27 dBi
Elevation Plot
Azimuth Angle = 40.0 Deg.


67-35/70
0 dB
EZNEC 1.0
04-06-1996 20:25:42
Freq = 24.9 MHz
673512
-10
-20
-30
0 deg.
Outer Ring = 9.35 dBi
Max. Gain = 9.35 dBi
Elevation Plot
Azimuth Angle = 49.0 Deg.


67-35/70
0 dB
EZNEC 1.0
04-06-1996 20:24:03
Freq = 21 MHz
673515
-10
-20
-30
0 deg.
Outer Ring = 8.27 dBi
Max. Gain = 8.27 dBi
Azimuth Plot
Elevation Angle = 9.0 deg.


67-35/70
0 dB
EZNEC 1.0
04-06-1996 20:26:44
Freq = 24.9 MHz
673512
-10
-20
-30
0 deg.
Outer Ring = 9.36 dBi
Max. Gain = 9.36 dBi
Azimuth Plot
Elevation Angle = 8.0 deg.

CONTESTS

CAM HARTFORD, N6GA
QRP ARCI Contest Manager

- ❒ **Results: QRP ARCI Novice Roundup**
- ❒ **Results: Winter Fireside SSB Sprint**
- ❒ **Results: Spring QSO Party**
- ❒ **Announcing: Summer Homebrew Sprint**
- ❒ **Announcing: Summer Daze SSB Sprint**

I hope you all have had a chance to recover and regroup from Field Day. If your group hasn't submitted it's entry into the Milliwatt Field Day competition, please do so soon. This contest has real plaques and trophies to offer the winners, compliments of the ARCI and Michigan QRP clubs. You wouldn't want to miss out, after that tremendous effort you put out.

Common Scoring Errors: Probably the most common scoring error I encounter is the counting of S/P/Cs. You can work an S/P/C on more than one band. When counting up S/P/Cs, count them per band, then add them together. If you work Ohio on 80, 40 and 20 Meters, you have worked three S/P/Cs. It is helpful to use the Summary sheet, because it has locations for points and S/P/Cs for each band.

Rule Discrepancies: Occasionally you will notice discrepancies between the rules as published in the Quarterly and in other radio journals. An example was the Spring QSO Party, in which there was a Battery multiplier in the QST version of the rules, but not in the Quarterly version. Our rules are often condensed by the other magazines, or they have old stuff stuck in their word processors that pops up at inappropriate times. In any case, the rules in the Quarterly are the correct ones. Use them as the guide.

Hope to see you in the contests, and thanks for you support. 72/73, Cam N6GA

UPCOMING EVENTS

Summer Homebrew Sprint	July 14
Summer Daze SSB Sprint	August 4
CQC Summer QSO Party	August25
Michigan Labor Day Sprint	September 2
New England QRP Afield	September 21
Fall QSO Party	October 19-20

1996 SPRING QSO PARTY

A good turnout was on hand for this year's Spring QSO Party. Propagation depended on where you were, and when you were on. Judging from the comments, it was much better on Saturday than Sunday, so if you waited to get into the fray, you probably lost out on a good bit of the fun. Thanks to AL7PS, WP4JXD, HP1AC andWB6FZH/KH6 for adding some DX interest.

Let's hear about it in the contesters' own words: WAS NEAT TO HAVE W6ZH AND N6MM CALL ME ON 40! - K8DD; VY POOR CONDX IN GENERAL. GLAD TO SEE ALL THE REAL SPORTS SHOWED UP! - N2CQ; CONDX GREAT SATURDAY, "EL STINKO" SUNDAY - VE6GK; HAD TO FIX WIFE'S CAR - AC4ZH; IT WAS GREAT TO HEAR W1AW JUMP INTO THE CONTEST - NØIZZ (THANKS TO ZACK); NEVER HEARD 40 M SO HOT - SATURDAY NIGHT SIGS BOMBING IN - WAØRPI; CONDX GOOD SATURDAY, BUT NOT SUNDAY, SO I FINISHED MY TAX RETURN - N3LAZ; LATE NITE DXING PAID OFF WITH SOME EXTRA MULTIPLIERS - W8MVN; MET GOAL OF 100 Q'S BETWEEN WEEKEND CHORES - WA6UKI; BACK INTO THE TEST AFTER 7 YEARS ABSENCE, REALLY HAD A BLAST! - W5VBO; HOPE THE SUNSPOTS COME BACK SOON - WBØSMZ; R4 VERTICAL (TUNER AND A PRAYER FOR 40 & 80M) - WC1F; I SHOULD HAVE GONE FISHING - KJ5MG; TROUT SEASON OPENED SATURDAY - K3WWP; ZP6CW CALLED ME ON 20M, WHAT A SHOCK!! I COULD HARDLY FINISH THE EXCHANGE - AD4ZE; TURNED ON THE RIG, THERE HAD BENA CONTEST GOING ON FOR 14 HOURS AND ME BLKISSFULLY UNAWARE OF IT - KE6PTM; SIGNALS AT HIGH LATITUDES WERE ALMOST NON-EXISTANT - AL7FS; IF IT ISN'T THE PA QSO PARTY, IT'S POOR PROPAGATION! - K7YHA; (SO MUCH WHINING - WHY NOT BLAME THE FLOOD, TOO? - ED.) BIGGEST HELP - N6MM ON 6 BANDS; BIGGEST SURPRISE - XE3AJM ON 10 METERS; MOST DIFFICULT QSO - N4ROA ON 80 METERS! - W6ZH; I SCORED HIGHER THIS TIME USING MY TRUSTY MFJ THAN LAQST FALL USING MY QRP+ - SOMETHING TO BE SAID FOR SIMPLICITY! - WB4ZKA; SCORE IS ALMOST 4 TIMES LAST SPRING - CONDX OR PERSISTENCE? - N3CZB; QRP OPERATORS, GOOD JOES!! - W9ETU; IT WAS THE PATIENCE OF MAINLAND OPERATORS THAT MADE MY QSO'S - WB6FZH/KH6; I'M GONNA HAVE TO GET A BETTER RECEIVER AND SOME SUNSPOTS - K5ZTY; AT 250MW I REALLY FELT LIKE A LITTLE PISTOL. THERE ARE SOME GREAT EARS OUT THERE. - AA7KF; SUNDAY 20M WAS VERY POOR, 80M WAS VERY NOISY (SNOW STATIC) - KØFRP; HIGHLIGHT WAS HP1AC CALLING ME ON 40 THROUGH THE STATIC - NZ8J; WORKED 14 STATES TOWARD MY WAS/QRP AWARD - KA1OX; ONLY 12% OF THOSE I WORKED WERE QRO - W1AW (KH6CP); HP1AC AND I TRIED 15 M BUT THE BAND WAS JUST TOO STUBBORN - AE4CA; ALWAYS A KICK TO WORK THE LEFT COAST ON QRP! - N3DQU; BOY, WHAT A DIFFERENT CONTEST! TRUE SIGNAL REPORTS, SLOW CODE SPEEDS AND WEAK SIGNALS. WHAT MORE CAN A HAM ASK FOR? - WA8YRS;

1996 SPRING QSO PARTY

CALL	SCORE	POINTS	SPC	PWR	BANDS	TIME	RIG	ANTENNA
ALBERTA								
VE6GK	55,860	285	28	5	20M	2.5	IC 751	YAGI @ 65'
ALASKA								
AL7FS	1,190	34	5	5	A-2	2	TS 440S	YAGI @ 42', G5RV
ALABAMA								
K4ZM	121,401	369	47	5	A-3	6	ARGO 515	550' LOOP
K4KJP	41,888	187	32	3	A-3	6	ARGO 515, W7EL, 9040	40 SLOPER, 550' LOOP, VERT
W4DGH	8,232	84	14	4	20M	2.5	ARGOSY II	YAGI
WA4KEJ	7,455	71	15	5	A-2	1	ARGO 515, 9020	VERT WHIP ON VAN
KE4AGT	5,250	75	10	5	40M	5	40-40, RAMSEY AMP	DIPOLE
AB4QL	2,000	40	5	0.9	40M	1.5	ARGO 515	80M LOOP
ARKANSAS								
K5LG	293,216	952	44	5	A-3	24	IC-725	?
N5SAN	43,340	197	22	0.5	20M	9	FT 747 GX	650 DIPOLE @ 60'
ARIZONA								
W5VBO	124,579	481	37	5	20M	15	QRP+	2 EL YAGI @ 25'
WB4ZKA	65,268	222	28	3	20M	7.5	MFJ 9020	VERTICAL
K7SM	16,541	139	17	2	40M	5.5	NORCAL 40A	ZEPP @ 80'

BRITISH COLUMBIA								
VE7BLU	9,450	90	15	4	40M	5	HW-9	BIRDCAGE, OPEN WIRE FEED
CALIFORNIA								
W6ZH	184,086	487	54	5	A-6	6.5	TT OMNI 6	KT34, 40M YAGI, VERTICAL
KG6VI	102,396	318	46	5	A-3	6	QRP+	YAGI @ 36', 2 EL 40M YAGI @ 40'
KO6KA	82,040	293	40	4	A-3	16	ARGO 509	MARCONI, SLOPERS
N6GA	34,888	178	28	5	A-4	4	CORSAIR II	YAGI @ 35'
KN6YD	23,667	161	21	5	A-2	9	FT-890	R7 VERTICAL
K6QWH	23,667	135	23	5	A-2	3	ARGO 509	?
KF6MP	12,880	115	16	5	20M	3	IC 735	60' WIRE @ 25'
KE6PTM	4,200	50	12	2	40M	2	NORCAL SIERRA	?
COLORADO								
KØFRP	691,390	1190	83	5	A-3	11	TS-820S	20M & 40M YAGIS, 80M LOOPS
WBØAPG	195,960	426	46	0.9	A-2	?	ARGO 515	YAGI, DIPOLE, VERTICAL
KØFX	180,180	660	39	5	A-4	?	?	?
WOØQ	42,630	210	29	5	A-2	6	FT-1000	2 EL QUAD, HF6V VERT
KDØC	3,570	51	8	5	A-2	2	QRP+	?
CONNECTICUT								
W1AW	105,280	470	32	4	20M	14	HW-9	YAGI
N1CJB	84,014	353	34	5	A-4	17	ARGO 556	VERT, BENT MARCONI
KA1OX	7,840	80	14	4	20M	4.5	TS-850S	YAGI
KH6CP	2,550	51	5	0.76	80M	1	ARGO 515	86' DIPOLE, BROKEN 80M LOOP
FLORIDA								
N4BP	418,047	1171	51	5	20M	22	TS-130V	YAGI @ 45'
W3DHN	665	19	5	5	20M	1	?	?
GEORGIA								
KN4QV	570,094	947	86	5	A-4	12	?	MULTIPLE DIPOLES
AE4CA	314,699	671	67	5	A-3	18	FT-840, NN1G	80M LOOP, 40M VERT
K4BAI	235,620	561	60	5	A-3	9.5	IC 736	TH6DXX, DIPOLES
KE2WB	21,672	129	24	5	A-3	4	HW-9	131' DIPOLE @ 40'
HAWAII								
WB6FZH	5,796	92	9	5	A-2	5	TT CENTURY 21	HF6V ON EDGE OF KANEOHE BAY
IOWA								
WØPFR	18,480	120	22	2	A-2	4	NORCAL SIERRA	MINI LOOP
IDAHO								
KF7ET	21,420	170	18	5	40M	14	QRP+	INVERTED VEE
WB5QMP	5,621	73	11	2	40M	14	NORCAL 40A	14AVQ VERTICAL
ILINOIS								
W9ETU	16,786	109	22	2	A-2	12	HW-8 (MANY MODS)	DELAT LOOP AND YAGI
W9CUN	16,240	116	20	4	40M	5	TT DELTA 580	GAP VERTICAL
INDIANA								
WB9PXR	223,146	759	42	5	40M	13	OHR CLASSIC	80M LOOP, 40M VERTICAL
KD9ZE	51,975	225	33	5	A-3	7	IC-736, OHR CLASSIC	MULTI-BAND HALF-SLOPER
W9FHA	49,490	202	35	5	A-2	3	OHR CLASSIC	80M ZEPP
KANSAS								
WØTID	117,656	382	44	5	A-2	11.5	ARGO 509	40M SLOPING LOOP, 3 EL QUAD
WBØSMZ	3,304	59	8	5	20M	2	TS-140S	YAGI @ 30'
KAØSIX	2,079	33	9	5	20M	1	?	?
KENTUCKY								
AC4ZH	4,851	63	11	4	40M	1.5	ARGO 505	DIPOLE
KS4XS	3,600	45	8	1	A-2	1	QRP+	TUNED WIRE
MASSACHUSETTS								
K1KDG	25,137	171	21	4	A-3	?	ARGO 509	DIPOLE, VERTICAL
AA1MR	23,961	163	21	2	20M	13	IC 735	80 ZEPP @ 35'
MARYLAND								
W3ERU	128,744	484	38	5	40M	18	TS850	40M VERT LOOP @ 50'
K3TKS	27,180	151	18	0.9	L-2	3	ARGO 509	80M LOOP

MARYLAND, CONTD.								
WC1F	2,457	39	9	5	A-3	4	IC 725	R4 VERTICAL
WA8MCQ	1,500	25	4	0.16	40M	1	TS-430	DELTA LOOP
MICHIGAN								
W9NIP	112,476	412	39	5	A-3	?	QRP+, MFJ9020	WINDOM, YAGI
AC8W	110,250	450	35	4	40M	6	OHR EXPLORER II	HF6V
K8DD	65,170	245	38	5	L-2	2.5	IC 751A	HF6V, 40M DIPOLE @30'
N8CQA	61,600	220	40	5	A-4	6	?	?
W8VFM	32,424	193	24	5	L-2	5.5	OHR-400	?
MINNESOTA								
WAØRPI	538,461	999	77	5	A-7	16	IC-735	LOOPS, DIPOLE
WAØSWD	8,393	109	11	5	20M	2	IC-706	40M LOOP
AAØSM	2,408	43	8	2.7	A-2	2	OHR EXPLORER, 40-9ER	RANDOM WIRE
MISSOURI								
KGØTW	169,435	515	47	5	A-2	9	TS-430S	?
NØIZZ	71,225	275	37	7	A-2	6	TS-520	40M EDZ @ 20'
WØGWT	30,000	100	20	0.1	A-3	7	IC 735	VERTICALS
NORTH CAROLINA								
AD4ZE	74,592	296	36	5	A-3	7.5	IC735, NC 40	80M DIPOLE
AE4IC	41,377	257	23	5	A-2	8	NW40, SIERRA	G5RV
NEW HAMPSHIRE								
AA1LN	2,464	44	8	5	40M	3.5	?	?
AA4LN	2,464	44	8	5	40M	3.5	?	?
NEW JERSEY								
K2JT	181,790	490	53	5	A-5	11	TS-130V	132' LONG WIRE
N2CQ	52,290	249	30	5	A-3	6	TS-850S	YAGI, ZEPP
N2MNN	49,500	165	30	0.95	A-3	5.5	WILDERNESS SIERRA	40M VERT LOOP
WK8G	41,202	218	27	3	A-3	8	IC 735	20M HALFSQUARE, 40M LOOP
AA2YO	18,396	146	18	5	40M	8	MFJ 9040	?
W2JEK	15,400	110	20	2	A-5	3	ARGO 505	DIPOLE, VERT, HERTZ
N2CX	12,180	116	15	3	40M	2	NORCAL 40A, ARGO 509	INV VEE, HF6V VERT
NEW MEXICO								
KN5S	87,360	390	32	5	20M	4	HB 12 BAND TCVR	DIPOLE
KB5DQ	53,760	256	30	5	A-2	4	QRP+	3 EL YAGI, INV VEE
NEW YORK								
K2LGJ	119,500	275	38	0.9	A-3	8	HW-9	SHUNT-FED TOWER, YAGI
WA2BQI	86,814	318	39	5	A-3	?	?	?
W2QYA	72,800	208	35	0.9	A-3	13	HW-8	100' MARCONI
WB2KKX	9,646	106	13	5	80M	5	ARGOSY II	RANDOM WIRE
W2NRD	5,208	62	12	3	A-3	2	HW-8	?
OHIO								
W8MVN	430,521	1079	57	5	40M	21	HB TX	LOOPS AT 60'
NZ8J	134,316	369	52	4	A-3	?	TT PARAGON	ZEPP, 3-EL YAGI
WA8YRS	124,740	396	45	2	A-3	8.5	HW-8	YAGI, VERTS, INV VEE
N8ET	65,534	302	31	5	40M	?	?	?
WA3PAK	19,740	141	20	5	A-2	?	?	?
KF8EE	3,840	48	8	0.95	80M	4	SW-80	120' END-FED WIRE @ 15'
N8LBI	980	20	7	5	40M	2	TS-440	DIPOLE
OKLAHOMA								
K5UP	40,180	5740	28	5	40M	12	ARGO 525	40M HORIZ LOOP
KJ5MG	22,638	154	21	5	20M	11	HB TCVR	DIPOLE
OREGON								
AA7KF	288,000	400	48	0.25	A-2	9	TS-940	DELTA LOOPS
WX7R	158,550	453	50	4	A-3	18	IC-735	LONG WIRES
AA7QU	79,625	325	35	5	40M	6	TS-870	BISQUARE @ 120
PENNSYLVANIA								
W3TS	202,170	293	46	0.25	A-6	4	HB TCVR	160 TEE, 40M INV VEE, YAGIS

PENNSYLVANIA, CONTD.								
K7YHA	89,880	321	40	3	A-8	?	WILDERNESS SIERRA	YAGI, 80M ZEPP
WA3YON	71,008	317	32	5	L-2	6	?	?
K3WWP	62,280	173	24	0.25	L-2	7	HB 6Y6	DIPOLES, RANDOM WIRE
AA3GM	37,541	173	31	5	A-3	9.5	ARGO 556	20,40 HAMSTICKS, 80 DIPOLE
N3DQU	27,888	166	24	4	40M	8.5	MFJ 9040	40M DIPOLE
NE3I	23,226	195	21	5	A-2	4	TS-440S	ATTIC DIPOLES
WA3SRE	19,660	140	14	0.95	80M	7	ARGO 515	40M LOOP
N3LAZ	19,026	151	18	2	20M	12	HB VXO, HB RX	G5RV
KW3U	9,100	100	13	5	A-3	3	?	?
N3CZB	5,712	68	12	5	A-2	10	TT CENTURY 21	INDOOR 36" LOOP
PANAMA								
HP1AC	190,442	446	61	5	A-3	7	K9AY,K1BQT, TS430	YAGI, LONG WIRE
PUERTO RICO								
WP4JXD	28,000	140	20	0.9	20M	10	SB-104A	1/2 SIZE G5RV
QUEBEC								
VE2ABO	27,125	155	25	3	L-2	8	HW-9	DIPOLE, LOOP
SOUTH CAROLINA								
WA2UAX	18,144	162	16	5	40M	5	TS-850	G5RV
TENNESSEE								
WA6KUI	86,240	385	32	5	40M	4.5	?	?
TEXAS								
K5ZTY	160,524	441	52	3	A-2	14.5	HW-8	YAGI, G5RV
VIRGINIA								
N4ROA	779,820	951	82	0.9	A-3	21	QRP+	YAGI, INVERTED "L"
W4XD	307,440	732	60	5	A-3	8.5	ASTRO 103	G5RV, HY TOWER
N4JEO	127,190	395	46	5	A-3	6.5	IC-735	130' DIPOLE
N3OS	24,794	161	22	3	40M	3	HB 12BY7	MINI-QUAD
VERMONT								
AA1PB	11,607	93	17	4	A-2	2	ARGO, OHR EXPLORER II	220' LONGWIRE @ 40'
NW1S	6,622	86	11	5	A-2	1	ARGO 509	20 YAGI, 40 HALFSQUARE
WISCONSIN								
W9MSE	332,150	650	73	5	A-3	9.5	TS-440	VERTICAL AND DIPOLE
WD9IAB	19,380	102	19	0.5	A-3	6	TT DELTA II	RANDOM WIRE
WB9LKC	6,734	74	13	2	A-3	6	HW-8	VERTICAL & WINDOM

TOP TEN

N4ROA	779,820
KØFRP	691,390
KN4QV	570,094
WAØRPI	538,461
W8MVN	430,521
N4BP	418,047
W9MSE	332,150
AE4CA	314,699
W4XD	307,440
K5LG	293,216

SINGLE BAND

20 M	N4BP	418,047
40M	W8MVN	430,521
80M	WA3SRE	19,660

HI / LO BAND

HI BAND	NONE	
LO BAND	WA3YON	71,008

TEAM COMPETITION

RACCOONS	K4ZM, K4KJP, WA4KEJ	170,744
NEW JERSEY QRP CLUB	N2CX, N2CQ	64,470

SUMMER HOMEBREW SPRINT

Date/Time:
July 14, 1996; 2000 - 2400 Z; CW only

Exchange:
Member - RST, State/Province/Country, ARCI Number
Non-Member - RST, State/Province/Country, Power Out

QSO Points:
Member = 5 Points
Non-Member, Different Continent = 4 Points
Non-Member, Same Continent = 2 Points
The same station may be worked on more than one band for QSO point credit.

Multiplier:
SPC (State/Province/Country) total for all bands.
Treat each band separately for S/P/C credit. Each S/P/C may be worked on more than one band for credit.

Bonus Points:
Points awarded for using Homebrew equipment,apply for each band on which Homebrew equipment was used:
+2,000 HB Transmitter used
+3,000 HB Receiver used
+5,000 HB Transceiver used

Homebrew Definition: If you built it, it is considered Homebrew.

Power Multiplier:
0 - 250 MW = X 15; 250 MW - 1 Watt = X 10
1 W - 5 W = X 7; Over 5 W = X 1.

Suggested Frequencies:

	GENERAL	NOVICE
160 Meters	1810 KHz	
80 Meters	3560 KHz	3710 KHz
40 Meters	7040 KHz	7110 KHz
20 Meter	14060 KHz	
15 Meters	21060 KHz	21110 KHz
10 Meters	28060 KHz	28110 KHz
6 Meters	50060 KHz	

Score:
Points (total for all bands) X SPCs (total for all bands) X Power Multiplier + Bonus Points.

Entry may be an All-Band, Single Band, Hi-Band (20M, 15M, 10M and 6M) or Lo-Band (160M, 80M and 40M). Certificates to the top three scores, to the top score in each Single-band, Lo-band and Hi-band class, and to the top score in each class in each SPC. The contest manager reserves the right to recognize special significant entries with a certificate award.

Entry includes a copy of the logs and a separate summary sheet. Include duplicate check sheets with entries of 100 QSOs or more. Indicate total time-on-the-air, and include a legible name, call, QRP ARCI Number (if any) and address.

All entries must be received within 30 days of the contest date. Late entries will be counted as check logs. Members and non-members indicate their output power for each band. The highest power used will determine the power multiplier. Output power is considered as 1/2 of input power.

Include a description of homebrew equipment, commercial equipment, and antennas used with each entry. Homebrew bonus points may not be claimed if a description is not included with the entry.

Send an SASE for a summary and sample log sheets. Include an SASE with your entry for a copy of the results. Results will be published in the next available issue of the QRP ARCI Quarterly.

The final decision on all maters concerning the contests rests with the contest manager.

Entries are welcome via E-Mail to CamQRP@cyberg8t.com, or by mail to:
Cam Hartford, N6GA
1959 Bridgeport Ave.
Claremont, CA 91711

SUMMER DAZE SSB SPRINT

Date/Time:
August 4, 1996 12 Noon to 8:00 PM, Local Time
Operate any 4 hours of the 8 hour period. Mark on & off times

Exchange:
Member - RS, State/Province/Country, ARCI Number
Non-Member - RS, State/Province/Country, Power Out

QSO Points:
Member = 5 Points
Non-Member, Different Continent = 4 Points
Non-Member, Same Continent = 2 Points
The same station may be worked on more than one band for QSO point credit.

Multiplier:
SPC (State/Province/Country) total for all bands.
Treat each bands separately for S/P/C credit. Each S/P/C may be worked on more than one band for credit.

Power Multiplier: (Power Output)
0 - 250 MW (0 - 500 MW PEP SSB) = X 15;
250 MW - 1 Watt (500 MW - 2 Watts PEP SSB) = X 10;
1 W - 5 W (2 - 10 Watts PEP SSB) = X 7;
Over 5 W (Over 10 W PEP SSB) = X 1.

Bonus Points: (Apply for each band)
+2000 HB Transmitter Used
+3000 HB Receiver Used
+5000 HB Transceiver Used

Homebrew Definition: If you made it, it's homebrew.

Suggested Frequencies:

160 Meters	1830 KHz	15 Meters	21385 KHz
80 Meters	3865 KHz	10 Meters	28385 KHz
40 Meters	7285 KHz	6 Meter	50128 KHz
20 Meter	14285 KHz		

Score:
Points (total for all bands) X SPCs (total for all bands) X Power Multiplier + Bonus Points

Entry may be an All-Band, Single Band, Hi-Band(20M, 15M, 10M and 6M) or Lo-Band (160M, 80M and40M). Certificates to the top three scores, to the top score in each Single-band, Lo-band and Hi-band class, and to the top score in each class in each SPC. The contest manager reserves the right to recognize special significant entries with a certificate award.

Entry includes a copy of the logs and a separate summary sheet. Include duplicate check sheets with entries of 100 QSOs or more. Indicate total time-on-the-air, and include a legible name, call, QRP ARCI Number (if any) and address.

All entries must be received within 30 days of the contest date. Late entries will be counted as check logs. Members and non-members indicate their output power for each band. The highest power used will determine the power multiplier. Output power is considered as 1/2 of input power.

Include a description of homebrew equipment, commercial equipment, and antennas used with each entry. Homebrew bonus points may not be claimed if a description is not included with the entry.

Send an SASE for a summary and sample log sheets. Include an SASE with your entry for a copy of the results. Results will be published in the next available issue of the QRP ARCI Quarterly.

The final decision on all matters concerning the contests rests with the contest manager.

Send entries via E-Mail to CamQRP@cyberg8t.com, or by mail to:
Cam Hartford, N6GA
1959 Bridgeport Ave.
Claremont, CA 91711

1996 WINTER FIRESIDE SSB SPRINT

Cam Hartford, N6GA

The annual Winter Fireside SSB Sprint came about this year in the face of some of the lowest sunspot numbers in recent memory. Coupled with a small turnout, it made for a slow contest.

Thanks again to the crowd from British Columbia for joining in and making this a more lively event. All of the BC participants were running homebrew gear, which most of them use for daily operations and net QNIs. Glad to know that the SSB homebrew spirit is alive and well in western Canada.

Soapbox: I had plenty of time for this one, but heard practically no activity - W9PNE; Very little activity here, except N5JWL working everything in sight - K3WRV; Had alot of fun with this one - couldn't work 4 hours because of Euro BC stations coming in - KG0TW; Where were all the northern states? Bands open only to the west from this QTH - KE4BF; This was a honey-do Sunday - N5JWL; How can I have such a great RST-R and make so few QSOs? - N5SAN; Contest QTH - cold damp basement. Wish it was by a fireside! - AE4MK; Not much here on 20! - WN2V; Lots of QRM and band dropped out, but QRP+ worked great - KF7ET; One weak station heard on 15M briefly,but I couldn't make out the call - W6SIY.

State	Call	Score	Points	SPCs	Power	Bands	Time	Rig	Antenna
PA	W3TS	28850	59	15	2PEP	A-4	2	HB TCVR	160 TEE, INV VEE, YAGI
MO	KGØTW	11655	111	15	5W	40M	3	TS-430S	DIPOLE @ 50 FT
CA	KI6DS	10098	7	2	5W	A-2	0.5	NORCAL CASCADE	DIPOLES
BC	VE7QK	6953	93	3	5PEP	75M	4	EPIPHYTE 2	25 FT
AR	N5SAN	6552	104	9	7 PEP	20M	2.5	FT-747GX	650 CF DIPOLE
BC	VE7JO	5245	35	1	5W	75M	1	HB TCVR	?
BC	VE7ZM	5231	33	1	5W	75M	0.5	CALIF. BOARD TCVR	?
BC	VE7GC	5210	30	1	3W	75M	1	HB TCVR	G5RV
TX	N5JWL	4200	60	10	3W	20M	1.5	QRP +	YAGI @ 30 FT
AL	KE4BF	2184	39	8	4W	A-2	2.5	ARGO 515	WINDOM, YAGI
SC	WN2V	1764	36	7	5W	A-2	3	QRP +	DIPOLES
IL	W9PNE	1568	32	7	10PEP	A-2	2	IC-751	SLOPER, YAGI
VA	AE4MK	1274	26	7	10 PEP	A-2	2.5	TS-50	ATTIC FAN DIPOLE
ID	KF7ET	1225	35	5	5W	40M	3.5	QRP +	INV.VEE @ 30 FT.
CA	W6SIY	840	24	5	4 PEP	A-2	3	TEN-TEC DELTA	DIPOLE, MINI-QUAD
NJ	N2MNN	560	20	4	10PEP	A-3	2	TS-850	VERTICAL LOOP
OH	WBØIQK	560	20	4	5W	A-2	1	ARGO 556	R7 VERTICAL
CT	N1CJB	294	14	3	5W	A-2	2	ARGO 556	VERT
MD	K3WRV	140	7	2	2W	H-2	2.5	ARGO 509	600 FT DIPOLE
FL	KX5U	14	2	1	5W	20M	0.5	?	?

1996 QRP ARCI NOVICE ROUNDUP

The first running of our QRP Novice Roundup is in the books, what there was of it. Many voiced support for the contest before it occurred, but few participated and even fewer submitted logs. The audience was somewhat divided because the FISTS also felt a need to fill in the gap left by the ARRL, and ran their own NR at the end of February. Next year we plan to run a joint effort with the FISTS. Perhaps our combined efforts in planning and publicity will make this a viable contest.

State	Call	Score	Points	SPCs	Power	Bands	Time	Rig	Antenna
PA	KA3JZS	5928	114	26	5	80, 40,15,10	13	IC 735	VERTICAL
NY	KB2TRF	1614	56	22	100, 5	80, 40	?	?	?
PA	WB3BFQ	1512	54	14	5	80, 40,15,10	15	QRP+	WIRE ANTS
MO	KGØTW	1320	33	20	5	80, 40	15	TS-430S	DIPOLE
NY	KA2SJG	768	32	12	5	80, 40	7	ARGO 509	DIPOLE
NY	N2JNZ	624	24	13	5	40	?	TS 520	TRAP DIPOLE
NE	NØBQW	420	21	10	5	80, 40	?	OHR CLASSIC, FT890	INV VEE
ND	KBØMWV	320	40	8	150	80, 40	?	?	?
MO	NØIZZ	288	12	12	5	80, 40	4	TS 520	40M EXT DBL ZEPP
NY	KA2FDA	276	23	6	5	40, 15	2	?	?
PA	K3WWP	56	7	4	5	80, 40,15,10	5	HB 6Y6	RANDOM WIRE
NJ	N2QXF	48	6	4	5	80, 40	?	?	?

QRP NET INFORMATION

Compiled by George "Danny" Gingell, K3TKS

1996 ARCI QRP Net Schedule

Net	Frequency	NCS (Alt. NCS)	Day	Time [1]
TCN [2]	14060	W5LXS (K2LGJ)	Sunday	2300 UTC
SEN [3]	7030 3535	K3TKS (AA1OC)	Wednesday [4]	0100 UTC 0130 UTC
GSN [5]	3560	W5TTE	Thursday [4]	0200 UTC
GLN	3560	W1CFI (WA1JXR)	Thursday [4]	0200 UTC
NEN	7040-41	K3TKS (KC1DI)	Saturday	1300 UTC
WSN-80	3558	WA6ARA (KI6SN)	Thursday [4]	0300 UTC
WSN-40	7040	W6SIY (several)	Saturday	1700 UTC

Notes:

1. Adjust UTC times to one hour earlier when local time switches to daylight savings time unless otherwise noted.
2. TCN remains at 2300 UTC Sunday the year around except on major contest weekends, then it will meet one hour later.
3. If conditions on 7030 kHz are poor, QSY to 3535 kHz at 0130 UTC (0030 UTC Spring/Summer). Please note that 3535 kHz is the Michigan QRP Club net frequency at 0200 UTC (see " Other QRP Nets " listing).
4. Note that in North America, net meets on the evening of the day before local time.
5. Net temporarily inactive.

Other QRP Nets

Net	Frequency	NCS	Day	Time [1]
BC (SSB)	3729	- - -	Every Evening	0300 UTC
MI-QRP	3535	K8JRO	Wednesday [2]	0200 UTC
NE-QRP (SSB)	3855	WA1JXR	Monday	2100 EST
NEIQS (NE ILL)	3560	- - -	Friday [2]	0200 UTC
OK-QRP	7060 (3560)	- - -	Sunday	1330 UTC
NW-QRP	10123	N7MFB	Tuesday [2]	0200 UTC
NW-QRP (ragchew)	7035	- - -	Saturday	0730 PST
N.C.QRP	3710	WA4NID (AA4SX)	Sunday	2200 EST
VE-QRP	14060	VE6BLY	Sunday	1800 UTC

Notes:

1. Adjust UTC times to one hour earlier when local time switches to daylight savings time.
2. Note that in North America, net meets on the evening of the day before local time.

Please tell your friends about the QRP Nets -- they might decide to join after seeing how friendly we can be!

NOTICE: There are openings for Net Control and Alternate Net Control stations on all ARCI nets.

Hi Gang-

This is to let you know that the "Green Mountain" series of monobander CW transceivers is ready to go. I'm presently shipping 30, 20 and 15 Meter versions, and 17M and 40M versions are pending. I'll be verifying the 17M version over the holidays; this flavor should be available by December 30th. Due to the interest in 17M here lately, I'll post a report as soon as it's ready. If you hadn't seen earlier postings, here's a summary of GM-series characteristics:

-Monoband Operation
-100 Khz coverage nominal
-High stability
-Heterodyne LO
- Temperature-compensated varicap tuning
- 2.5W output power
- Improved audio- LM380 output
- Effective crystal and front-end filtering.
- Interconnect to controls uses 0.100" headers
- built-in RIT
* Currently available as a Board Kit

High-quality 3.5" x 5.0" PC board
-Double-sided, PTH, masked & silkscreened
-All on-board parts
-Selected crystals
-18-page Manual

* A high-quality enclosure option will be announced shortly. This product will feature a handsome extrusion enclosure with silkscreened front panel legends. The board kit is currently available for $72 postpaid , US and Canada, $75 overseas. Please contact me for further information.

73, Dave Benson, NN1G (Small Wonder Labs)

NR	DATE	TO	POWER	WITH	POWER	MI/WATT	BND	MDE	QSO DATE
458	790204	WA3ZBJ	5	ZL1BHV	100	1,720	28	SSB	781231
459	790204	K2RS	2	ZS1VT	150	3,900	21	CW	790110
460	790204	WD5JGC	1	KH6JJP		3,550	28	SSB	111078
461	790204	WD5JGC	1	KG6JIH		7,000	28	SSB	781112
462	790217	AA2E	2	I0ZQ		2,100	14	CW	781025
463	790217	WB7FAH	5	ZS2AG		2,100	14	CW	790131
464	790307	K4EVH	3	DK1XE	50	1,320	21	CW	780220
465	790307	WA5VCM	5	VK2DAV	5	1,900	14	SSB	790208
466	790307	K3NGN	0.3	WB8OPC	150	1,167	7	CW	780326
467	790307	N0AKJ	1	KG6JJH		6,500	28	SSB	790202
468	790307	WD5BUG/4	2.5	OH8PF	KW	2,000	21	CW	781213
469	790311	WA4BTL	0.175	WA0LPK/KL7	200	17,000	28	SSB	790211
470	790311	WD4RXJ	100	SM0FSM	2.5	1,720	21	CW	780315
471	790311	SM0FSM	2.5	WD4RXJ	100	1,720	21	CW	780815
472	790322	WA4DOU/7	3	JA4OQH		2,008	14	CW	770728
473	790402	W0DBZ	3	KH6GGZ	200	1,333	21	CW	781119
474	790404	VE5JQ	5	VK6NDJ	10	1,979	28	CW	790208
475	790412	G4BHR	2.5	W4BND	150	1,600	14	CW	790313
476	790419	N7CV	5	JR1AOQ	200	1,110	7	CW	781022
477	790419	N7CV	5	JA9UAD	1	1,110	21	CW	790408
478	790426	SM7BNG	3	JA7AGO	160	2,200	14	CW	790406
479	790426	KA0BNI	5	ZL2ABB	180	1,600	21	CW	790331
480	790506	VK2DAV	5	WA4VCM	5	1,900	14	SSB	790208
481	790506	WD4KJF	3	I5YGB		1,665	14	CW	790419
482	790601	K5UP	3	VR3AH	7	1,543	14	CW	790408
483	790601	SM7CZC	2	JA4OQH	100	3,250	21	CW	790223
484	790617	W5QVZ	0.94	N2KW	5	1,881	14	CW	790408
485	790617	G4BHR	2	KL7JKV	90	2,206	21	CW	781014
486	790723	G4BUE	0.005	N1YL	KW	675,000	21	CW	790411
487	790811	K1BH	5	YK7HV	200	2,100	14	SSB	790719
488	790811	VK7HV	200	K1BH	5	2,100	14	SSB	790719
489	790811	WB0WIW	2	HB9ALO	200	2,266	28	CW	790421
490	790916	JH8DEH	5	SP9AID	50	1,280	21	SSB	780924
491	790930	WB1FEH	5	KX6NT	200	1,360	14	SSB	790908
492	791011	WB2RCP	5	ZL1BKX	260	1,740	14	SSB	760328
493	791021	N4BP	5	VK6HD	100	2,980	28	CW	790701
494	791021	JF1YMA	0.8MW	JA1TCV		5,600	21	CW	790916
495	791021	K7LYT	2	KH6ILA		1,300	28	SSB	790415
496	791021	WB3JJL	2.5	I6JKW	120	1,760	21	CW	790531
497	791028	W8PCS	5	JA1ILN	100	1,280	21	CW	781014
498	791030	W9SCH	0.5	W1BJJ	150	1,620	21	CW	781025
499	791114	KA4AXS	4	LU7EKA		1,225	28	CW	
500	791114	W5BWF	2	ON8RD	130	2,475	21	CW	791107
501	791114	ON8RD	130	W5BWF	2	2,475	21	CW	791107
502	791114	W9SCH	0.36	N6BRT	100	4,600	21	CW	791108
503	791205	KA1CZF	5	JA2ETQ	120	1,360	28	CW	791101
504	791205	KA4FJD	2.5	OE1WYW		1,920	21	CW	790717
505	791205	WD4IUF	2.5	OE1WYW		1,920	21	CW	790715
506	791205	W8HZA	2	YO2BC		2,550	21	CW	791025
507	791212	JR3GPP	20	JH8IAT	0.1	6,500	50	AM	780712
508	791212	G4DYF	4	P29KC		2,750	28	SSB	791120
509	791212	N4BP	2.5	VK6IE	100	5,960	21	CW	791112
510	791212	KA0AZQ	100	KS6GU	2	3,000	21	CW	790223
511	791212	W0GK	1	JA3WBK	1	6,500	28	CW	791031
512	791212	JA3WBK	1	W0GK	1	6,500	28	CW	791031
513	791212	W1HR	35MW	G4BYE	15MW	219,400	28	CW	790703
514	791218	WB8VGE	3	KL7--	70	1,189	21	CW	781008
515	791218	N5BAK	2	KH6CHL		1,800	21	CW	790528
516	791224	WD6BYN	2	WN2GJY	240	1,257	21	CW	791126
517	791224	WB0WIW	4.8	YU3EO	150	1,040	14	CW	791215
518	800111	OK1DKW	6uW	G4FKL		1,241,667	21	CW	791115

NR	DATE	TO	POWER	WITH	POWER	MI/WATT	BAND	MDE	QSO DATE
519	800111	OK1DKW	3	JA3EQC		1,866	14	CW	780715
520	800111	KA4EDW	5	VK3NAC		1,800	28	CW	791229
521	800111	KA4EDW	5	JJ1BBQ		1,400	21	CW	800103
522	800122	KA8DFJ	2.5	PY2ABO		1,960	21	CW	790725
523	800122	WD5BUG	2.5	JA4AEZ	160	2,560	21	CW	791215
524	800204	WD8RYY	2.5	ZS1XR	100	3,360	21	CW	781106
525	800204	WD8RYY	5	VK3YT	125	1,960	14	CW	791029
526	800215	W2INJ	KW	PA0HRK	1	3,660	28	SSB	780314
527	800215	AA4MI	4	SP9KFM		1,246	28	CW	791227
528	800215	WD8MFP	5	JA1ADN	200	1,260	28	SSB	791213
529	800215	WD8MFP	5	ZL4KI	100	1,760	21	CW	800109
530	800215	WD8MFP	5	ZS3KC	150	1,500	21	SSB	800121
531	800215	K3NN	4	VK5FM		2,500	21	CW	790828
532	800215	W0OGJ	2	KG6JAQ		3,950	14	CW	750702
533	800224	KB5MM	5	ZS6RM	KW	1,880	14	SSB	791230
534	800224	WB7CFH	180	KA1CON	2.5	1,000	28	CW	791214
535	800315	WD9DUF	100	VK7NRT	5	1,880	21	CW	790813
536	800305	WB5MBS	1	ZL1LZ	70	6,900	28	AM	791030
537	800305	WA2BQI	2	N6OH	100	1,100	21	CW	791102
538	800316	WB9SBY	0.35	AD9X	200	1,029	7	CW	800203
539	800316	KA2AYK	2.5	I6JKW	40	1,085	21	CW	790214
540	800316	W8BAX	2	ON6FT	80	2,000	21	CW	781008
541	800316	KA4BCT	2	WB7QQM	2	1,075	21	CW	790126
542	800330	VE5ADL	2.5	KB6VW		2,100	21	CW	800319
543	800330	WD0HSP	1	KA1BPJ	100	1,285	21	CW	800319
544	800413	W6RFX	3	OE2APM	100	1,980	28	CW	800317
545	800413	KA1BTI	2.5	ZL2TX	100	3,717	21	CW	790319
546	800413	KA8HSL	70	WD4LOE	1	1,015	21	CW	800318
547	800413	KA8HSL	60	K5DDJ	0.4	3,125	28	CW	800316
548	800420	KA4JBA	2.5	G3RDQ	100	1,450	14	CW	800320
549	800504	KL7FDQ/7	2.5	JF1CEQ	200	2,320	21	CW	791202
550	800504	N1AOI	2.5	PY4PZ	200	1,000	21	CW	800421
551	800504	KA4DLC	0.742	KA8EKT	100	1,392	21	CW	800318
552	800504	KA8EKT	100	KA4DLC	0.742	1,392	21	CW	800318
553	800417	KB5DQ	100	SM5KAS	2	2,522	21	CW	791212
554	800517	N6HI	5	PA0GG	5	1,111	14	CW	800316
555	800517	KA4JBA	2	G3PIM	100	1,795	21	CW	800409
556	800517	VK3VEU	5	G4GLW	90	3,200	21	CW	800420
557	800517	VK3NQQ	5	G4GLW	90	3,200	21	CW	800420
558	800517	WB3KOZ	2.5	ZP5NW	180	1,560	21	CW	800204
559	800517	WD5BUG	3	G3PTO	100	1,433	7	CW	800129
560	800517	WD5BUG	3	P29EJ		3,000	14	CW	800408
561	800517	KA1CZF	5	VK2VQX	20	1,980	21	CW	791108
562	800517	WD4IUF	2.5	YU3TAN		1,920	14	CW	791111
563	800601	G4GJW	2.5	WD4PSQ		1,800	21	CW	790518
564	800601	JR1TTC	2	K7BA	800	2,600	14	CW	800505
565	800615	W2XQ	4	YU9RTW		1,113	7	CW	790101
566	800615	KA1EXG	2.5	G3YVR	150	1,320	21	CW	800523
567	800615	G3YVR	150	KA1EXG	2.5	1,320	21	CW	800523
568	800615	I4YDR		W6RFX	3	2,000	28	SSB	800422
569	800626	KA4EBW	1	XE1BEV	75	1,500	7	CW	800216
570	800626	KA4EBW	1	WH6AJB	60	5,500	21	CW	800304
571	800626	KA4EBW	1	KA4NNU/6Y5	80	1,200	3.5	CW	800620
572	800626	W2JEK	2.5	KL7JCE	180	1,300	21	CW	790420
573	800626	KB4VC	3	YU3AW	500	1,700	28	SSB	800330
574	800626	N8BFY	2.5	ZL1AFE		3,418	21	CW	800614
575	800708	KA5BEE	3.5	G4IGT		1,170	21	CW	
576	800708	AI1Y	2.3	YU7GST		1,990	14	CW	
577	800710	WD4NVN	2.5	SM6CVX	500	1,800	21	CW	800328
578	800723	WB1GNX	3	ZL2TX	100	3,000	14	CW	800607
579	800805	K1MKP	5	VK3BZ	150	2,044	28	CW	790321

NR	DATE	TO	POWER	WITH	POWER	MI/WATT	BAND	MDE	QSO DATE
580	800819	AI1Y	2.3	RU2RKN		1,793	7	CW	800313
581	800819	JK1PEC	1	KH6HHN	200	4,300	21	SSB	800404
582	800904	WD8OJC	5	PY1ZAD	160	1,010	21	SSB	800819
583	800904	VK3CIW	100	W2RDB	10	1,010	14	SSB	790930
584	800904	WA2PIP	75	OH2BUB	2	2,000	21	CW	800217
585	800904	W4ATC	250uW	K4CAW		320,000	432	SSB	800810
586	800904	K4CAW		W4ATC	250uW	320,000	432	SSB	800810
587	800904	W4ATC	500uW	K6PXT		5,000,000	50	SSB	791204
588	800911	KA4NNW	2.5	OK1APV		1,800	21	CW	800712
589	800911	KA4EBW	1	WP4BCX	75	1,500	28	CW	800902
590	800922	W5VJT	3	JA7AXB	2	3,100	21	CW	771116
591	801014	K7ETZ	2	ZS2AG	150	5,796	14	CW	790418
592	801014	WA1JVY	2	G4BUE	5	1,550	21	CW	791229
593	801014	WA2JVY	2.5	GM4FGD		1,240	14	CW	800928
594	801101	WA2JVY	3	GM3OXX	2	1,000	28	CW	801019
595	801101	VY1AU	0.25	KB6CO	0.025	7,012	28	SSB	800213
596	801101	VK3NQA	0.8	VK6NTM	0.6	2,130	28	AM	800308
597	801101	VK3NIO	0.5	VK6NTM	0.6	3,408	28	AM	800308
598	801101	VK6NTM	0.6	VK3NQA	0.8	2,840	28	AM	800308
599	801101	JG1YBC	60uW	JM1JVE		6,666	21	CW	800913
600	801119	WB1ESN	2.5	JH3LPT	150	2,683	21	CW	801001
601	801119	KB6CO	0.25	VY1AU	0.25	7,012	28	SSB	800213
602	801119	KB9OO	2	JA1EUV	100	3,100	21	CW	800314
603	801119	SM0GKF	5	VK7NRT	5	2,000	21	SSB	800507
604	801120	KA9CIM	2.5	DJ1FE		1,740	21	CW	800921
605	801130	WD0EGC	1	K1HZP	160	1,350	21	CW	801109
606	801130	K1HZP	160	WD0EGC	1	1,350	21	CW	801109
607	801203	K4AHK	5	VK4AWJ	KW	1,870	14	CW	800829
608	801203	K4AHK	5	ZS6DN	KW	1,600	28	SSB	801005
609	801203	K4AHK	5	JR1JFO	180	1,340	21	CW	801115
610	801203	VK5ZF	0.4	VK6NBR	1	3,725	28	CW	800823
611	801215	AE9K	5	PY1AYE		1,063	21	CW	800405
612	801215	PY1AYE		AE9K	5	1,063	21	CW	800405
613	810104	WD5HYD		VK7NRT	3	2,966	21	CW	800330
614	810104	WD0EPV	70	F9OB	2	1,950	21	CW	801118
615	810122	N7ARE	5	VK4AOK	120	1,500	28	SSB	790514
616	810122	KA0FDL	5	PY1BCF		1,050	21	CW	800721
617	810131	WA1YLN	2.5	VK4LG		3,840	21	CW	791101
618	810131	WB7UNJ	3	JA2IJV	20	1,933	28	SSB	791215
619	810131	WA9FWO	8	VK3MR		1,088	21	CW	800618
620	810131	WB4RRA	4	VK5CU	200	2,621	14	CW	801007
621	810131	WD5ITK	3	GM4GNR	70	1,466	28	SSB	800325
622	810131	WB3KOZ	3	DK5EZ	800	1,300	7	CW	801222
623		JA1BBU					28	CW	000000
624		YV1BQ					28	SSB	000000
625		WB8BSB					21	CW	000000
626		W6SKQ					21	CW	000000
627		K4KBL					21	CW	000000
628		OK1DLD						CW	000000
629		WD5BUG					14	CW	000000
630		WD5BUG/4					14	CW	000000
631		AG2A						SSB	00000
632	810409	WA2KSM	2.5	I3XTY	2.5	1859	21	CW	800409
633	810415	WB1ESN	1.5	OK2BEH	100	2,537	14	CW	800606
634	810421	VE5ADL	2.5	LA2FY	10	1,450	14	CW	800808
635	810425	KL7DG	5	PY1VT	100	1,680	21	CW	810215
636	810429	N1ABS	5	JA8FXO	200	1147	21	CW	791118
637	810430	AI2I	5	JA3YKC	150	1,320	21	SSB	800622
638	810511	KB9JJ	2	VK3BCA	200	4802	14	SSB	810401
639	810511	KA6NXU	2.5	KA4GRX	100	1423	21	CW	
640	810513	WB5SOO	2.5	VK6NIC/3X		2,090	21	CW	810218

NR	DATE	TO	POWER	WITH	POWER	MI/WATT	BAND	MDE	QSO DATE
641	810515	KA5FQX	1	VK3XB		9071.8	21	CW	
642	810521	WB9VGJ	5	AH2E		1,473	28	SSB	
643	810523	KA4IUS	5	ZL2MM		1,540	21	CW	
644	810606	WA1YIO	1	UA4BHP	100	4,900	21	CW	
645	810606	WD8RYV	1	KA6DOQ		2,445	21	CW	
646	810606	WD4BLU	1.5	UA6HNM		3,658	14	CW	810502
647	810611	KA1CZF	2.5	KH6XX		1,957	7	CW	
648	810919	WB1ESN	4	PY1ZAE		1,200	28	CW	810412
649	810629	WB5SOO	2.5	PY1MEB		1,921	21	SSB	810626
650	810721	K8IF	2	EA9GJ		2,042	7	CW	810531
651	810721	VK2VVA	2	VK6NLU	10	1,004	28	CW	800705
652	810731	K4KJP	0.001	V2EQR		45,000	432	SSB	810731
653	830823	UY5OQ		WD4DSS	1.5	3,750	21	CW	800530
654	810823	WD4DSS	1.5	UY5OQ		3,750	21	CW	800530
655	810830	KA7FEF	2	VK2VVA	2	3,843	28	CW	810221
656	810830	KA7FEE	2	VK2VVA	2	3,843	28	CW	810221
657	810916	W0GNV	1	WB2FQN	150	1,630	21	CW	810902
658	810917	WA2JHN	0.5	KA4EQW		2,130	7	CW	811008
659	810923	N5CLD	1.62	AH6BA	180	2,315	21	CW	810821
660	810924	WA1VVX	1	OK2BUJ		3,850	21	CW	810908
661	811105	VE7DXU	0.25	K3TKS	1.5	9,424	21	CW	821019
662	811105	JJ1AIN	0.88	AH6A	200	4,995	21	CW	810813
663	811105	VE6AAN	1.75	GI3JVJ		2,285	14	CW	810416
664	811106	N4VC/4	3	AL7C	QRO	1,000	50	SSB	791117
665	811106	WB5SOO	2.5	VK1NDO	10	3,560	28	SSB	810823
666	811106	G3ZOH	0.5	W7ITN	60	9,400	21	CW	810801
667	811106	KA1FEX	1.25	ZL2AWW	100	7,380	21	CW	810913
668	811107	KE8P	3	JA3KGC	10	2,333	21	SSB	800313
669	811107	WB4SXX	0.75	VK4UR	QRO	12,930	14	CW	801012
670	811107	KA1MF	1.5	UO5OBC	QRO	3,000	7	CW	800831
671	811107	WB3HNK	1.5	PA0OGY	QRO	2,537	21	CW	780911
672	811107	KA5HEK	2	DA1NP	QRO	2,628	28	SSB	810219
673	811108	WB6WKM	1	JA2BWD	100	5,075	21	CW	780802
674	811117	WB3HLH	2.5	JH3QYD	20	2,440	28	CW	800225
675	811117	N1BOM	0.95	K0UBA	5	1,075	21	CW	811018
676	811117	KC9BT	100	ZD8FBI	2.5	2,465	21	CW	801204
677	811118	W6RCP	2	VK3VEV	5	3,750	28	CW	000000
678	811123	VE3LRB	2	KA6JEC	10	1,812	21	CW	800629
679	811123	W9ITV	2	VQ9TT	100	4,718	21	SSB	800421
680	811123	W9ITV	2	G4BUE	5	1,994	28	CW	791117
681	811206	WB9ZDN	2	ZS2RM		5,151	21	CW	791205
682	811214	N0CTW	1	KA2GPG	1	1,000	21	CW	811104
683	811214	VK1BB	3	JK1IZF		1,643	21	CW	810513
684	811214	KA0BLE	75	VK2NEC	9	1,070	21	CW	780325
685	811220	KC4HX	1	WA6TAF	160	2,175	14	CW	810525
686	811220	HB9BOW	50	PA0DST	0.02	19,500	14	CW	790331
687	811220	AE5V	2	SM5CMP		2,462	14	CW	810915
688	811220	KD6OQ	2.8	ZL2UW		2,322	7	CW	
689	811220	ZL2UW		KD6OQ	2.8	2,322	7	CW	
690	811220	KB2ZQ	2	WB3GPR/6	60	1,300	28	SSB	81
691	811221	KB1W	3	DL9CQ	QRO	1,302	28	CW	810118
692	811229	WB1HIH	0.05	W5VZK	QRO	40,000	7	CW	811129
693	811229	KH6OA	5	ZS6FG	QRO	2,501	28	SSB	810505
694	811229	WA4QFJ	1	KA6HXJ	100	2,340	21	CW	81
695	811229	WA7YRV	5	VK3NSY	QRO	1,631	28	SSB	800120
696	820116	W8BCE	1.5	KD6O	QRO	1,200	21	CW	811106
697	820116	AF3Z	3	DJ2ZI	QRO	1,333	28	CW	811117
698	820116	EA1AER	3	W0QGI	QRO	1,466	28	CW	810415
699	820116	W6MUL	50MW	AL7G	5	44,000	28	CW	811207
700	820116	ZS6P	2	W9NAX	QRO	4,288	28	CW	810916
701	820116	VE6ACH	1.5	K4JSG	QRO	1,433	21	CW	810408

NR	DATE	TO	POWER	WITH	POWER	MI/WATT	BAND	MDE	QSO DATE
702	820118	KA9JKK	1	KA7HNR	QRO	1,900	21	CW	811110
703	820118	EA8EY	1	ZL4KI	QRO	12,100	21	CW	800831
704	820130	DA2VK	1	KA5AGD	5	4,800	28	SSB	801002
705	820130	N2CNI	2	ZL2MM	QRO	4,400	21	CW	811120
706	820131	W6JHQ	1.5	WA1YLN	1.5	1,590	21	CW	811018
707	820131	WA3YZW	1.5	G4DZW	1.5	2,313	21	CW	790121
708	820205	N4FLC	1.5	AE7N	QRO	1,386	14	CW	820116
709	820213	WB8BHU	1.5	VK1FT	QRO	6,400	21	CW	790818
710	820213	K4KJP	75uW	W4ODW	800MW	168,000	1296	CW	811214
711	820213	W4ODW	0.8	K4KJP	75uW	168,000	1296	FM	811214
712	820213	JH6FZN	20MW	JH8ANO		54,652	50	AM	810805
713	820213	WA4PGM/0	200MW	EA7BZN		21,750	28	CW	811223
714	820213	KA4TQA	1.5	DL7CS	QRO	3,072	21	CW	820126
715	820213	VK2PCV	4	N1BAX	QRO	2,500	28	CW	810419
716	820214	WB8CTC	2	VQ9WE	QRO	4,700	21	SSB	800409
717	820227	WB6UNH	0.1MW	WB9LTY	QRO	19,250,000	21	SSB	790615
718	820227	WA2SXF	2	VK1WH	QRO	4,925	28	SSB	811205
719	820308	KA7GXO	2.5	JH1PQD	5	2,134	21	CW	811218
720	820322	WD9EGW	2.6	3D2ER	QRO	2,746	14	CW	810419
721	820322	N6ESV	2.5	ZL1AOC	QRO	2,640	28	SSB	820111
722	820322	GW3SB	1.5	W8FWQ	QRO	2,200	21	CW	800902
723	820325	VK2PY	70	ON7QG	10	1,200	21	SSB	810309
724	820331	N6EEG	200MW	N0ABH	50	7,350	28	CW	820315
725	820426	KA1CZF	2	3B8CF		4,605	14	CW	820226
726	820426	KG1K	2	KD6PY	KW	1,346	14	CW	820320
727	820426	KA1CDC	0.05	KG1F		2,920	7	CW	820125
728	820426	K4BNI	2	VK5NQ	QRO	4,993	21	CW	800817
729	820509	WB0URA	0.75	9J2BO	5	11,012	28	CW	820116
730	820509	WB6APP	6	ZL2KT		2,253	50	SSB	810313
731	820511	VK3BXA	1.2	G6FB	150	8,705	21	CW	790831
732	820516	K4KJP	0.03	W4EQR	30	1,500	220	SSB	820412
733	820526	JH1MBQ	0.012	JH8ISF		58,000	50	AM	820803
734	820527	K0VV	0.5	DJ0EU	100	9,268	28	CW	810907
735	820527	KA3CNX	2	VK3BJB	400	5,160	28	SSB	820108
736	820613	WD4LOO	0.95	VK3KS	QRO	10,534	21	CW	800416
737	820613	WB4BBH	2.5	VK4VU	QRO	3,667	21	SSB	800302
738	820613	WB4BBH	5	JR2LFW	QRO	1,515	21	CW	801130
739	820624	KA5NLY	2.75	VK5NPS	30	3,485	21	CW	820608
740	820701	WB3HNK	3	VP8ML	QRO	2,153	28	SSB	820307
741	820721	G4NNJ	0.85	OH6FW	15	1,476	21	CW	820316
742	820721	VK5NPS	30	KA5NLY	2.75	3,485	21	CW	820608
743	820730	WB2IPX	2	UA0CED	QRO	2,498	28	CW	791108
744	820730	N5AE	2.9	VK4UR	QRO	2,826	14	CW	810914
745	820730	W6YVK	2.5	3B8CF	QRO	4,501	28	SSB	810323
746	820731	JT1BG/2	5	LU1DGZ	QRO	2,271	14	SSB	800708
747	820731	G3VTT	0.1	VK5QG	QRO	100,730	14	CW	820205
748	820731	KA8OBP	2	KA6SIQ	2.5	1,030	21	CW	820525
749	820731	DF5OQ	5	N5ALS	QRO	1,048	28	CW	810321
750	820808	N1AIS	88MW	W5PIZ	50MW	22,334	28	SSB	820404
751	820808	N1AIS	25MW	N2CJP/4	100MW	19,176	144	SSB	820706
752	820808	N1AIS	75MW	W1BJ	QRO	2,787	432	CW	810821
753	820813	K4KJP	2.2	I7IXR	QRO	2,537	28	CW	820301
754	820830	W4MNZ	5	ZK1AA	5	1,224	50	SSB	790503
755	820830	KA7KLH	2	JM1JIV	200	2,547	21	CW	811226
756	820830	KA1IOV	2	EA1BTE	QRO	1,602	21	CW	820707
757	820830	K4KJP	250uW	W4EQR	10	176,000	144	SSB	820827
758	820830	JR1TXR	2	LA3UL	QRO	4,505	21	CW	820329
759	820830	JF2MBW	0.25	JR6RWX	20	3,208	50	CW	820628
760	820909	WB5FCO	1.5	UA1OSA	200	3,558	14	CW	760621
761	820909	WB5FCO	1.0	JH1APK	QRO	6,907	21	CW	770414
762	820926	SM6DEC	QRO	K8LJQ	0.2	20,595	--	--	000000

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