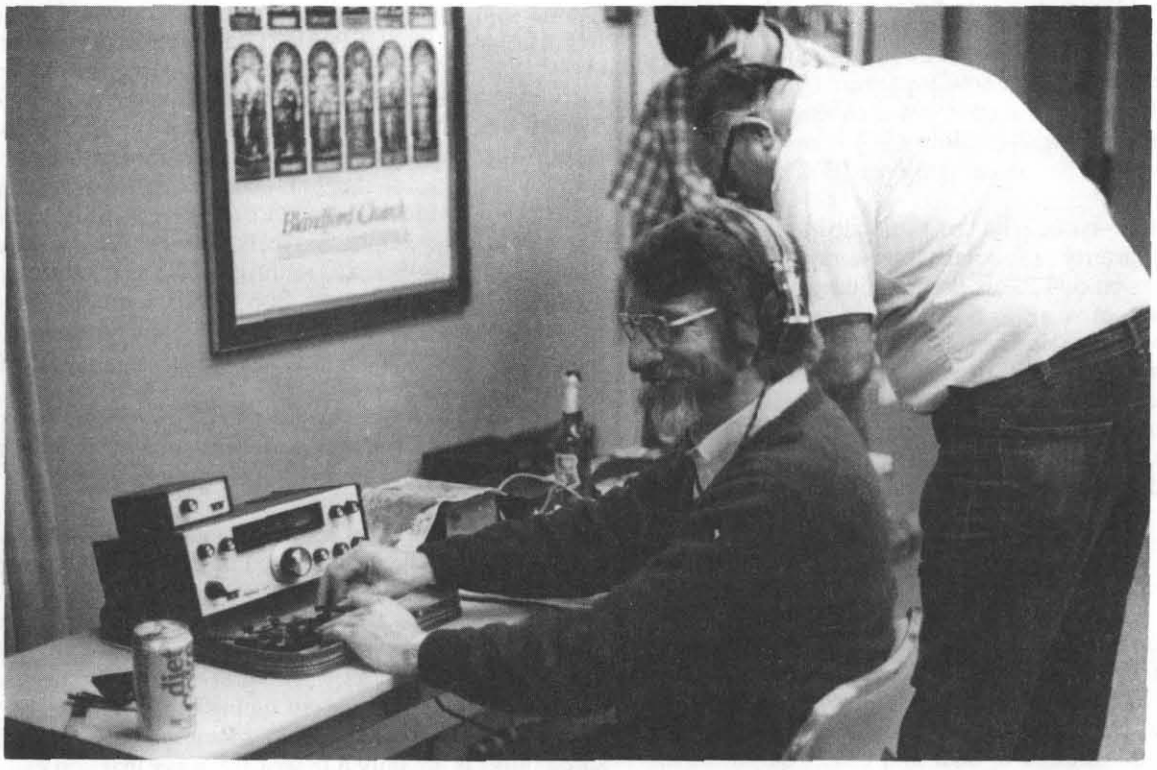
QRP Quarterly

Journal of the QRP Amateur Radio Club, International

April 1988 Volume XXVI Number 2



ARCI President Jim Fitton, W1FMR was one of the many operators at the QRP station set up in the QRP hospitality suite at the Dayton Hamvention last year. The station will be set up again this year, so if we don't see you there, maybe you'll be able to work the station.

Contest Results
Holiday Spirits Homebrew Sprint...p. 20
Winter Fireside Sprint...page 21

ARCI NEWS

Editor's Word

Paula Franke, WB9TBU

I hope this issue doesn't get put too late. Things at the homestead here have been a little shaky since last issue. I had some semi-minor surgery the week before Christmas, the OM just spent a stint in the hospital suffering from complications of Crohn's Disease, and now, with deadline time breathing done my neck, I've been diagnosed with mono. My part-time job at the newspaper is rapidly turning into full-time, especially if you count the night-time meetings that need to be covered. Yeah, kids, it's been a fun time here!

Needless to say, radio operating time is at a premium, but I still try to check in to the nets as often as possible to keep up with what's going on with the club. Saturday morning NEN and SUnday evening TCN are now my tenuous link to sanity! I've been noticing that 80 meters on Wednesday nights, after the GLN and GSN, has turned into a QRP bonanza--nothing but QRP signals as far as the ear can hear (OK, maybe I exagerate a bit!)

I want to thank everyone who has responded to the editorial needs of the Quarterly, especially those who have been submitting articles on disk. This is such a time saver that my typists have a lack of work to do (I'm sure they aren't complaining!) I also appreciate the letters of comment from the membership. I'm still trying to polish the rough edges to make this the best magazine possible. Thanks to all the members who have taken the time to offer input. The magazine is only as good as those who contribute. I'm glad to say, we have some pretty good contributors. Thanks to all!

DXpeditions

PJ0M-Saba Island

An expedition to Saba Island, manned by 6M DX Society members Mario Karcich WB2CZB, Jim Holt N3AHI, and John Laing W1EXC, has been finalized for July 7 through 14, 1988. The special callsign PJ0M will be used. Operation will be on all bands, 80 through 6, SSB and CW. Equipment includes an FT757, two TS680s and amps, with wire antennas on HF and 3 and 5L beams on 6.

Particular attention will be paid to exploring 6M multihop paths to the U.K. and Europe as well as to the Americas. In addition, WB2CZB, member of the QRP ARCI, will actively solicit QRP contacts. QSLing is via Mario K2MUB.

Event: QRPvention
Place: Belton Inn, Dayton, Ohio
Dates: April 27-May 1
(give or take a couple of days)
Be There!

President's Message

Jim Fitton, W1FMR

It is my pleasure to serve in the capacity of president of QRP-ARCI for the next two years. Thanks to the officers and Board of Directors for the vote of confidence. Let me tell you a little about myself. I am 48 years old, work for AT&T in North Andover, Mass. and live in Salem, N.H. I am single, have two teenage daughters living nearby and, like everyone else, try to balance the activities of daily living with an overwhelming compulsion for this magnificent hobby. Most often, however, daily living loses out. I view this position of president as a tremendous opportunity to achieve personal growth and expansion from learning to manage an international organization. QRP-ARCI has a fine staff of talented and enthusiastic individuals dedicated to running the club in a professional manner and having fun at the same time. I have personally met all of the officers (Except for Bob Brown) and most of the Board members. On each meeting, I have come away with the same thought. How lucky we are to have that caliber of individual on the staff of QRP-ARCI. The Board of Directors, for example, has Mike Bryce, who writes for 73 Magazine; Paula Franke, Radiosporting Magazine; and Rich Arland, World Radio News. Bob Brown, secretary/treasurer, is just finishing a book for us QRPers on propagation techniques, and vice-president Fred Bonavita's reputation speaks for itself.

If you follow QRP-ARCI month by month, you will notice constant subtle changes in areas such as awards, contesting, the QRP Quarterly (or QQ as it is called) and net operating.

In addition, officers board members, project managers, and helpers are continually informed of the latest in QRP through communication memos issued frequently by Bob Brown, our secretary/treasurer. The club is always on the lookout for creative ideas and talented individuals to promote the ideals of QRP. Projects, such as working at the information booth at Dayton, doing a few pages of typing for the Quarterly, providing copies of club documents, or locating parts for club sponsored projects are only a few of the ways that you can participate.

I believe, however, that it is the nature of any club or organization to self-destruct because it is composed of individuals who each have a slightly different idea of what the club should be doing. If left alone, the club would certainly pull itself apart. Therefore, it is our goal to get everyone thinking along the same lines. This is the job of the QRP-ARCI staff.

Sometimes, it takes guts to make the "gutsy" decision. Because it may or may not be the right one, the fear of being wrong has many of us either hesitating over the big decision or making the gutless decision. This is where we must support each other. The manager who takes the responsibility must feel free to make the big decisions.

Classified Ad Policy

The Quarterly will accept short "classified ads" from its members who desire to sell equipment and other items of interest. They will be printed on a space available basis. Send information to the editor labeled "QRP Quarterly Classified".

The QRP ARCI is a non-profit organization dedicated to increasing world-wide enjoyment of QRP operation and experimentation. QRP, as defined by the club, is 5 watts output CW, and 10 watts output PEP.

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Dayton 1988 QRPvention!!!

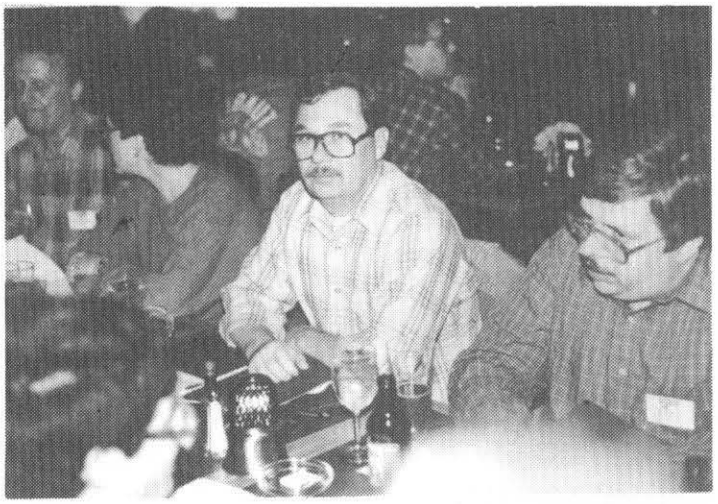
The 1987 QRP forum at Dayton was well attended with more than 150 QRPers filling the room to standing room only.

All photos courtesy Tom Root, WB8UUJ.

Red Reynolds, K5VOL, has put together the following QRP event schedule for the Dayton Hamvention:

Thursday	12 noon	Hospitality suite opens, Belton
	8 p.m.	Antenna forum, Belton
Friday	7 p.m.	QRP dinner
	10 p.m.	Hospitality suite opens
	10 p.m.	Homebrew "show and tell", Belton
Saturday	8 a.m.	NEN check-in
	????	QRP Forum, Hara Arena
	5:30 p.m.	BOD meeting
	5:30 p.m.	Hospitality suite opens
	7 p.m.	Pizza party, hospitality
	8 p.m.	Official ARCI meeting
	9 p.m.	Awards, managers' reports, Belton
Sunday	5:30 p.m.	Meet in lobby/coffee shop
	6 p.m.	TCN net check-in
	7:30 p.m.	Remaining members' QRP dinner
	9:30 p.m.	Planning meeting for 1989
Monday	????	Departures

The hospitality suite will stay open each evening for general use. An antenna will be available to use with your own rig or the club station.



Outgoing ARCI president Les Shattuck, WB2IPX, eyes the camera as he waits for the food to arrive at the QRP banquet.

Zack Lau, KH6CP/1 and George Dobbs, G3RJV attempted a new kilomiles per watt record as they try out equipment in the hospitality suite. Perhaps we should call it "centimeters per watt"!

This photo captures a rare occurrence: a clear shot at the QRP ARCI booth! Crowds were usually so intense that it was difficult to move down the aisle.

Rooms are still avaliable for the convention. Myron Koyle, N8DHT, is in charge of room reservations this year. After discussing the situation with officials at the Belton, Myron has come up with the following reservations procedure:

Send the following information to Myron: your name, call, address, and telephone number where you can be reached or a message left; which nights you'll need a room (several QRPers show up on Thursday and don't leave until Monday); a check made out to the Belton for a deposit of $55; two to three SASEs; name, call, address and phone number of any roommates.

Myron will record your name(s) and deposit, then forward both to the hotel. The hotel will send confirmation to him; he'll record the verification and send it on to you in one of your SASEs. That way you only have to work with one person and the hotel only has to work with one person, minimizing the chances of a foul-up.

If you have already made a reservation with the Belton and didn't go through Myron, be sure to check with him to make certain your name is on his list. It is his list that the hotel will use to hold rooms.

If you're already certain who your roommate is, only one of you needs to contact Myron and send in a deposit. But, please remember, if the person who made the deposit cancels out and gets his/her money back, you're in trouble because the hotel may cancel the room reservation, So, it is very important that as soon as you know who your roommate is, that the two of you work out that contigency.

Contact Myron Koyle, N8DHT, at 1101 Miles Ave. S.W., Canton, Ohio 44710.

The sign says it all for the GQRP group that came to Dayton well prepared to spread the word about homebrewing.

Lynn Pastor-Hawkins, KA8MUT, (283 Sekitan, Addyston, Ohio 45001) has taken on the job of publicity manager for the Dayton Hamvention. She will be controlling the sign-up register at the hospitality suite and will head up the committee to handle membership applications at the booth. She'll be needing volunteers to who will be able to take a two hour shift at the booth each day.

Commercial booth #236 has been obtained. Volunteers are also needed to staff the booth to sell whatever we'll have on hand as well as to spread to QRP word. Contact Jim Fitton, W1FMR.

What If...?

by Paula Franke, WB9TBU

As I sit here, putting the final touches on the April issue of the Quarterly, the Winter Olympics in Calgary are in progress. I note, with varying degrees of interest and amusement, the demonstration sports which have been included this time around.

Aerial ski jumping (commonly called "hot-dogging", I believe) seems to be geared toward those athletes with a death wish. Disabled skiing was very interesting to watch; I am impressed with the skill and resolve that the handicapped skiers demonstrated.

But..."ice sculpture" as a sport? I suppose times are changing. One tends to wonder.

About this same time, I chanced to talk with our ever diligent secretary/treasurer Bob Brown, NM7M. Bob, as some of you may know, has been trying for some time to get tax exempt status for the ARCI. Having gone through the same thing in recent years myself when organizing a local historical society, I am familiar with how truly difficult this task is.

There are very few justifications for granting tax exempt status to an organization such as educational, scientific, or sports-related. Unfortunately, the IRS sees us as essentially a social organization--for the time being. Bob is assembling evidence to prove a more accurate purpose for the ARCI.

But "ice sculpture" as a demonstration Olympic sport got my mind working in a semi-bizarre manner. What if amateur radio was declared a demonstration sport for the 1992 Olympics? What sort of events might be included?

Before you think your editor has been inhaling the fumes from the spray adhesive while pasting up this issue, consider this: in some foreign countries (notably the USSR), amateur radio is indeed a sport. Check your March issue of QST. The Soviets hold award competitions in events such as code copy and direction finding. I remember, several years ago reading a similar article, in one of the ham publications, about 'radiosporting' in the USSR, with local and regional competitions culminating in nationals in which hams compete in a field day type contest, using homebrew gear and antennas. In keeping with the Soviet's concept of sport, there are hams attaining the level of master of sports, just as do figure skaters and hockey players.

I recently saw a new ARRL promotion video, which included a bit about how the Japanese have combined ham radio with sport into something that appeared to be a biathalon, combing ham radio and cross country skiing. Who knows how many other countries in which this is happening?

"Your point, editor, please!" OK, here's my point. It seems to me that ham radio as a legitimate sport in this country is not out of the realm of possibility. The structure for competition is already in place, albeit not organized at this time. There is field day, code competitions at various conventions and hamfests, and foxhunting.

As a matter of fact, I believe that QRPers are the true sportsmen in the hobby (is my bias showing?), in that we generally don't take advantage of the "advantages" of the hobby (i.e. commercial QRO rigs and 200 ft. towers with 80 meter beams). Nor are we, generally speaking, a group of "appliance operators". Ham radio, as a sport, cries out for homebrew rigs, test equipment and antennas, as well as non-commercial power sources. Sounds like QRP, right?

OK, here's the question. What event(s) would you design for amateur radio as a demonstration Olympic sport? Think about it, write a description and send it to me. I'll put the responses together for a future issue of the Quarterly.

1987 QRP Field Day Results

by Ade Weiss, W0RSP
833 Duke St. #83
Vermillion, SD 57069

Well gang, QRP Field Day '88 is just around the corner and it is time to survey the results of Field Day '87 to refresh your memories of the fun and excitement that can be had by adventurous QRP'rs who head out to parks, farmer's fields, abandoned fire-towers, beaches, and rugged mountain wilderness in search of a real QRP "high".

The three categories showed some impressive increases in all-time high QSO records and the "Top-Twenty Club Standings" showed a considerable amount of shuffling with the previous rankings sliding downward under pressure from this year's results.

In the one-watt trophy category, an average turn-out of eight milliwatters saw KM8X, a veteran operator, at the top with 224 QSOs and three others in the 100-200 QSO range. Bear in mind that we're talking about less than one-watt to a temporary antenna!

Entries for the five-watt trophy include five above the 300 QSO level. Trophy winners KR2Q and WB2BHC managed a new all-time high of 558 QSOs (excepting "big-gun contest pro" N4BP's phenomenal 999 QSOs in 1981 and 1046 QSOs in 1984).

The club category went wild, as a glance at the Top-20 Club scores indicates. Last year's club plaque winner, W1ECH, The Zygo ARC, posted 1263 QSOs to top the 1170 racked up by N4BP in 1982, but the big news is that the Zuni-Loopers (W6SKQ) avenged their previous humiliation at the hands of HAH! (K9NG) by marshalling 646 QSOs at the milliwatt level for a new all-time high club score just a hair in front of W1ECH.

Is there no upper limit for one-watt scores? What is going to happen once the sunspot cycle heats up, now that these battle-hardened veterans have the skill and knowledge to overcome relatively poor conditions? It's exciting to think about! The reports from entrants tell the same story as in past years--some frustration, but a lot of fun despite setbacks or poor showings. As usual, everyone is committed to a better showing next year.

Station	CW	SSB	Total	Total
One Watt Trophy				
#KM8X	223	1	224	2838
WB7BIV	115	73	188	2406
K3DML	184	0	184	2208
NJ7M	133	0	133	1746
W0RSP	72	0	72	1014
W5TTE	54	0	54	798
KA5NLY	0	24	24	438
KA7BCD	13	0	13	306
Five Watt Trophy				
#KR2Q	439	119	558	3498
W0UY	191	244	435	2760
AA2S	364	0	364	2184
KO5I	0	325	325	2100
NI1L	211	112	323	2088
WB0RXF	213	24	237	1572
W4XD	228	0	228	1518
WA8TCG	0	218	218	1458
AA4CO	149	36	185	1260
WD5GLO	171	0	171	1176
KW4M	160	0	160	1110
NR5A	143	0	143	1008
W6YVK	49	98	147	882
NM7N	219	0	219	807
N4KEZ	74	29	103	768
KE4KE	13	75	88	678
N8AFP	2	60	62	522
WR5Q	49	0	49	444
N9EX	40	0	40	390
K1KDG	29	24	53	318
KT1H	2	19	21	276
KC4AVR	0	16	16	246
Clubs				
#W6SKQ*	405	241	646	7902
W1ECH	569	694	1263	7728
K7SS	423	723	1146	7026
K9NG*	442	98	540	6630
W6JTI	515	360	875	5400
KE4T	380	352	732	4542
K2ECQ	356	239	595	3720
KA9HAO	333	79	412	2622
N5EM	404	1	405	2580
NU4B	375	5	380	2430
W3TS	313	0	313	2028
VE4AKI	32	51	83	648

*#Award winners *one-watt club entry*

[Scoring: number of QSOs X power multiplier (under 1 watt = X8, 1-5 watts = X4) X 1.5 for battery or polar + 150 for full portable. Awards only to full portable stations using antennas erected on FD and operating completely independent of a.c. mains and home facilities.

Top-20 Club Scores 1979-1986

Call	year	QSOs	Total
1. W6SKQ	'87	646	7902
2. W1ECH	'87	1263	7728
3. N4BP	'82	1170	7170
4. K7SS	'87	1146	7026
5. K9NG*	'87	540	6630
6. K9NG*	'86	533	6546
7. K9NG*	'85	503	6186
8. W1ECH	'86	904	5574
9. W6JTI	'87	875	5400
10. K8BX	'81	854	5274
11. K9NG*	'84	418	5166
12. W6JTI	'86	829	5124
13. W3TS	'85	776	4806
14. KE4T	'87	732	4542
15. N6UU	'84	721	4536
16. K8IF	'79	732	4488
17. W6SKQ	'86	712	4422
18. N2RI	'83	699	4344
19. N5AF	'82	685	4260
20. K8IF	'82	684	4254

**one watt club entry*

QRP Field Day Trophy Winners

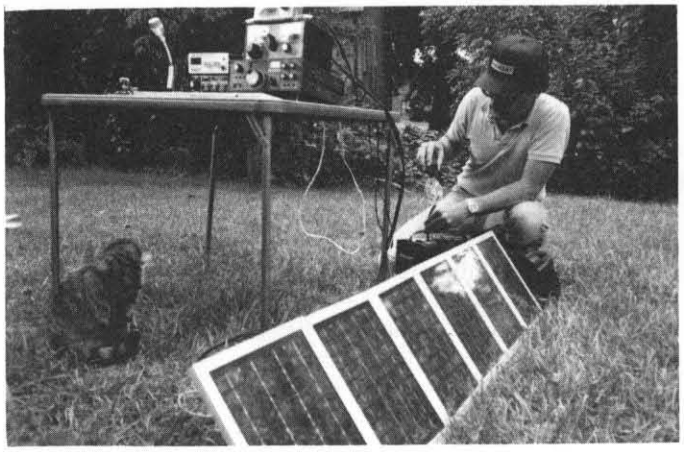
Five Watt Class

year	call	QSOs	Total
1970	K4OCE	220	1470
1971	WA6ABP	137	1175
1972	W7DRA	55	562
1973	WA5WYO*	79	1098
1974	W0IYP	439	2748
1975	WB8OSM	220	1470
1976	K6TG	128	918
1977	N2AA	389	2790
1978	WA4IAR	442	2804
1979	WD5BKO	287	1872
1980	K1JX*	741	9042
1981	N4BP	999	6144
1982	N5EM	259	1704
1983	WA0VBW	435	2760
1984	N4BP	1046	6426
1985	W0KEA	486	3066
1986	WA9IRV	500	3150
1987	KR2Q	558	3498

**one-watt entries adjusted to x8 multiplier*

One Watt Class

1981	K5WNH/0	239	3018
1982	---	---	---
1983	N0BYC	241	3042
1984	W8ILC	425	5250
1985	KN1H	373	4626
1986	KK7C	236	2982
1987	KM8X	224	2838



N4KEQ checks the charge level of the deep-cycle battery and the solar panel which powered the Argosy setup at N4KEZ.

The first telegraph message transmitted by telegram was "What hath God wrought?" in 1844.

Updating the Compact 20 Meter CW Transceiver

by Rick Littlefield K1BQT
P.O. Box 114
Barrington, NH 03825

[Editor's Note: Homebrew enthusiasts got a welcome surprise when the June 1987 issue of ham radio showed up with a feature article on a compact 20-meter transceiver.

Closer inspection, however, showed many flaws and omissions in the piece, and even the corrections run in the July issue failed to report all of the improvements the author had made on his original design.

The QRP Quarterly is pleased and priveleged, therefore, to offer this update of the "Compact 20-Meter CW Transceiver," by Rick Littlefield, K1BQT. Not only does it correct the errors of the original piece, but it expands on topics in the original and offers circuit modifications and improvements -- including some the author says "should have been there." It's interesting that a major ham radio magazine can devote 13 pages to an article, yet not manage to get in all of the details the author says should have been included.

Rick Littlefield says of himself, "Since I am into building small transceivers and other compact 'gizmos', my interests very closely track those of many QRP enthusiasts." We hope he will submit future articles to the Quarterly. -- W5QJM]

Designing a radio is a never-ending task; given enough time to think about it, there is always something to improve. The "Compact 20-Meter CW Transceiver" is no exception, and over the past several months, I discovered a couple of ways to make it better.

Because of limited space, my original article in ham radio omitted many details -- including some that should have been there. Also, there were the inevitable errors. This article will bring readers up to date, filling in gaps, correcting mistakes and presenting the latest design change.

The first improvement is in the driver stage (Q10), which is changed to Class C operation. This lowers cost, simplifies construction and tune-up, and replaces the hard-to-find DV-1201K power FET with a common bi-polar device.

This change also increases the driver output by 300mW to one watt. T3 is changed to match the lower impedance of the new driver (see details below), and the bias network is eliminated. The output circuit remains unchanged. See fig.1.

One of the strange circuits in this design which needs explanation is my VFT, or Very Fine Tuning. It is basically a fine-tuner or 'clarifier' control -- not a full-blown RIT. Many readers were confused by the 10K linear-taper pot and the unconventional way it is wired into the circuit.

The pot actually functions as a small-value, variable capacitor. The internal parts form the variable element and the metal case surrounding the pot forms a second, fixed element. Using a pot this way has proven itself in several applications. Linearity and temperature stability are excellent, and the cost is very low.

Several changes have been made in the circuit board patterns published in ham radio to accomodate the new Class C driver stage. (See fig. 1) For those wishing to purchase ready-made PC boards, updated versions are available from RadioKit. Details will be at the end of this article.

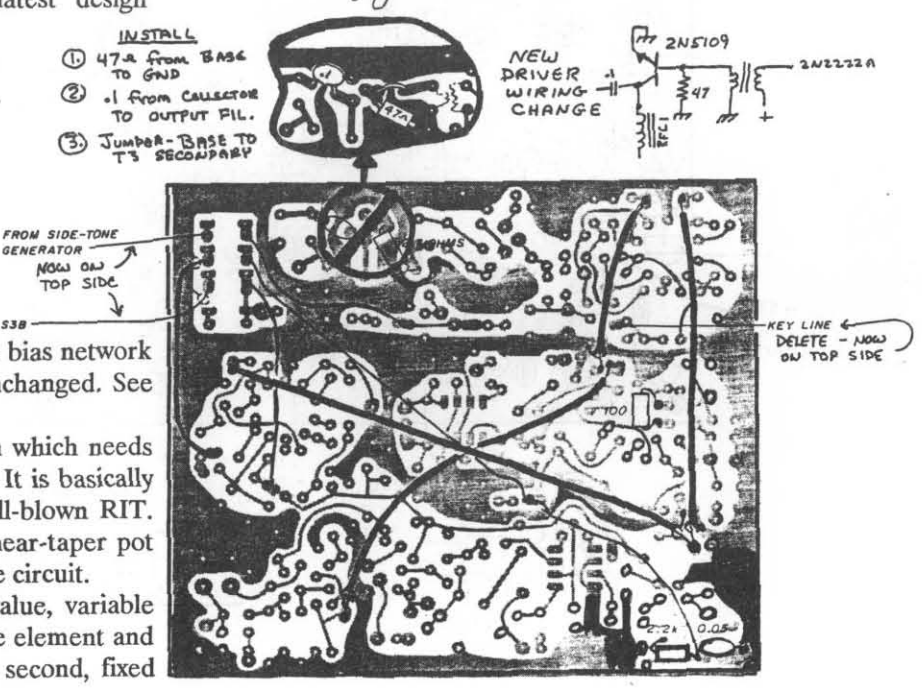
For convenience, the CW filter and control module have been combined on a single board (see fig. 3). In addition to modifying the main board for the Class C driver, the updated version provides connections from the top of the board for relay K2, CW filter in and out, and the key line to U5.

The power amplifier board was changed (see fig. 4) so the 2K meter-adjust pot stands on end, making it easier to adjust after PA installation.

Nobody's perfect, and this was a complex article. Consequently, between the writer (me), the magazine's draftsperson, two editors and the copywriter, there were plenty of opportunities to drop the ball. And we did! Here is an update on missing information:

1. Semiconductor numbers were for everything except those located on the main board. CW filter IC = 1458 dual op-amp. Q7 = 2N5109 (replaces DV1201K). Q8 = 2N3906. Q9 = MPS2222. Q10 = BS-170 (switching FET). Q11 = MRF479. K1 and K2 are minaiture 12v, dpdt relays (radio Shack and others).

figure 1



2. Omitted inductor information on the PA module is: T4 = 9t. #26 enam trifilar on FT37-61 core (9:1 balun). T5 = 1t. primary, 3t. secondary (see below). L7 and L8 = 12t. #26 spread to occupy 80% of T37-2 toroids. RFC2 = 3t. #26 on VK200 or 5t. #24 on FB43-802.

3. RFC1 on main board is 8t. #26 on FB43-802. The modification to the driver stage resulted in revamping T3 to 25t. #32 on FT 23-63. Secondary is 5t. #32 on cold end.

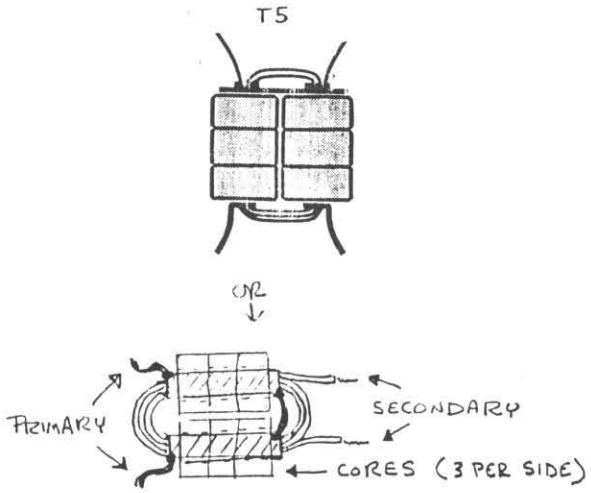
4. The draftsperson omitted the key locations on several ICs, making positioning for installation difficult. The corrected parts placement drawing for the main board reflects these changes (see fig.2).

5. Also on the main board parts placement diagram in the original article, a 1N914 diode is shown near the 20K pot (S- meter zero). This should be designated Z1, a zener diode. This same diode was mislabeled as CR1 on the schematic. See fig. 5.

6. On the schematic of the power amplifier, note the MRF479 is an NPN, not a PNP as drawn.

7. No, there are not two BFO inputs to U5 on the main board. Input to pin 1 is from the VFO. See fig.5.

The power amplifier output transformer (T5) is a 1:9 unit using standard broadband construction practices very common in today's solid state equipment. However, not all hams are familiar with how this is done or what materials are used.



The primary is a 'single turn' made either from two short pieces of brass tubing or RG-58 braid. This 'turn' is installed inside six FT37-61 cores (3 to a side, see drawing). Pieces of PC board can be used to hold everything in place. Thread the secondary inside the tubing or braid. Stranded, teflon-coated wire is best for the secondary.

The ARRL Handbook, and a recent "Beginner's Bench" article by Doug DeMaw W1FB in QST, cover procedures for making these transformers. Also see Motorola's "RF Device Data" book for detailed instruction on making broadband transformers.

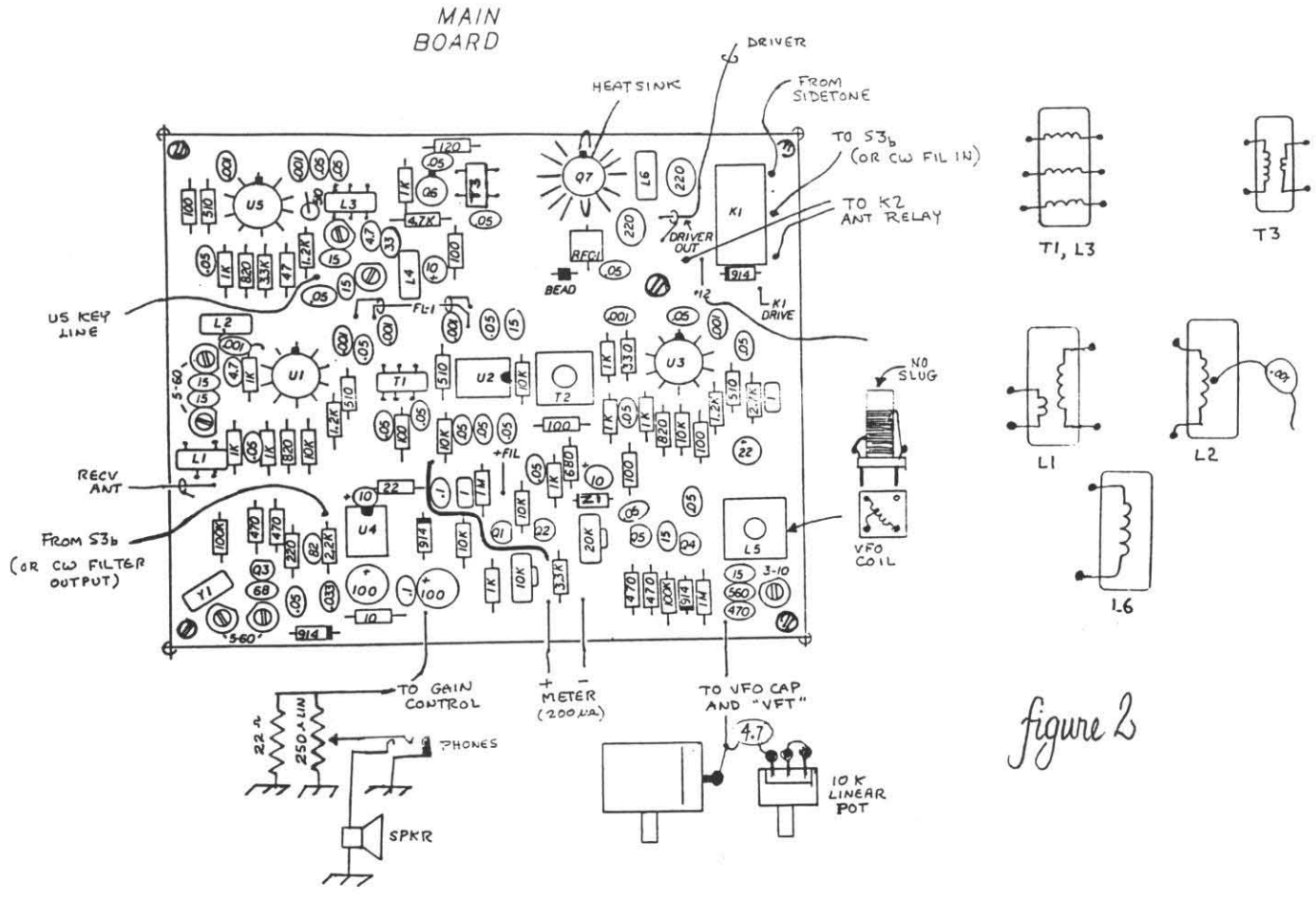


figure 2

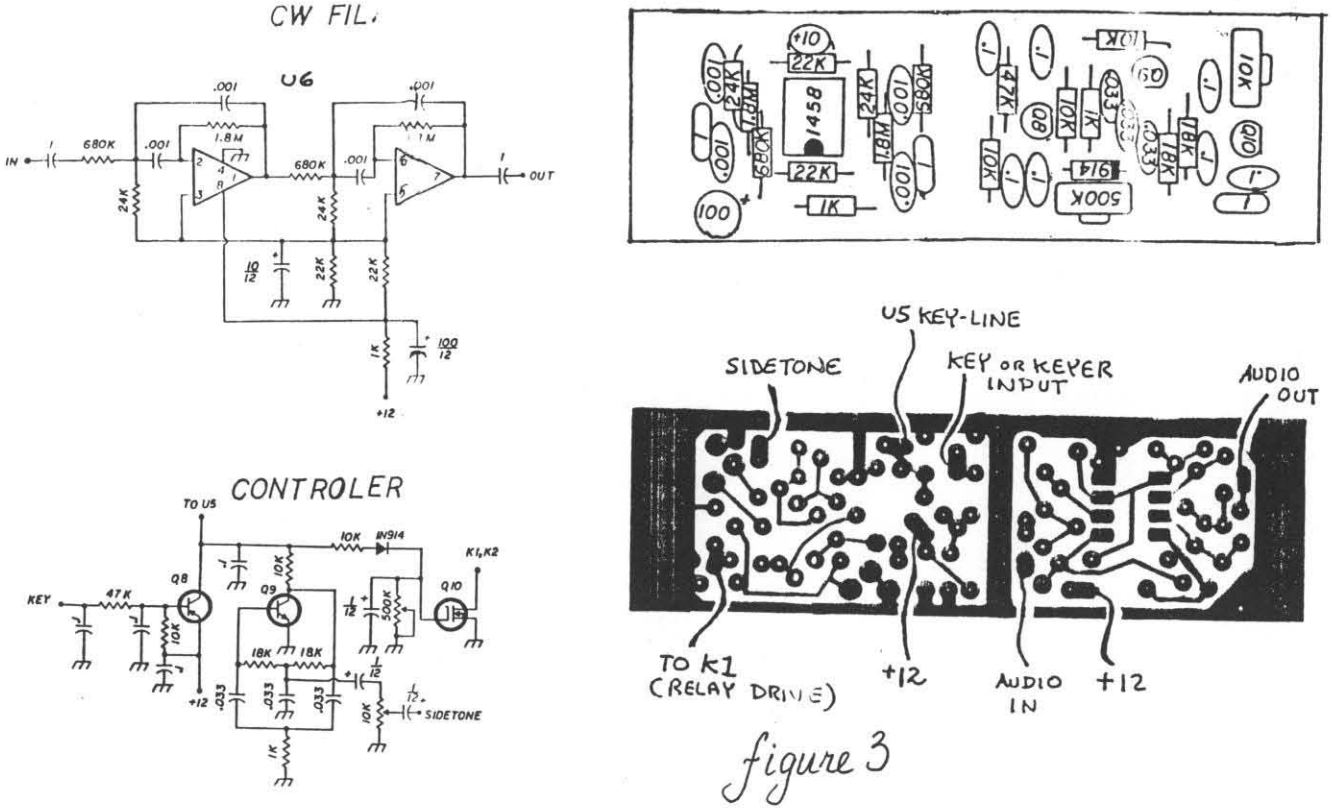


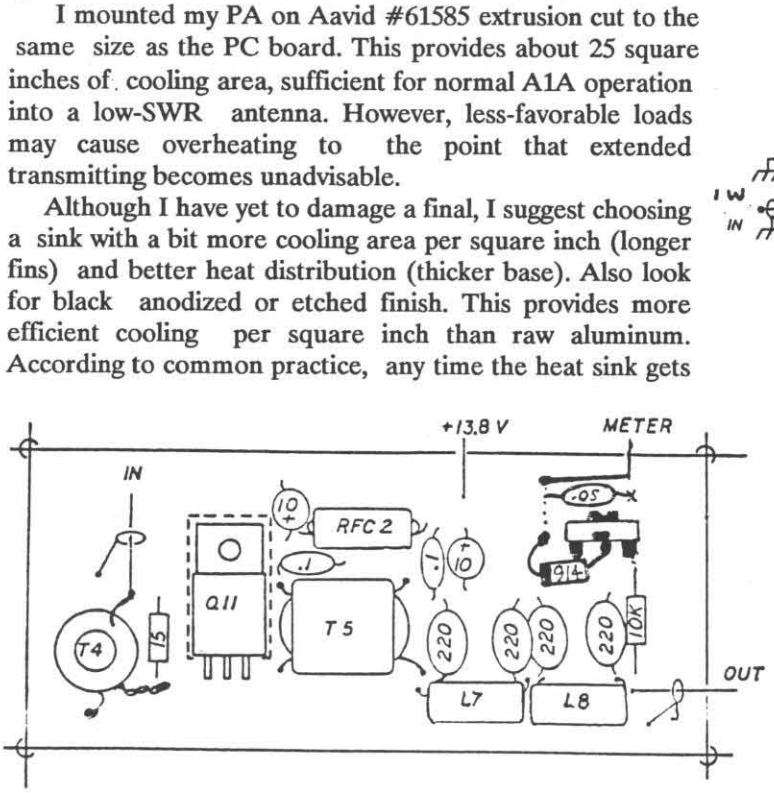
figure 3

The article says too little about heat sinks. With one watt of drive, the MRF479 delivers a potent dose of RF, as much as 17 watts, and generates a fair amount of heat in the process. This means an efficient heat sink is essential to protect the device and draw heat from the cabinet.

I mounted my PA on Aavid #61585 extrusion cut to the same size as the PC board. This provides about 25 square inches of cooling area, sufficient for normal A1A operation into a low-SWR antenna. However, less-favorable loads may cause overheating to the point that extended transmitting becomes unadvisable.

Although I have yet to damage a final, I suggest choosing a sink with a bit more cooling area per square inch (longer fins) and better heat distribution (thicker base). Also look for black anodized or etched finish. This provides more efficient cooling per square inch than raw aluminum. According to common practice, any time the heat sink gets

Note to constructors:
Difficulty in reproducing drawings and space limitations were unavoidable. Some figures referred to may not have been included. Anyone wishing a complete set of full size drawings should sent an SASE to Paula Franke, WB9TBU.



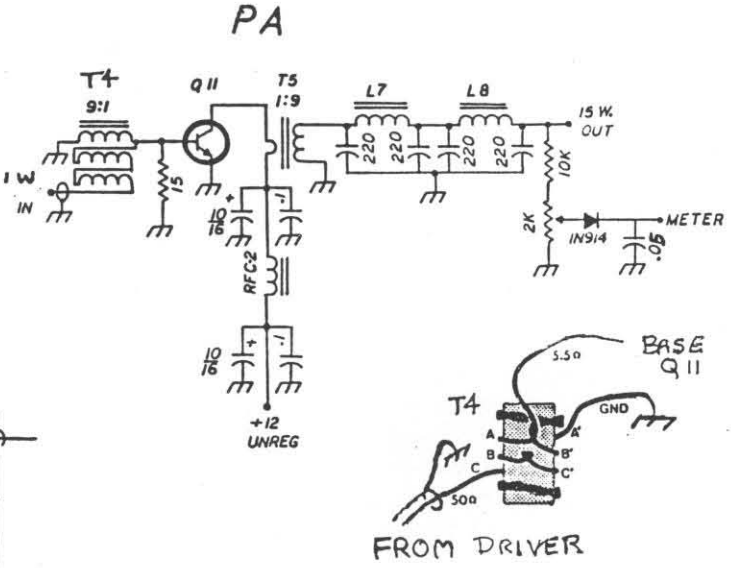


figure 4

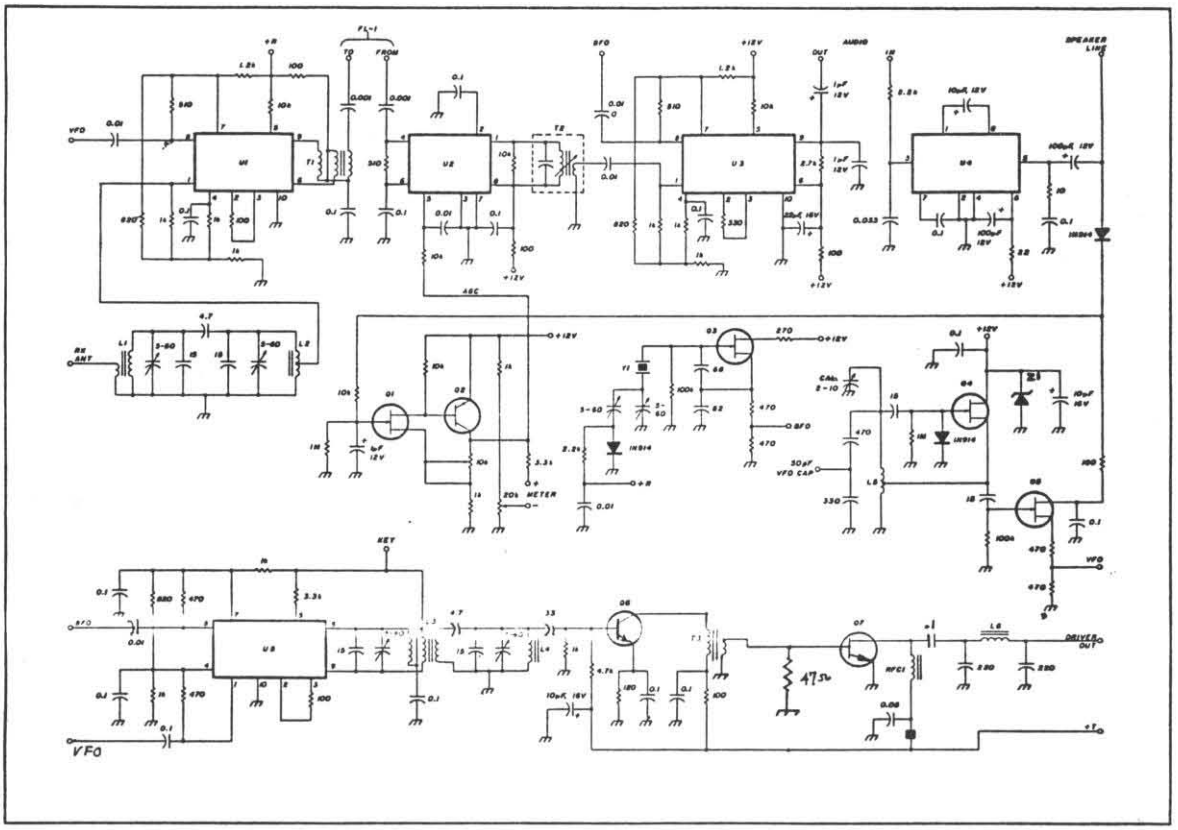


figure 5

'too hot to handle' after a transmission, cooling is insufficient.

In packaging the transceiver, it is imperative high-level RF be kept away from the transmit mixer stage. Avoid placing the unshielded antenna change-over relay (K2) or an unshielded antenna line near filter coils L3 and L4.

One builder installed K2 directly above U5 and encountered severe parasitics. Much to his relief, this instability disappeared as soon as he moved K2 to the other side of the chassis.

Most rigs, including the really expensive ones, have high harmonic content in the sidetone, and this can become really irritating after a while. the twin-T oscillator used in this rig is reasonably clean, but it could be pure sinewave with one, simple modification. Simply wire the audio CW filter 'downstream' so that the sidetone audio, as well as the receive audio, passes through the filter. That removes virtually all audible harmonics, making the sidetone a sheer pleasure to hear.

In conclusion, after nearly a year and 62 countries, I still log about 90 percent of my CW time on this rig and I am working on a CMOS keyer module for it. For me, there is something special about operating homebrew, an extra kick that even a TS-940 can't deliver.

Good luck with your project, and I hope you will share your modifications and suggestions.

A word on kits: Complete kits or printed circuit boards for this transceiver are available from RadioKit, P.O. Box 973, Pelham, NH 03076. Send $1 for catalog and additional information. Because of the logistics involved, RadioKit will not sell partial kits or individual specialty parts.

Information for Writers

The Quarterly welcomes articles on all aspects of low power communications: equipment construction and modification, antenna experimentation, and operating practice, as well as reports of experiences, presentations on QRP for local clubs, announcements and letters.

Photos of your station and projects should be good quality black and white when possible.

The editor can accept manuscripts via modem (312-946-2198) or on disk for IBM or MacIntosh.

Send contributions to individual members of the editorial review board or to the general editor. Material will be selected and edited according to space limitations. Please send a business size SASE to the general editor (WB9TBU) for a copy of the Quarterly's Writers Guidelines.

Editorial deadline dates are Jan. 25, Apr. 25, Aug. 1 and Nov. 1. Remember, your editors are volunteers who, like yourself, must squeeze this work into busy family and work lives and still get on the air from time to time.

Please include your name, address, call and telephone number on all correspondence. Enclose an SASE if you wish material to be returned or when requesting a reply from officers and authors.

Propagation & DX

Bob Brown, NM7M
504 Channel View Dr.,
Anacortes, WA 989221#

I think it is fair to say that one often doesn't know when things get better or worse in our lives; in short, it takes quite a bit of change in one direction or another to make a difference.

The same could be said of our propagation situation, it being hard to know when we're climbing out of a solar minimum or going down from solar maximum. The latter point has not been of great concern to us lately but the former has certainly occupied some of our discussions. But we're in luck these days as there are folks of a statistical mind who keep track of these things.

For example, in the first week of September '87, NOAA announced to all who would listen that the solar minimum for cycle 21 occurred back in September of 1986. I guess that came as news to all of us but it really didn't make us leap off our chairs and rush right to the ham shack; after all, we'd seen some pretty good DX conditions by that time, early April and late July of '87, so it was clear that something was changing. Be that as it may, the interest now is just what we can look forward to with the start up of cycle 22.

There are a couple of questions in this area: what can we expect for the peak in the sun spot count in the new solar cycle and when it will occur. As you might expect, there is a full spectrum of opinion on those matters, all the way from those in the private sector to those in government laboratories. The NOAA report which covered the recent solar minimum gave estimates of the maximum sunspot count ranging from 118 to 185; their own suggestion was that the lower figure was closer to reality, at least from what we know at this point in time.

As for the time of solar maximum, their calculations suggest that it will be a broad peak, pretty flat from '90 to '91. Whatever turns out to be the case, that has to be good news. After all, we've been sitting here all this time when the solar flux was down in the 70's; what a joy it'll be to try DX'ing on the bands with a solar flux up around 175, maybe even better.

But just being there is not enough; you really have to be equipped for the occasion. True, there are all sorts of tales about "working the world with a quarter-watt and a wet noodle on 10 meters". That's folklore but we deal in reality, spelled with an "R", so let's talk about it starting with what we know.

For example, in the months after solar cycle 22 started up, we saw an increase in both the solar flux, as reported by WWV, and magnetic activity, as given by the A-index. We can expect more of the same but we have to recognize those manifestations of increased solar activity will be strikingly different. For example, the solar flux will increase due to changes in the x-ray flux reaching the earth's atmosphere but the increase will depend on active regions on the sun coming around the limb and facing toward the earth. That was the case earlier when active regions came around one at a time; then, we saw peaks in the solar flux that lasted about two weeks time with the maximum flux when the region was at central meridian, facing the earth. Now we can expect several active regions on the solar disk at one time, some growing and others decaying. Thus, the changes in solar flux will not be so neat and simple to interpret. Put another way, your record of the solar flux reported by WWV will have a more ragged appearance.

Geomagnetic activity arises from those same active regions, sometimes from flares that take place in their vicinity and other times just because solar particles, called plasma, spew out of those regions and impinge on the outer boundary of the geomagnetic field. We know from our days back in solar cycle 21 that magnetic activity, given by a rise in the A-index, disrupts our use of the ionosphere. With the increased solar activity since the start of cycle 22, we've already seen a rise in the magnitude and variability of the A-index. The magnetic disturbances that really disrupt the HF bands are usually seen as spikes in the A-index, its value suddenly rising to levels like 25 or more in a day or so.

We can expect more of that as well as a general rise in the A-index. The problem for hams, especially for QRP'ers, is to find those times between ionospheric disturbances and take advantage of the improved propagation that results from the greater x-ray flux reaching the earth from active regions. As they say in the Services, it's the old game of "Hurry up and Wait"! In order to play that game, your really need current information on solar activity. So how does one come up with that? Easy; it's just a matter of how "current" you want it. So let's look into that too.

Back in the waning days of cycle 21, we saw recurrent patterns in the solar flux and, to some extent, in the A-index. Thus, except for new regions that might develop, propagation conditions were predicted easily, essentially "more of the same" only 27 days later. Some of the regions on the solar disk lasted so long that they could be followed for several solar rotations.

As a result, the propagation columns in the ham magazines had some success in forecasting conditions, say for important contests. But that was then, in the late days of cycle 21, and now is now, in the rising phase of cycle 22. With an increase in solar activity, any sort of "canned forecast" that was written 27 to 54 days before publication has to be less than relevant for our purposes. So a different approach has to be taken, relying more on current information than before. Indeed, more attention has to be paid to active regions as they rotate onto the solar disk and whether they are growing or decaying in size and activity. That means that active regions have to be described by more than just the solar radio flux; indeed, optical observations are necessary to add the additional dimensions to the analysis, where the regions are located and how they are developing.

Since the typical ham shack does not come complete with a solar observatory, we have to rely on those folks who have access to one or more. Here in the USA, that means NOAA; however, we have to get deeper into their database to get the information we need. There are several ways of doing that and they have various time-scales associated with them and even some expense. For example, if you have a telephone modem for your computer, you can dial up the NOAA BBS and get a variety of information, all displayed on a menu. So set your telecommunications program for 8-bit data words with one stop bit and no parity; the BBS will operate at either 300 or 1200 Baud. Just dial up (303) 497-5000 and you're in business. But don't forget to load the information into your buffer

so you can print it later or save it to your disk; there's no point in having all the information you're paying for just scroll up the screen to infinity.

That tells you how to get the information but just what is it? Well you can get such items as a current solar/geophysical forecast, a radio propagation forecast, MUF information for a path of your choice, etc. There is even a Help Screen that you can save to disk, giving you all the details of what is available on the BBS. Myself, I find the solar forecast the most helpful as it gets right down to regions on the sun; with that, you can do some predicting yourself and feel like you're part of the game.

In any event, we're talking about a prepared set of messages that cost you the price of a phone call. If you want more detailed information, you can call the duty forecaster, 24 hours a day, 7 days a week. Just call (303) 497-3171 and ask your questions. However, they should be about specific points, say "what were the solar coordinates of the flare at XXXX UTC and what is your estimate of when the magnetic storm will commence?" Otherwise you're wasting the forecaster's time and your money!

Another approach that you might be interested in, more up to date than what you find in the ham magazines but not to the extent of what you can get by phone, is the "Preliminary Report and Forecast of Solar Geophysical Data" that comes out each Wednesday from NOAA's Space Environment Services Laboratory in Boulder. It runs about 10 pages in length, starting with highlights of the solar and geomagnetic activity in the previous week and going on to give a forecast for the coming week. There is also a summary of the solar and geomagnetic indices of the previous week and a twenty-seven day forecast of the indices based on the last-minute data that comes into Boulder from all over the world. Indeed, these forecasts take into account whether the regions coming onto the disk will be growing or decaying in activity.

This weekly forecast is used by many agencies of the US and friendly foreign governments. Amateur radio operators can get on the mailing list if their interests warrant it. The thing to do is write to the Space Environment Services Center in Boulder, Co; the mail address is 325 Broadway, R/E/SE2 and the zip code is 80303-3328. Just tell them that you have a serious interest in how solar/geophysical conditions affect radio propagation. Any other aspects of your ham radio efforts, say working with MARS, would be relevant. After all, the folks at NOAA want to know what their work is used for, particularly when it comes around to budget time.

Let me conclude by making the following observation. We all have a unique opportunity in the next few years. We will see another solar cycle develop right before our eyes, as it were.

This could be a tremendous learning experience, even more so if you not only follow band conditions but also the events on the sun. All this is called "solar-terrestrial physics"; if you want to take the course, now is the time to sign up!

Membership

The initial QRP ARCI membership fee of $12 ($14 for DX) covers lifetime membership plus the first four issues of The Quarterly. The membership and renewal form is located inside the back cover. Additional forms are available, for an SASE, from Membership Chairman Bill Harding W4AHK, 10923 Carters Oak Way, Burke, VA 22015.

Members' News

by Fred Bonavita W5QJM
P.O. Box 12072, Capitol Station
Austin, Texas 78711

A close look at the cover of the 1988 ARRL Handbook will produce a familiar-looking face: Milliwatter **Rulon VanDyke, KA7BCD**, hard at work in the 1986 Field Day competition. An even closer look at the photo credits inside the handbook, however, describes the scene only as "an unidentified contest op racks up points in a cozy QTH." Ouch!

Joel Kleinman, N1BKE, assistant production manager for the handbook, explains: "There was no identification on the back of the photo, so we had to go this route." He went on to say he was sending Rulon a complimentary copy of the handbook as is done for all those whose photos make the cover.

That was the second time that shot made a cover. It's on the front of the April 1987 issue of The Quarterly. It's a reminder, too, to make sure all photos sent to The Quarterly are identified fully.

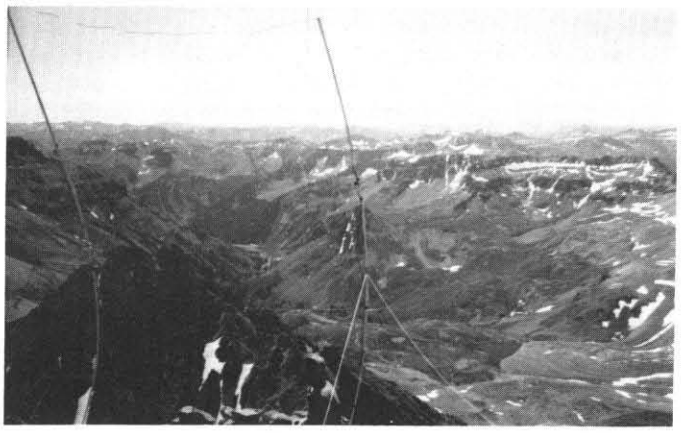
Welcome to the new kid on the block, and order his catalogue. **Chris Hethorn, KM8X,** has opened the Small Parts Center, and he's stocking a limited but good number of parts with the kit-builder and homebrewer in mind.

Chris says he's thinking of marketing some kits as soon as he builds his supply of parts to a satisfactory level. He figures his catalogue lists about one-fourth of the items he'd like to offer, but he's finding it difficult to locate manufacturers of certain components. High on the list of endangered species, he says, is the air-variable capacitor with a quarter-inch shaft.

Send Chris a 22-cent stamp plus your name and address to 6818 Meese Drive, Lansing, Mich. 48911, and you'll get a copy of his catalogue. And while you're at it, send along your congratulations to him, too. Two days before Christmas, Chris received the 1987 Milliwatt Field Day trophy from **Ade Weiss, W0RSP.**

"It sure is beautiful," he says. "I worked FD in northern Michigan at a primitive campground with no electricity, outhouses and an old hand pump for water. Had a great time making 224 QSOs with an Argonaut set at 900 mW output."

It may have been summer, but it also was windy, chilly (40 degrees) and at an elevation of 14,375 feet when this shot was taken of a 20-meter loop antenna used by **Howard Knott, NX0Q,** to capture a Kilomiles-per-Watt (KM/W) Award. Note how the poles are bending in the breeze, gang, at the top of Mt. Sneffels, Colo.



NX0Q Howard Knott's 20-meter loop antenna at 14,375 feet.

Says Howard: "My HW-8 was a little slow on CW due to the cold air. I have to come up with a smaller, lighter 20-meter antenna for high peaks. I'll have to use PVC pipe. I don't want to become a lightning rod in a sudden storm."

Hans Tscharner, HB9XY, reports little success in trying two-way QRP contacts with the U.S. on the club's "First Sundays" or in the regular contests.

Hans entered the April 1987 QRP ARCI contest but found U.S. stations were "working inside the continent only." He is running an Argonaut 509 with a 40-meter longwire and a W9PNE "X" beam on 15 meters. (OK, gang, get the hint?--ed.)

Bill Aaker, KB5CKX, writes from Dallas he's back on the air as a "re-tread ham" from the 1950's, when he lost interest as W5YML and dropped out. "Let's just say hamming has changed in 25 years, when 'real radios' glowed in the dark," he says.

Bill is interested in discussing kit building and homebrewing equipment and would welcome hearing from club members with experience in either or both.

Our faithful correspondent from South of the Border, **Jake Jacobs, NW6F/XE2IOF,** has an original complaint: Just as time for the Transcontinental Net (TCN) rolls around on Sundays, so does a bunch of visitors. "They never understand that CW takes all my concentration," Jake advises. "This one particular fellow is also a ham and knows I like to check-in, but he insists on coming every Sunday afternoon at net time. The only way I'll be able to do it is get into the old school bus I'm converting and find a deserted beach."

Dick McIntyre, K4BNI, has moved -- from Florida to 1,200 feet up the side of a mountain in Virginia. He's at Basye, Va., about 10 miles west of Mt. Jackson and almost into neighboring West Virginia. (I'm a Virginian, and I had to go find Basye on the map, so don't feel left out. --ed.)

"It's a very quiet QTH," Dick advises. "I'm still using my Argonaut 509 and a new HW-9 into my Butternut vertical." An interesting observation from Dick: "I note that some 75% of the QRPers I sent QSLs to are Extra Class tickets. I guess that says something!"

From San Antonio, Texas, comes word from **Dick Swanson, N5JWL,** that he'd like to hear from anyone who has used an HW-8 mobile. Dick is blessed with an extra "8" and wants to try it from his automobile (his address: 714 Cypress Cliff Drive, San Antonio, Texas 78245).

A transplant from Iowa where he was KA0GUJ, Dick has been active in QRP since the Fall of 1987. He has 26 states confirmed on 20 and 15 meters with one watt output into a Moseley TA-33Jr at 30 feet.

Brad Hutton, KT1H, reports from Bow, N.H., he's now operating his TenTec Corsair QRP and plans to try to drop it into the milliwatt range.

A parting word: QRP activity is on the upswing on 30 meters these days, and more stations are turning up around 10.110 MHz. We'd like to get some operating reports from 20 and 12 meters, especially about any DX snagged.

Shower down all reports to me at the address above, please, and send along some good black and white pictures to illustrate things. Keep those cards and letters coming.

Field Day Antenna Raising, *Zuni Loop Style*

Cam Hartford, N6GA
1959 Bridgeport Ave.
Claremont, CA 91711

"How did you get the ropes up in the tops of those trees?" is the most-asked question we have to deal with on Field Day at the Zuni Loop. A steady stream of passers-by, of both the Ham and non-Ham variety, stops to ponder our FD antenna farm. The more curious and outgoing ones ask about how we do it, and, pushing aside the temptation to say "trained monkeys" or "trained helium balloons" we fill them in on the finer points of sling shots and fishing lines.

Choosing a public campground for our FD site has both its advantages and disadvantages. On the upside is the 7300' elevation, its uninterrupted view over the desert to the north and east, and of course the 90' pine trees we use to hold up the antenna farm. The disadvantages include having to share the campground with two or three other FD groups, and actually getting the ropes over the tops of those trees.

The trees really are an integral part of our FD effort. They allow us to put up large wire gain arrays which would otherwise be impossible to erect without dragging up large beams and even larger towers. This year we put up a four element 40 meter Delta Loop array with the bottoms of the loops 25 feet off the ground and the apexes at 70 feet. Try doing that with towers! Our first sad attempts at roping these trees were not very successful. We tried tying a rope to a rock, and throwing the rock at the tree. This procedure netted us about 30 feet of height and three burned-out shoulders. Next a sling shot was

summoned for the job, and proved much more satisfactory. We initially used the two-person approach, with one person operating the sling shot and another one holding the spool, as illustrated.

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Net Report

by Danny Gingell, K3TKS
3052 Fairland Road
Silver Springs, MD 20904

We had 312 stations participating in the nets for a total of 2,684 QNIs. The average number of check-ins per station was 8.6026. There was an increase of 72 more stations participating this year. We received QNI's from a total of 57 different states, provinces and countries, including seven Canadian provinces and three DX countries. Absent in 1987 were the states of SC/AR/NV/ND/KS. This is proof that you can get almost all of your W.A.S. QRP on the nets. Good luck in 1988!

I am very pleased to have such a great gang on the nets and I am very appreciative of the fine job that is done by our net control stations. All you have to do is look at the top scoring group and you will be sure to find the NCS's among them. Again, my thanks to each of you who participated in this activity during 1987. I hope that we can continue to grow as a club and that each of you will try to join us on the nets this year.

Let's make 1988 an even better year. We welcome any ideas and suggestions that may improve the nets. Please remember that the nets are here for each of you. Our primary purpose is to hook-up with our friends and fellow QRPers. We strive to keep our nets a friendly, but orderly, meeting place. We will try to get a message through to a friend, arrange a sked, help check out a new rig or whatever.

QRP DX TU ES 73/88 DE K3TKS, W1FMR, K2JT, W5LXS, NM7M, W6RCP, NJ7M, WA1JXR, KH6CP/1, WB9TBU & all the rest who support the nets.

QRP ARCI 1987 Net Activity Report

Month	TCN	NEN	SEN	GLN	GSN	WSN	Total
Jan	58	37	18	18	27	64	222
Feb	70	34	25	19	34	62	244
Mar	105	34	23	17	22	51	252
Apr	88	34	23	17	22	51	252
May	89	54	25	23	16	52	259
Jun	51	23	24	20	15	27	160
Jul	43	27	26	28	11	25	160
Aug	69	32	23	4	11	42	181
Sep	77	28	31	23	15	40	214
Oct	85	31	21	16	18	40	211
Nov	76	41	36	38	11	37	239
Dec	41	45	51	51	26	49	263
Total	852	420	348	293	246	525	2684

1987 QNI Contest Results Top 25

Callsign	Name	QTH	QNIs	Score
WB9TBU	Paula	IL	102	164
K3TKS	Danny	MD	122	140
W5TTE	Ed	NM	115	132
XE2IOF	Jake	Mex	54	108
KH6CP/1	Zack	CT	96	105
W5LXS	Roger	TX	90	96
W5XE	Ray	TX	90	91
NM7M	Bob	WA	84	84
W1FMR	Jim	NH	74	83
W6RCP	Jim	OR	72	73
W6JHQ	Tom	CA	69	69
WA1JXR	Greg	MA	58	68
N4EL	Dick	NJ	56	67
KD2JC	Joe	NJ	33	64
NJ7M	Chuck	ID	59	60
WB8ZWW	Wayne	OH	45	59
K2JT	Joe	NJ	54	56
KD8FR	Lowell	MI	26	51
WD8JCR	Jim	OH	37	47
K6MDJ	Fred	CA	30	46
W3TS	Mike	PA	40	44
W6SIY	Keith	CA	43	43
K4KJP	Terry	FL	21	42
N8CQA	Buck	MI	31	39
K9IFO	Will	IL	26	38

QRP ARCI Net Awards

Callsign	Award	Date
N4EL	GLN-80	9/87
K6MDJ	WSN-40	10/87
WB9TBU	TCN-20	11/87
WJ6Q	WSN-40	12/87
WB0T(N0ETQ)	TCN-20	12/87
KD8FR	TCN-20	12/87

New QNI 100 Certificates

WB7BIV	QNI-100	12/87
K2JT	QNI-100	12/87
WB9TBU	QNI-100	12/87

QNI-100 Seals

K3TKS	QNI-600
K3TKS	QNI-700 (720)
W1FMR	QNI-400 (415)
NM7M	QNI-400 (419)
K4AHK	QNI-200 (227)
W5LXS	QNI-200 (259)
K6MDJ	QNI-200 (198)

QNI 100 Honor Roll

Callsign	Total	Name	State
K3TKS	720	Danny Gingell	MD
W6RCP	589	Jim Holmes	OR
W1FMR	415	Jim Fitton	MA
NM7M	419	Bob Brown	WA
NJ7M	332	Chuck Lindsay	ID
K8IF	246	Thom Davis	MI
K4AHK	227	Bill Harding	VA
W6JHQ	287	Tom Brown	CA
WB2IPX	205	Les Shattuck	VA
W5LXS	259	Roger Rose	TX
K6MDJ	198	Fred Turpin	CA
WN6F	158	Brian Greer	CA
WA9WZV/4	150	Gary Beam	FL
W5QJM	171	Fred Bonavita	TX
KV7X	168	Jay Sturdivant	WA
W3TS	167	Mike Michael	PA
KH6CP/1	158	Zack Lau	CT
K5BOT	156	Ed Popp	TX
W5TTE	148	Ed DeBuvitz	NM
N6GA	148	Cam Hartford	CA
XE2IOF	136	Jake Jacobs	Mex
W6SIY	133	Keith Clark	CA
W6SKQ	128	Bob Spidell	CA
WB8ZWW	117	Wayne Watson	OH
N7IS	115	George Bowman	WA
K2JT	102	Joe Mead	NJ
WB9TBU	102	Paula Franke	IL
WB7BIV	101	Bob Joiner	OR

A QRP-sized QSL that manages to fit all necessary information into it's tiny message area. The QSL bureaus seem to have difficulty dealing with the small size, however!

Idea Exchange

by Mike Michael, W3TS
P.O. Box 593, Church Lane
Halifax, PA 17032-0593

Special Offer:

Wes, W7ZOI has sent a small number of 600 Hz bandwidth 1.98 MHz I.F. center frequency CW filters to me to pass along to QRPers that would like to homebrew a CW SuperHet receiver. The filters were donated by Herb,KC4X, and they are free, but I would appreciate 39 cents for postage. I will ship them in a small mailer envelope. Wes sent a sheet suggesting how to use the filters and some results of measurements he made on them. There is only a small number available and they will go out on a first come, first served basis.

Frequency Readout:

Paul, KF6OC writes: "Sometime back, a fellow ham called and informed me he could hear my CW signal on a frequency in the phone band. I checked and found I was emitting a spurious signal. After correcting the spurious signal, I decided I needed a simple, better method of checking my out-going signal.

I like building and have built several QRP rigs, both receivers and transmitters, some crystal and some VFO controlled. My favorite antenna is a random wire about 135 feet long. This is fed with a homebrew roller coil tuner. It loads well on all bands. I did not know if the tuner could cause spurious trouble or not. I decided to check the frequency of the antenna itself.

I used a frequency counter and wrapped a few turns of the pickup lead around the random wire, close to the tuner output. With key down, this gives me a readout of the antenna output frequency. For those with coax feed lines, a pickup loop close to or inside the tuner should work fine. My homebrew VFO QRP transmitter had no accurate means of checking the Frequency output. I use this method to know my exact frequency. For instance, if someone says I will meet you on 7062, I can key down and tune my VFO to that frequency and know where I am. I also use it for checking my homebrew receiver frequency by tuning the output signal. This method works well for me.

Dummy Load:

Luke, W5HKA wrote to tell of the idea of using Radio Shack 8 ohm non-inductive resistors as a dummy load. He hooked up six of the 8 ohm resistors in series and then tried them. He said the results were a "disaster for RF applications." He then made up another dummy load using ten 470 ohm 2 watt resistors in parallel, which worked much better. He had the chance to measure the two loads on a Vector Impedance Meter (HP 4815A) and below is a table of the results:

Freq	Radio Shack	2W Carbon
DC	50.04 ohms	51.2 ohms
2 MHz	55 @ +9 dgrs	52 @ -4 dgrs
3.5	55 +17	52 -3
7	65 +34	52 -2
14	105 +54	54 -6
21	135 +62	54 -7
30	137 +72	54 -7

(A perfect load would remain at its DC value and read 0 degrees up to 30 MHz.)

Paul says: "From the data it can be seen the Radio Shack resistors are inductive and therefore useless at RF frequencies. The 2 watt carbon resistor network is very well behaved.

Century 22 Mods:

Rock, W9SCH writes with a few mods for the Century 22: "Connect a 22K ohm resistor in series with the "Hot" side of the Drive Control pot. This makes it easier to adjust the output power level to QRP (much less critical), yet permits drive to full output.

"Connect a 47 ohm, 2 watt carbon resistor in series with the meter light which, in my opinion, is far too bright. (When you are sitting in a semi-dark room in ,perhaps, a drowsy condition such a bright point of light induces semi-auto-hypnosis). Putting in the resistor reduces the glare to a nice, mellow glow..."

"Remove an older AF power output transformer from a discarded tube-type B.C. radio. The exact impedance-ratio is not critical, but a transformer from a solid state set will not do. (Also save the variable cap, etc. for other projects.) We then connect our high-Z phones to the high impedance winding and plug the low impedance winding (the one that went to the speaker voice coil before) into the transceiver phone jack. The volume increase in the phones provided thereby is near phenomenal (ten dB anyways), making weak signal reception much easier." This works with any of the newer transceivers (that want to feed low-Z phones) when using older high-Z phones.

Rock also goes on to say that if older high-Z phones are available, "they should be used on homebrew ham receivers, as at least one A.F. stage can be left out." Rock goes on to tell of some tests he did on the high-Z phones he has and the least sensitive set required only 1.1 microamps to make an audible sound he could hear.

QRP and Flea Power:

The last item from Rock is interesting. Next time someone says QRP is flea power, ponder this:

A Flea Fantasy

We have heard our QRP activity referred to as "flea power" radio. But what is flea power and, if it were radiated from a dipole antenna (and received on another) how far could it be received? Let's make an estimate and see:

Let us assume that a flea's body is approximately equivalent to a sphere one millimeter in radius. It would then occupy a volume of:

$V=4/3\ \pi\ r^3=4/3(3.14)(10^{-3})=4(10^{-3})$cubic cm.

Now, the density of most living matter is quite close to that of water, or one gram per cc. So the mass of our hypothetical flea is thus about $4(10^{-3})$ grams or $4(10^{-6})$ kilograms. By definition, power is (work/time) or watts=(joules/second). If (in the meter-kilogram-second system) the acceleration of gravity is approximately equal to 10 m/sec2, then:

watts = [(kilograms)(meters)(10)]/seconds

Suppose that our enthusiastic flea could jump so as to reach a height of one foot (about 0.3 meter) in one-tenth of a second. If so, then he would therefore generate:

$P_{watts}=[(4)10^{-6})(3)(10^{-1})(10)]/10^{-1})=(12)(10^{-5})$ or about 0.00012 watt, approximately 10^{-4} watt.

Let us then imagine this as completely converted to radio frequency power at 14 MHz. What sort of DX could one expect to cover when this power is radiated by a half-wave dipole under ideal conditions?

The formula for ideal transmission between two half-wave dipoles is given by many text books as: $-DBW_{received}=37+(20\log f$ MHz)+(20log$d$ MHz)-(10log watt radiated)

Good operators, using good receivers, can readily copy signals at the -140 DBW level, about 0.7 microvolts across the receiver input terminals. So, if we make use of this in the formula above, we find:

(20log d)=140-(37+23+40)=100 miles

Thus, we would estimate that a true "flea power" transmitter might well be able to work over a hundred mile range. If good beam antennas are used at each end, it would probably work appreciably further. Who knows? Try it sometime...

An Optimized 4-Element Yagi

by Brice Anderson W9PNE
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Lancaster, IL 62855

I don't completely enjoy the work involved in putting up a HF beam antenna on top of a 50 ft. tower. Therefore, when I purchased a 4-element 28 MHz beam, I wanted to be sure that it would work at full efficiency when installed. How could I be sure? I would test it out in the yard before putting it on the tower.

What started out as a simple performance check developed into a summer long design effort. The performance of the commercial antenna was very disappointing, and I thought I could improve on it. I got so involved in this study that I spent most of my time on it.

I set up an antenna testing range in the vacant field next to my property; a suitable distance from power lines, the house, and other antennas. I used a CB field strength/wattmeter for forward gain and front-to-back measurements. I spent several hours calibrating this device in dB units, using the Argonaut 515. The unit was very accurate and sensitive. It gave a full-scale deflection at a distance of 75 feet when connected to the standard dipole receiving antenna.

The "Standard" half-wave receiving antenna was made of telescoped aluminum tubing and fed with a gamma match. This standard antenna showed a very flat SWR over the band, being 1.0 on channel 20 (27.205 MHz)and 1.1 on channel 1(26.965 MHz) and channel 40 (27.405 MHz).

The "Reference" transmitting antenna was constructed like the "Standard" receiving antenna except that a tubular capacitor replaced the small air dielectric variable. Performance was equal to the "Standard" antenna, but the tubular capacitor was immune to the effects of rain and insects. The antenna was fed with one electrical wavelength of 50 ohm coaxial cable.

A lot of time was spent in building and adjusting these two antennas, since the accuracy of the tests depended upon them.

Two ten foot long steel mast sections were set up about 75 ft. apart. A wooden table and chair were set off to one side between the two masts. The transmitting antenna was installed on one mast and the receiving antenna on the other. A SWR bridge was placed in the transmitting line right at the transmitter. A two wavelength electrical length of 50 ohm coax cable was connected from the receiving antenna to the field strength meter. A section of transmission line that is a multiple of an electrical half- wavelength accurately presents the impedance of the antenna at its end.

Base reference data was obtained by connecting the TX to the "Reference" transmitting antenna and reading the field strength meter connected to the "Standard" receiving antenna.

The sensitivity control of the field strength meter was adjusted to obtain a reading 10 dB below full scale. This would permit testing an antenna having up to 10 dB gain without exceeding full-scale deflection.

All measurements of the Yagi under test could be compared to the reference data to determine forward gain. By turning the test antenna 180 degrees, the front-to-back ratio could be determined.

The commercial 10 Meter beam, which was set up exactly according to the instruction manual, was initially tested at 28 MHz, using the Argonaut 515. It was quickly determined that the gain was far below the manufacturer's claim. I was glad I hadn't put it on the tower.

Since all tests were to be performed in the CB band, it was necessary to lengthen the elements proportionally for the lower frequency. When the lengths had been adjusted, measurements were made. The Yagi and receiving antennas were mounted horizontally, with the following results:

	CH.1	CH.20	CH.40
SWR	1.6	1.1	1.35
F-B	25dB	40dB	60dB
Gain	----	7.7dB	----

The gain was 2.3 dB below the expected 10 dB. Although I didn't record it, the gain was less at the band edges. The F-B ratio was very good. I was not satisfied with the forward gain.

These initial measurements were followed by weeks of testing different element lengths and spacings in search of the optimum. This is where a good computer program could have saved me a lot of work. But the experiments were exciting and gave me a healthy respect for the Yagi antenna.

I tried the formulas of two different beam manufacturers, Ed Noll's formula, ARRL's Optimum formula, the one derived from a 4- element example given in the ARRL Handbook, the NBS formula and the one I experimentally derived.

The NBS design gave the best results, and I recommend it for horizontally mounted Yagi beams. However, I wanted to mount my beam in the vertical plane. The element spacing in the NBS is dissimilar and made it nearly impossible to mount vertically without having an element very close to the supporting mast.

I needed a design that provided for equal element spacing to give a mechanically balanced vertical mounting with the maximum possible spacing between the supporting mast and adjacent elements. Equal element spacing gave 62.5 inches center-to - center, which is electrically 0.15 wavelength.

The formula used by a CB manufacturer provided excellent performance. The ARRL Optimum formula also did very well. Yet neither gave the complete performance I wanted. Since the ARRL design was closest to my requirements, I used those element spacings as a starting point for my experiments.

The complete 4-element Yagi was of substantial construction and weighed 18 pounds. The mechanical design.follows.

I tried dozens of element length combinations to fit the various formulas. I took as accurate mechanical and electrical measurements as possible, so that the end formula could be accurately determined. When I completed the investigation, it was November 25th. My hands were cold, rough and cracked. However, the results were extremely gratifying.

With the antenna mounted in the horizontal plane, the forward gain was 10.5 dB at band center. Compare this to the manufacturer's 7.7dB. And the front-to-back ratio was 19.6 dB, which I thought was excellent. The SWR at band center was 1.12.

The acid test was to be the performance when mounted in the vertical plane. Table 1 gives a comparison of the performance in each plane.

TABLE 1 : ANTENNA PERFORMANCE

Plane	SWR			dB F/B ratio			Fwd gain/dipole dB		
	CH.1	20	40	CH.1	20	40	CH.1	20	40
HORIZ	1.2	1.12	1.75	19.8	19.6	19.3	8.8	10.5	9.2
VERT	1.5	1.1	1.5	16.3	19.1	19.9	8.4	10.5	9.4

Channel 1 is 26.965 MHz, Ch.20 is 27.205 MHz and Ch.40 is 27.405 MHz. The band covered was 440 kHz wide, corresponding to 455 kHz band width in the 28 MHZ band.

The derived formulas for element lengths of the 4-element Yagi beam are as follows (using the driven element length as the reference):

DRIVEN ELEMENT	:	1.0000	204.5 inches	(actual length
REFLECTOR	:	1.0611	217 "	(for CB band)
1st DIRECTOR	:	0.9633	197 "	
2nd DIRECTOR	:	0.9389	192 "	

I scaled the antenna down in size to the 28 MHz band to verify its performance there. Sure enough, it was identical.

The dimensions for resonance at 28.250 MHz, which will work great in the CW band and the new Novice/Tech bands, follows. These were obtained by multiplying the CB dimensions by 27.205/28.250 or 0.963. These are the element lengths:

DRIVEN ELEMENT	: 197	inches	
REFLECTOR	: 209	"	NOTE: dimensional er-
1st DIRECTOR	: 189.75	"	rors of 1/8th inch
2nd DIRECTOR	: 184.875	"	have negligible effect

The same formula can be applied to 15 and 20 meter beams. The strength of the tubing used for the boom and elements of the 10 meter beam are probably sufficient for the 15 meter beam. However, a 20 meter beam should be built with tubing about twice the diameter for sufficient strength.

I didn't show the Gamma match changes, but the dimensions will have to be enlarged proportionally for 15 and 20 meters.

Dimensions for a 21 MHz beam centered at 21.150 MHz follows. CB dimensions are multiplied by 27.205/21.150 or 1.2863.

BOOM LENGTH	: 247	inches
ELEMENT SPACING	: 80.375	"
DRIVEN ELEMENT	: 263	"
REFLECTOR	: 279.125	"
1st DIRECTOR	: 253.375	"
2nd DIRECTOR	: 247	"

I personally would not attempt to build a 20 meter version, but here are the dimensions for the strong and courageous. Multiply CB dimensions by 27.205/14.100 or 1.9294 for a design center of 14.1 MHz.

BOOM LENGTH	: 370.5	inches
ELEMENT SPACING	: 120.5	"
DRIVEN ELEMENT	: 394.5	"
REFLECTOR	: 418.75	"
1st DIRECTOR	: 380	"
2nd DIRECTOR	: 370.5	"

Is it worth the effort to build a beam with 10 dB forward gain? Anyone who has ever used such a beam will wholeheartedly say YES ! Back when the sunspots favored 28 MHz propagation, I made a 10 meter beam from a CB 4-element beam. I adjusted it for 10 dB forward gain and mounted it vertically polarized 52 feet above ground. The results were spectacular. In DX contests, using my old Argonaut 505, I could work DX right through pile-ups, getting most on first calls.

Switching between the 4-element Yagi and my excellent Hustler 4BTV vertical during non-contest DX QSO's showed signals from the beam to be from 4 to 5 "S" units better than the trap vertical. The same advantage was true for receiving. In another type of test, I could continue solid QSO's with Japan 30-45 minutes after the JA signals had faded out on the Hustler.

Once you have used a powerful 10 dB beam, which increases your power ten times and lowers your angle of radiation as well, you are completely spoiled for anything else. I can hardly wait for 10 meters to come alive again. I'm ready !

Notes On The Delta Loop Antenna

by Jim Fitton, W1FMR
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The 40 meter Delta Loop antenna in the big oak tree outside my bedroom window is almost invisible, and works like a wonder (see ARCI Quarterly July-October 1986). Because of the close relationship to the tree, however, seasonal changes cause the antenna's resonant frequency to shift.

For example, in the summer, sap flowing through the branches and leaves, all become part of the antenna system and result in a lowering of the antenna resonant frequency. This means that it now appears that there is too much wire in the loop and it has to be shortened in order to maintain a low SWR. A neat way to fix this without cutting or soldering is to take a portion of the loop, say six inches, and form this into a short section of parallel (balanced) line.

A short length of plastic or PVC pipe slipped over the loop at the feedpoint will do the job nicely (see fig. 1). Sliding the pipe toward the loop reduces the size of the loop and therefore increases the resonant frequency. This short section of line that is formed, because it is balanced, will not radiate. To restore the loop back to the lower frequency, slide the pipe back to its previous position.

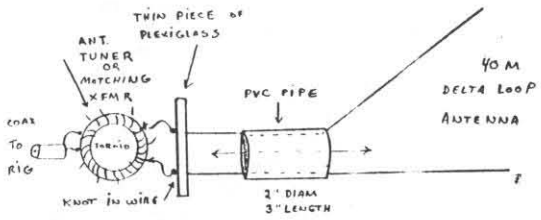
This neat trick was tried at successfully at Dayton last spring, with the loop's apex and feedpoint located eleven stories high in the QRP Hospitality Suite at the Belton Inn.

Remember that shortening the apparent length of wire in the loop increases the resonant frequency. Also, that at resonance, a loop has an impedance of approximately 100 ohms. One loop tried, however, measured 75 ohms.

An excellent tool for experimenting with antennas is a grid dip oscillator because it will tell you the resonant frequency quickly and easily. Heathkit puts out a beauty and it is portable and easy to use. Another is the noise bridge, useful because it indicates resonance, impedance and reactance directly (see superb article by W6SIY in July 1987 issue of the Quarterly). Palomar puts out the best one I've seen, portable and small, it will fit in your pocket.

An HW-8 transceiver powered by nicad batteries, along with noise bridge and grid dip oscillator, provides a portable antenna test set that can be carried outside, right to the antenna terminals. The simple S-meter circuit (QST November 1979, page 57) added to the HW-8 greatly increases its versatility for noise bridge use.

A NEAT WAY TO TUNE A DELTA LOOP ANTENNA



Tune loop by sliding pipe towards loop or away from loop. This makes the loop smaller or larger, and changes the resonant frequency.

Since the ends of my loop come through a window directly into the shack, it is very easy to work on. A small knot tied near the end of each wire keeps it from slipping through the crack beneath the window, without impairing performance and, if an antenna tuner is connected (balanced input) directly to the loop or via a length of balanced line, all higher harmonically related bands can be tuned, with surprising performance. Also, if a couple of 33 foot wire radials can be placed around the perimeter of the room, connected to the antenna tuner ground terminal, the loop can be an effective "longwire" on 80 meters.

The Delta Loop antenna is an excellent performer; try one and see!

On Two-Element Beam Antennas

Bob Brown NM7M
504 Channel View Dr.,
Anacortes, WA 9821

If you're into QRP DXing, sooner or later you come to realize that a beam antenna is a necessity, not a luxury. Just when that happens to you depends on a lot of things, say your DXCC count staying constant for an unbearably long time or just plain envy at what you hear the other folks talking about on the 2 meter DX net.

So you start hankering for something better than that vertical or dipole of yours. How far down the road you go seems to depend on a lot of factors, some even beyond your control. Be that as it may, a two-element beam will get you started, perhaps something like a two element quad. When you've learned all you can about that antenna and reached your next mid-life DX crisis, you can go on to better things. So let's start at a modest level and talk about two-element beams, their variety and how they work.

If their variety dazzles you, don't worry. They all work on the same basic principle, constructive and destructive interference of RF wave trains coming from the two radiators. The differences are really in their geometry, some beams using conventional arrangements of their elements while others have something of an unorthodox arrangement about them. You can rest assured that just about every one of those beams has been built and used at one time or another. That's responsible for some of the lore in DXing, antennas working above or below expectations. So the problem is to sort one's way through all those antennas - phased verticals, W8JK's, Yagis, Quads, X-beams, variations of the Button Beams, etc. - and the claims made for them, identifying the essentials which are responsible for their main features, whether good, bad or indifferent.

Now getting down to fundamentals, we all know that two-element beams are just like any other antenna, their patterns depending on the interference of the wave trains from the radiators. The problem is to determine the currents in the elements from their shape and spacing. Once that is done, it's fairly simple to get to the radiation fields from the current distribution. That last remark should be qualified a bit by saying it applies mainly to simple geometries, like those with dipole-like radiators. Thus, one finds an excellent theoretical treatment of W8JK's, phased verticals and Yagis in books like "Antennas" by John Kraus W8JK, or "Yagi Antenna Design" by James Lawson W2PV, published recently by the ARRL. It should be noted that the ARRL book on Yagis also gives some practical designs as well.

But Quads are another matter, the theoretical side available to the likes of you and me being limited to an analytical calculation of the radiation field from a driven loop with a square shape. Also, while the interaction of dipole-like elements has been well known for decades, the same is not true for loop antennas. Thus, theorists can treat Yagis like coupled circuits, knowing all the self and mutual impedances needed to calculate the currents. However, when it comes to loops, they are not as fortunate and numerical techniques are essential, substituting for an analytical approach in working out their properties.

Until recently, good numerical methods were available only for those with access to mainframe computers. Thus, an extensive literature came forth, based on use of the Numerical Electromagnetic Code (NEC), and even an organization, the Applied Computational Electromagnetic Society (ACES) where such techniques and their results were reported. For ham radio, however, the spin-off of this approach came when the NEC was brought down in size to the point where it could fit into personal computers, first through MININEC and now through a revised version MININEC 3. Thus, within the memory limits of one's computer, some antenna problems can now be tackled where earlier they defied analytical approaches and thus were beyond our reach, quantitatively speaking. That remark applies primarily to Quad antennas and non-traditional variations of the Yagi; the approach to the classical Yagi still rests on sound analytical methods and designs are facilitated mainly by the speed of PC's.

For example, one technique for Yagis, discussed by Kraus, is to load a reflector with an inductance at its center rather than lengthen it or load a director with a capacitance rather than shorten it. With only a modest computer program, the effects of those reactances on the gain, F/B ratio and feed-point impedance of a Yagi are easily obtained.

While a number-crunching program like MININEC 3 can be used to work out the design of a two-element Quad, checking the results in something else. For example, the computer program can work out the feed-point impedance, pattern, gain and F/B ratio when the antenna is located at a height H above a perfect ground plane. Okay, those numbers will be of interest and serve as a guide to you but seeing what you actually have over a real ground is something else, particularly since most ham shacks do not abound with equipment for antenna measurements. But all is not lost, there are ways to check out an antenna. For example, for a square Quad that is fed at the midpoint of its bottom section, its radiation pattern is horizontally polarized. If you have a horizontal dipole whose height is the same as that at the center of the Quad, that would be of help in estimating the gain of the beam. The only word of caution is that the dipole should have the same orientation and be at some distance, say a wavelength or more, so as not to have a significant interaction with the quad and its pattern.

As for the F/B ratio of a two-element beam, that really involves the gain at the center of the main lobe of the antenna, typically at 30-35 degrees above the horizon for a height H of about half wavelength, and the minor lobe at the back of the antenna at the same angle. If you're an avid QRP'er, you know that the RTTY and AMTOR types hang out on 20 meters just above the TCN frequency, 14.060 MHz. Since those people seem to transmit endlessly, you might make a quick check of your F/B ratio by taking a peak reading of one of them on your S-meter and then spinning your beam by 180 degrees and taking another reading. If you have a RTTY or AMTOR terminal unit, you can even "read the mail" to locate to QTH's involved. So, if you're picking them up on a single F hop and they're 700-1000 miles from you, you'll get an estimate of the F/B ratio of the beam. Of course, if you're in the Midwest, another approach would be to try one of the daily bulletin transmissions sent out by W1AW; that's just as good.

The feed-point impedance of a beam is another thing. As you know, by using a line with an electrical length that corresponds to a half-wavelength, you can see what the impedance is at the other end of the line, say at the antenna feed-point. The real problem comes in what you use to make the measurement. I say that as the simple noise bridges that one can buy are notoriously poor in their dial calibrations. Thus, some sort of re-calibration is needed or the use of a more sophisticated impedance bridge. In any event, you'll be interested in knowing what is the feed-point impedance of the beam. You can bet your bottom dollar it will not be 50 ohms, so you'll have to do some figuring to find a way to feed that antenna if it meets your other expectations. In that connection, most Yagis use a gamma match at the feed-point while one can also use a gamma match or an RF transformer in matching the feed-point impedance of a Quad to that of the transmission line. For the Quads, you can see the Hy-Gain or Cubex brochures for details.

While the MININEC 3 program does yeoman service in working out the features of conventional Yagis and Quads, the program readily comes into its own when we get to Yagis with odd shapes, say the X-beam and the variations of the VK2ABQ Button-Beam. In case you can't conjure up mental images of those antennas, you might turn to the chapters on close-spaced or horizontal beams in the RSGB Antenna Book by G6XN. Anyway, it is not difficult to explore those antennas with the MININEC 3 program. All you have to do is put in a set of cartesian coordinates for the ends of the various sections of the antenna, specify the wire size and the height above ground. When that's done, just type <RUN> and MININEC 3 does the rest. For example, you can ask the program to calculate the currents in the wires and the feed-point impedance of the antenna. When you have that, the next step is to have the program calculate the far-field radiation pattern at whatever elevation angles or azimuths you desire. You can even ask MININEC 3 to change the frequency and explore the bandwidth of the antenna. If one has literature on traditional Yagis, then you can see how the beams with compromise geometries compare with the standard designs. In that way, one can see the cost/benefit ratio, as it were, that obtains with the smaller size and geometry. Before we look at the features of these beams, however, it should be noted that one of the first points made in the RSGB Handbook is that main contribution to the RF field of a dipole comes from the central portion of the radiator. That idea serves as the basis for several variations on the dipole, the ends going off at various angles with respect to the main portion of the wire. Turning to variations on the two-element Yagi, that feature is prominent, the ends of the two elements being bent back and then tied together by insulating material.

The differences between these non-standard geometries are found in the separation of the ends of the two elements as well as the spacing of the central portions. For example, the VK2ABQ beam has folded ends which are one-eighth of a wavelength or less in length and the central portions of the two elements are parallel. One extreme is the so-called "Button Beam" which is essentially square in shape with a small spacing (the size of most coat buttons) between the ends of the two elements. That places the central portions of the radiators about a quarter-wave apart. On the other hand, folding back less of the ends results in a shape more like that of a rectangle and the spacing of the central portions of the elements comes closer to that found with more conventional Yagis, 0.1 to 0.2 wavelength. The other extreme, the X-beam, is the case where the central portions of the two elements are pulled close together, in something like the shape of an X, and the ends of the elements folded back more than 90 degrees. In that case, each of the four arms, or branches, of the X is a quarter-wave or less in the length, the remaining portion being folded back and tied to the corresponding portion of the other radiator.

By applying MININEC 3 to these problems, one may obtain quantitative measures of the principal features of each beam where, earlier, nothing but qualitative statements are available. Thus, one finds that the variations of the VK2ABQ "Button Beam" compare rather favorably with two-element Yagis of the same size when it comes to gain and F/B ratio. The surprise is that bringing the ends of the elements into close proximity with each other results in a higher feed-point impedance, in the range of 200 ohms. Without that knowledge, one probably would have difficulty in feeding the antenna properly. Similar results are obtained with the variation of the VK2ABQ beam with a diamond like shape.

The X-beam, on the other hand, compares poorly with a two-element Yagi of about the same physical size as the gain, F/B ratio and the feed-point impedance is on the low side. The reason for this is not hard to find: the very close spacing of the portions of the radiators in the X-beam which carry the greatest antenna current. While the average geometrical spacing of the driven and parasitic radiators in an X-beam is about .12 wavelength, if one weights the separations of antenna segments according to the current in them, the mean separation of the elements is considerably less, more like .03 wavelength. Thus, the X-beam suffers from the features of a closely-spaced Yagi - low gain, poor F/B ratio and a low feed-point impedance - making it little better than a simple dipole and thus probably not worth the effort in putting it up.

However, this should not discourage one from playing with those non-conventional beams. For one thing, they might provide a good answer to FD situations where you don't want to waste your RF in unwanted directions, like out into the Pacific or Atlantic from coastal sites. With their smaller size, they could well be squeezed into tight locations where a full-sized beam wouldn't fit. And for FD, short-haul contacts are the rule of the day so the beam need not be placed as high as for DXing. So this could be a good way for you to work into beams, learning about them without having to tear up the family antenna farm.

As I said at the start, one of these days you'll have a beam; it's only a matter of time. After all, surveys show that more than 85% of DX stations that QRP'ers work have a two-element beam or better. Why sit on the sidelines when you could be in there, DXing with the best of them, QRP'ers that is.

Classified Ads

☎✉☎✉☎✉☎✉☎✉

For Sale: Operating Heathkit HW-8 QRP TX/RX and HWA-7-1 power supply, both with manuals and Ade Weiss' modification booklet. HW-8 has receiver sensitivity mods, speaker, and audio filter installed. Ade Weiss RIT mod is built and tested, ready to install. Most parts for SWR/wattmeter. Just the thing to get a person into QRP, for the right price $55 FOB. Jack Horner KA6SPY, 470 Hillcrest Pl. #5, Friday Harbor, WA 98250 (206)378-5377

Wanted: How many QRP ops are on packet? Would like to put together a list of call, state and home PBBS for QRP-ARCI. Please send your call, state, and home PBBS to K8DD at NM8X-9. Or to Hank Kohl, 1640 Henry, Port Henry, MI 48060.

☎✉☎✉☎✉☎✉☎✉

For Sale: TV-502, TV-506 mint, $150 each plus shipping. 48' aluminum tower, 18-14" sections, $350, pick up only.

Wanted: 220, 432 XVTRs and antennas. Time Colbert WA8MLV, General Delivery, Burton, Ohio 44021

☎✉☎✉☎✉☎✉☎✉

For Sale: TenTec Model 219 CW filter for Argosy, others. 250 Hz. $40. James Flynn KD9ZT, Box 32, Dana, IL 61321. (815)854-2280.

☎✉☎✉☎✉☎✉☎✉

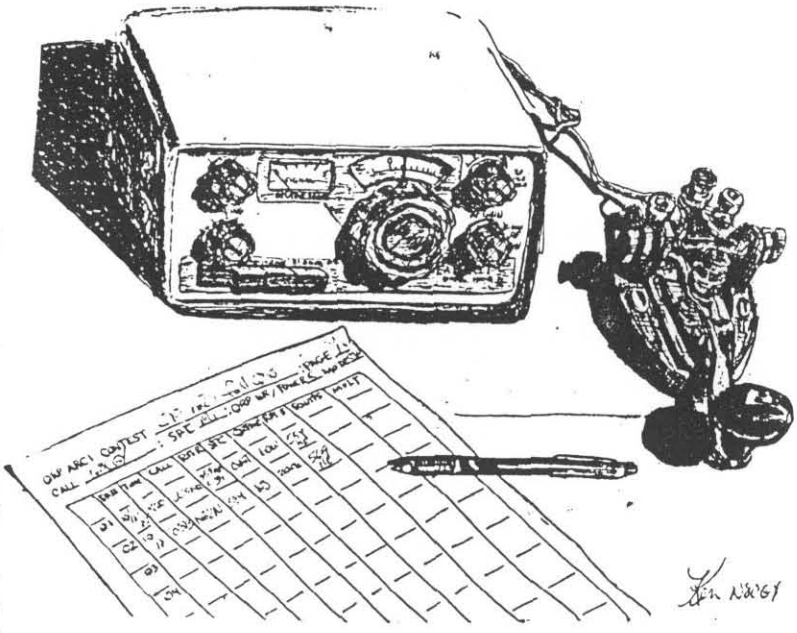
For Sale: Heath HW-8 with AC power supply and manual. Contact Dick Swanson, N5JWL, 714 Cypress Cliff Dr., San Antonio, Texas 78245. days: 512-521-5105; nights 512-270-0306.

☎✉☎✉☎✉☎✉☎✉

Wanted: Manual, or at least a schematic, for the HW-7. Photocopies quite acceptable. Mike Czuhajewski, WA8MCQ, 2934B Olive Court, Fort Meade, MD 20755.

Contesting

by Red Reynolds, K5VOL
835 Surryse
Lake Zurich, IL 60047



Apologies are due to a number of fellows for omitting their calls from the Fall QSO party results. Due to errors in addresses announced and the post office taking 25 days to forward the entries, the entries of K1CGJ, WA1JXR, K1KDG, AI2S, N2AZS, KB8AOB, K8HTV, AI0W and G4EBO were received the day after Christmas. Also for the Fall QSO Party, K7KJM should have been listed as the 20 meter winner. This was a result of a transposition error by yours truly.

The good news is that **Lou Nix, WD5GLO,** is now the assistant contest manager. This is to accomplish two things: one, to provide help with the contests for the contest manager; and second, and more importantly, to provide the club with backup in the contesting department and avoid a switch to a totally new manager should one of the managers become unable to continue. The change could be softened, regardless of whoever takes over.

The Spring QSO Party will occur just a few weeks before the big Dayton QRPvention, so bring along your logs and a supply of QSLs to swap with some of the QRPers in attendance. You can also deliver your entry to the contest manager, saving postage and grief. Those mailing an entry might include a self-addressed and stamped QSL or postcard to be mailed as soon as the entry arrives, letting you know your entry has been received.

A special thanks to the check logs. These proved very valuable when some entrants did not indicate whether their QSOs were running as a homebrew or commercial entry! Cross checking and entering this information can easily become a nightmare. There were a lot of positive comments from the entries. Most of the QRPers are excited about using homebrew rigs in a special sprint. With the club's "Two-fer" project, we should have even more next time! It's not too early to get started on homebrew rigs for the next one and the summer version of the homebrew sprint.

A few changes are planned for next year's holiday spirits sprint. These include two classes of entry, an all-homebrew and a mixed homebrew/commercial class. Also the "Two-fer" entries get double bonus points. All-commercial gear entries will become check logs.

Both the Spring QSO Party and the Summer Homebrew Sprint provide bonus points for homebrew along with single-band entries. Get started on your homebrew gear. reprints of the original "two-fer" Quarterly article are available from both KN1H and K5VOL for the usual SASE.

New rules have been added, effective with the Fall QSO party and are strongly suggested for the above contests. These include a dupe sheet for entries with over 100 QSOs and inclusion of the amount of time operating. The 40% rule is now in effect. Watch for the new multiplier system and a new entry class to become effective with the Fall QSO party. Analysis of the past year's contests indicate there will not be a multiplier based on antennas and that there will be only two power classes in the future. Continued monitoring of the results will allow adjustments as they are needed.

QRP ARCI Holiday Spirits Homebrew Sprint

*** COMMERCIAL ***

	CALL	S-P-C	SCORE	BND	PWR		RIG	ANTENNA
	K1OG	CO	2,744	20	3.0		HW-9	YAGI
	VE2ABO	QUE	528	40	1.5		HW-8	LOOP
*	W4FRL	FL	33,048	A-2	4.0		HW-8	VERTICAL
	W6YVK	CA	20,664	A-3	2.5	S	ARGO 509	YAGI/DIPOLE
*	K9PNG	IL	20,320	A-3	2.0		ARGO 515	LONGWIRE
	KC9UR	IN	14,036	A-4	5.0		ICOM 740	VERTICAL
	NG1G	VT	13,176	A-3	2.5		HW-9	LOOP
	NL7DU	AK	6,960	A-2	4.5		TS-430S	YAGI
	WD9IWP	IL	5,880	A-2	.9	B	HW-8	INV VEE
*	NM7M	WA	4,704	A-2	5.0		CORSAIR	YAGI
	N7IS	WA	1,248	A-3	1.5		HW-8	SKELETON CONE

CHECK LOGS: WA8MCU, AB4AS, K4KJP

*** HOME-BREW ***

	CALL	S-P-C	SCORE	BND	PWR		RIG	ANTENNA
*	KZ1L	MA	24,150	20	.98	B	HB RX/PARAGON TX	G5RV
	K9AY	CO	9,572	20	2.8	B	HB TCVR (SUPHET)	GROUND PLANE
	WORSP	SD	4,892	20	1.5		HB TCVR	---
*	KH6CP/1	CT	40,580	40	.86	S	HB TCVR (SUPHET)	DIPOLE
*	W1KKF	CT	40,460	40	2.4	B	HB TCVR	G5RV
	N8GJR	OH	17,700	40	.9	B	HB TX /SUPHET RX	PHASED VERT
	KM8X	MI	14,135	40	.95	B	HB VXO/SUPHET RX	---
	W1FMR	NH	7,380	40	.80		HB TX / DC TX	LOOP
	WB7BIV	OR	5,900	40	.40	S	HB TUNA-TIN-2 / HERRING-AID-5	CCD DIPOLE
	K5VOL	IL	5,710	40	.45	B	HB VXO / DC RX	LONGWIRE
	NJ7M	ID	5,364	40	1.5		HB VXO/SUPHET RX	DOUBLE ZEPP
	WA3SRE	PA	5,192	40	1.5		HB TX / ARGO 515	VERTICAL
*	W6JHQ	CA	2,180	40	3.8		HB TX / HR1680	G5RV
	W6SIY	CA	1,380	40	.25		HB TUNA TIN-2/RX	DIPOLE
	W2JEK	NJ	950	40	.65	B	HB FOXX	DIPOLE
	K4KJP	FL	740	40	.20	S	HB TUNA TIN-2/--	SLOPE DIPOLE
*	W3TS	PA	247,300	A-6	.90	S	HB TCVR (SUPHET)	DP/TEE/ZEPP
	KB1MJ	MA	30,700	A-3	.80		HB TX/RX (SUPHET)	---
	WB5FKC	TX	19,540	A-3	.90		HB TCVR (SUPHET)	PHASED VEE'S
	JH4UYB	JAPAN	424	A-2	2.0		HB TX / COMM RX	YAGI

GENERAL CONTEST RULES - QRP ARCI CONTEST / SPRINTS

DATE/TIME- MM/DD/YY-HHHHZ THROUGH MM/DD/YY-HHHHZ

EXCHANGE - MEMBER - RST, STATE/PROVIDENCE/COUNTRY, ARCI NUMBER
NON-MEMBER - RST, STATE/PROVIDENCE/COUNTRY, POWER OUT

** HOMEBREW SPRINTS, RST SUFFIXED W/ 'HB' OR 'C',
INDICATING HOMEBREW OR COMMERCIAL EQUIPMENT.
'HB' SHOULD BE USED ON ALL BANDS IF HOMEBREW
GEAR IS USED ON ANY BAND. 'C' IS USED ONLY
IF ALL GEAR USED IS COMMERCIAL.

POINTS - MEMBER - 5 POINTS
NON-MEM, DIFFERENT CONTINENT - 4 POINTS
NON-MEM- 2 POINTS
** HOMEBREW SPRINTS, IF STATION WORKED IS USING HOMEBREW,
ADD 5 POINTS (IE, NON-MEM USING HB: 2 + 5 = 7 POINTS).

MULT SPC TOTAL ALL BANDS
THE SAME STATION MAY BE WORKED ON MORE THAN ONE BAND FOR
POINTS AND S-P-C CREDIT.

** HOMEBREW SPRINTS, SPRING AND FALL QSO PARTIES
BONUS POINTS (HOMEBREW EQUIPMENT USED EACH BAND WORKED)
+ 200 FOR EACH BAND HB TX USED
+ 300 FOR EACH BAND HB RX USED
+ 500 FOR EACH BAND HB TCVR USED
(MAXIMUM OF 500 / BAND ON WHICH QSO MADE)

POWER SUPPLY MULTIPLIER
X 1.0 - COMMERCIAL POWER
X 1.5 - BATTERY
X 2.0 - SOLAR/NATURAL, OR BATTERY CHARGED ONLY BY
SOLAR OR NATURAL POWER.

POWER MULTIPLIER
X 10 - 0-1 WATT OUT CW (0-2 WATTS PEP SSB)
X 8 - 1-2 WATTS OUT CW (2-4 WATTS PEP SSB)
X 6 - 2-3 WATTS OUT CW (4-6 WATTS PEP SSB)
X 4 - 3-4 WATTS OUT CW (6-8 WATTS PEP SSB)
X 2 - 4-5 WATTS OUT CW (8-10 WATTS PEP SSB)
X 0 - OVER 5 WATTS (10 WATTS PEP) IS A CHECK LOG

SUGGESTED FREQUENCIES

	--CW--	--PHONE--
160M -	1810 KHZ	
80M -	3560, 3710 KHZ	3985 KHZ
40M -	7040, 7110 KHZ	7285 KHZ
20M -	14060 KHZ	14285 KHZ
15M -	21060, 21110 KHZ	21385 KHZ
10M -	28060, 28110 KHZ	28885 KHZ
6M -	50060 KHZ	50885 KHZ

CALLING - 'CQ QRP, CQ QRP, CQ QRP DE K5VOL, K5VOL, QRP TEST K',

SCORE = POINTS * SPC * POWER MULT * POWER SPLY MULT + BONUS.

ENTRY MAY BE AN ALL-BAND ENTRY, OR A SINGLE BAND ENTRY, COMPETE AGAINST OWN CLASS OF ENTRY. CERTIFICATES TO THE TOP 10 SCORES OVER-ALL FOR THE QSO PARTIES, AND THE TOP 3 SCORES FOR SPRINTS. CERTIFICATES TO THE TOP SCORE IN EACH BAND FOR SINGLE-BAND COMPETITORS. CERTIFICATES WILL BE ISSUED TO THE TOP SCORE IN EACH S-P-C AND CLASS IN WHICH 2 OR MORE ENTRIES ARE RECEIVED, AND THE SCORE IS AT LEAST 40% OF THE AVERAGE OF THE TOP 10. THE 40% RULE APPLIES ONLY TO THE SPRING AND FALL QSO PARTIES. SINGLE BAND ENTRIES APPLY ONLY TO THE HOMEBREW SPRINTS AND THE SPRING AND FALL QSO PARTIES.

ENTRY INCLUDES A COPY OF THE LOGS AND A SEPARATE SUMMARY SHEET. INCLUDE DUPLICATE CHECK SHEETS WITH ENTRIES OF 100 QSO'S OR MORE. INDICATE THE TOTAL TIME-ON-AIR, INCLUDING TIME SPENT LISTENING. ALL ENTRIES MUST INCLUDE A COMPLETE NAME, CALL AND ADDRESS. ALL ENTRIES MUST BE POST-MARKED WITHIN 30 DAYS FOLLOWING THE CONTEST. LATE ENTRIES WILL BE COUNTED AS CHECK LOGS. MEMBERS INDICATE THEIR MEMBERSHIP NUMBER ON ALL LOGS. MEMBERS AND NON-MEMBERS INDICATE THEIR INPUT OR OUTPUT POWER FOR EACH ENTRY. THE HIGHEST OUTPUT POWER LEVEL USED WILL DETERMINE THE POWER MULTIPLIER. OUTPUT POWER IS CONSIDERED AS 1/2 OF THE INPUT POWER. IN THE SPRING AND FALL QSO PARTIES, A MAXIMUM OF 24 HOURS MAY BE OPERATED WITHIN THE 36 HOUR TIME PERIOD.

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.

A SUMMARY SHEET AND SAMPLE LOG SHEETS ARE AVAILABLE FROM THE CONTEST MANAGER FOR AN SASE WITH 1 UNIT OF POSTAGE.

INCLUDE AN SASE WITH 1 UNIT OF POSTAGE IN THE ENTRY FOR A COPY OF THE CONTEST RESULTS. RESULTS WILL BE PUBLISHED IN THE NEXT AVAILABLE ISSUE OF THE QRP ARCI QUARTERLY.

SEND ENTRIES TO:
RED REYNOLDS, K5VOL
QRP ARCI CONTEST MANAGER
835 SURRYSE ROAD
LAKE ZURICH, IL. 60047
U. S. A.

Corrections to Fall CW Contest results:

KA5GIS/1 ran .4 watt power level, not 4 watts, as listed Contest information was reversed for K7KJM, in Oregon, and WB5CTS, in Oklahoma. K7KJM was the actual winner in the 20 meter single band category. The results should have read as follows:

WB5CTS	Steve	18,112	5w	3 bands	HW-8	random wire
K7KJM	Greg	23,520	1.5w	20M	Corsair	Yagi

QRP ARCI Winter Fireside Sprint

	CALL	NAME	S-P-C	SCORE	BND	PWR PEP	RIG	ANTENNA
*	W8WVR	WAYNE	OH	70,890	4	1.8 B	ARGO 509	DIPOLE
*	W3TS	MIKE	PA	41,100	4	1.0 S	HOMEBREW	INV V/T/SQU
*	N2GGW	BRIAN	NY	31,815	4	1.8 B	ARGO 509	DIPOLE
*	N7FEG	MAURICE	CA	26,880	1	2.0 S	ARGO 515	YAGI
	WD5GLO	LOU	OK	13,680	3	3.0 B	ARGO 509	YAGI/DIPOLE
	W2PFS	HAROLD	NY	11,520	4	4.0	TR-7	FAN DIPOLE
	WB5KFC	CHRIS	TX	4,480	3	2.0 S	HOMEBREW	INV VEE
*	WD9IWP	TOM	IL	2,457	2	6.0 B	IC-735	VERTICAL
	K5VOL	RED	IL	1,736	1	4.0	ARGO 509	LONGWIRE
	W9ZSJ	GEORGE	IL	1,176	1	10.0	---	---
	W1FMR	JIM	NH	1,008	3	10.0	ARGOSY	LOOPS
	KZ1L	ANDREW	MA	728	2	10.0	TEN TEC	G5RV
	W1KKF	BILL	CT	600	1	6.0	TS-820	G5RV
	K9PNG	JIM	IL	510	1	2.0	ARGO 515	LONG WIRE
	W6SIY	KEITH	CA	56	2	3.85	TT DELTA	MINI QUAD

* = certificate winners
Check Logs:
KH6CP

Contest forms can be found on pages 26 and 27.

A Cardbox 40 Meter Trans-Receiver

by Steven Morris, N5JBB
9813 Rustic Road,
Sand Springs, OK 74063

I have always wanted to work portable while camping, but have not done so because I own tube type "boat anchors". This rig was built with backpacking, camping and hotel room use in mind. It is simple, small, low cost and easy to build; consisting of a crystal controlled transmitter and a direct conversion receiver of good sensitivity and dynamic range.

The unit, shown in fig.1, is built into a 3X5 card box on a chassis split into separate transmit and receive sections. The chassis is constructed from double-sided PC board material soldered together to form a shelf off the front panel to which the circuit boards are attached. The receiver board, shown in fig.2 is mounted atop the shelf, while the transmitter board (fig.3) is attached to the underside.

The receiver is a direct conversion type based on the low cost 1496 mixer chip, as shown in fig.4. It contains an oscillator, antenna circuit, 1496 product detector, low noise audio preamp and an LM 386 headphone amplifier. The oscillator circuit was lifted from DeMaw's QRP Notebook. The antenna circuit is tuned to reject out of band signals. The center tap of T1 is used to supply bias currents to the 1496 mixer while maintaining the high input impedance looking into its signal ports. This helps to raise the Q of the antenna circuit. The VFO signal is injected into the carrier port of the mixer using a small capacitor to minimize pulling the VFO. The dynamic range of the mixer can be adjusted by varying R8. I have tried both a 100 ohm and 1K resistor with good results. RF filtering at the mixer audio output is done by C10, R11 and C11.

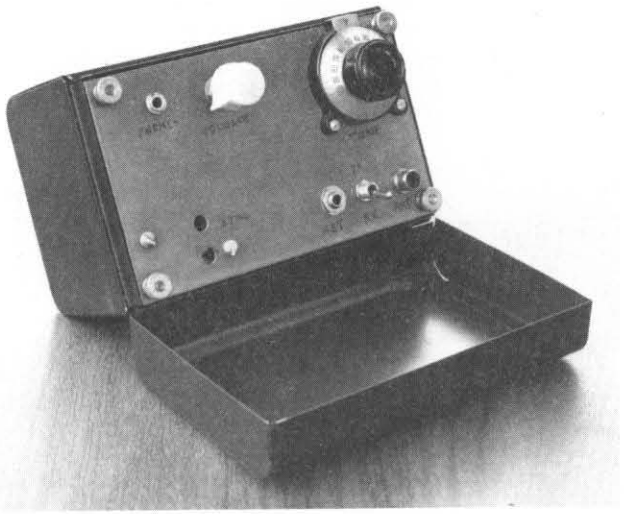


Figure 1: The little rig fits nicely into a common 3x5 inch index card box.

The audio preamp uses a low noise 2N5210 transistor running at a voltage gain of 10. C13 is used to set the 3db response of the amp at 1000 Hz. Additional gain can be achieved by bypassing R18 with a 10 microfarad capacitor.

The LM386 headphone amplifier is a common circuit. Additional gain can be gotten by installing R18 and C16.

The receiver is built on a 3.5 by 2 inch board as shown in fig.5. A component placement diagram is also shown.

The transmitter circuit, fig. 6, uses a modified "Universal QRP Transmitter" circuit taken from the Handbook

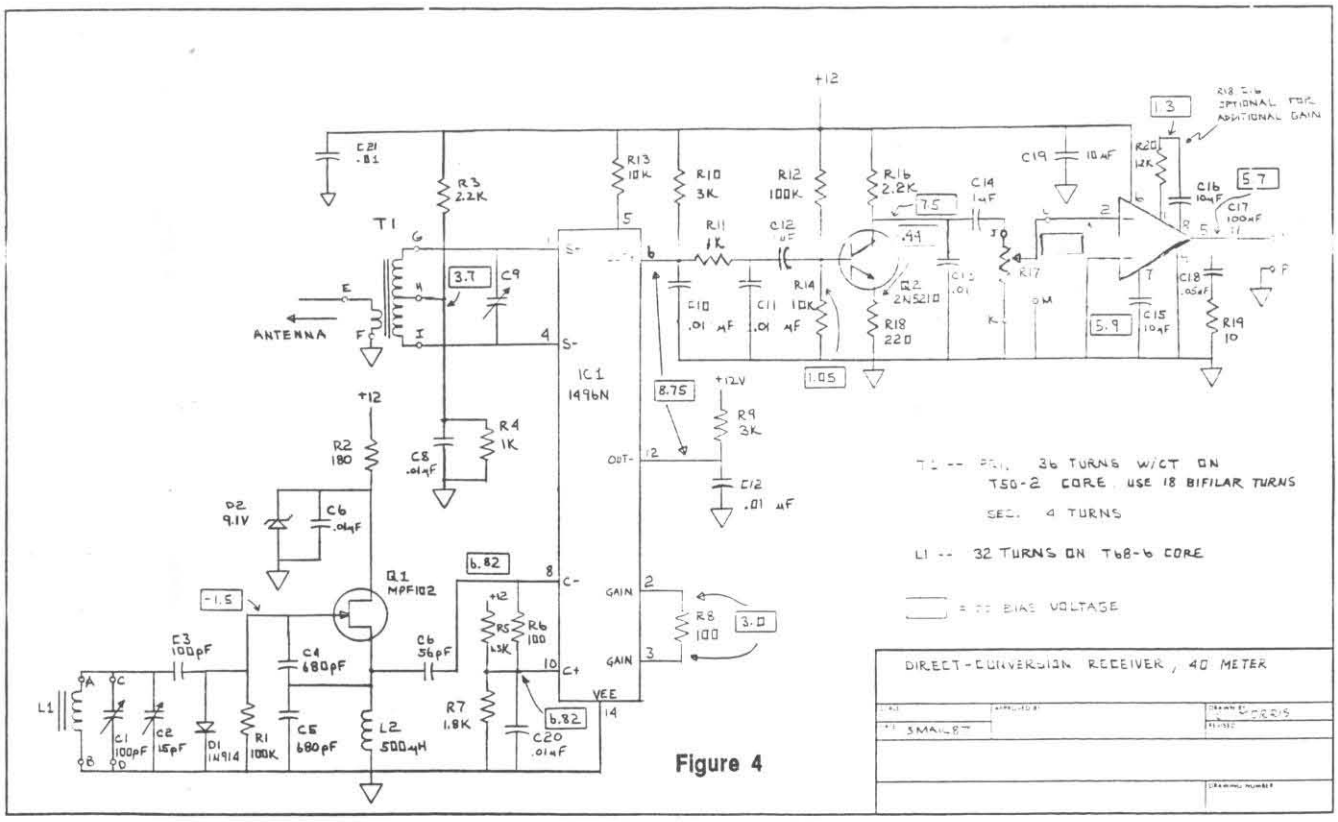


Figure 4

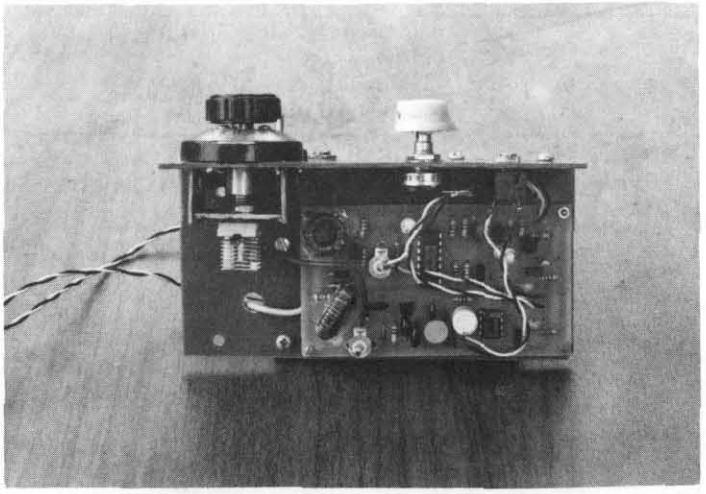


Figure 2: Receiver board is attached atop the shelf.

of Solid State Design. A PNP power transistor was used as the PA because of junk box availability. This change simplified wiring the TX/RX switch. The MPS-U57 is a miniature power transistor capable of dissipating several watts. It has a fT of 50 MHz, a breakdown voltage of 100 volts, and costs about a dollar each. The circuit keys very well, although experimentation with the value of C2 is recommended. Fig.7 shows a suggested layout for the transmitter, which matches the receiver board size. A component placement diagram is also shown. The output of the transmitter is about 4 watts when running off a 20 vdc supply and 1.5 watts from 12 vdc.

After the receiver circuit is constructed, you should check for shorts across the power supply before applying power. Compare the DC operating voltages of your circuit against those noted in fig.4 to help verify correct wiring. Set the unit next to a calibrated receiver, and with C2 at maximum capacitance, adjust C1 to oscillate at 7.000 MHz. If you have a signal generator, inject a 1mV 7.001 MHz signal into the antenna terminal. With an AC voltmeter on the audio output, adjust C9 for maximum output. If no signal generator is available, you'll have to peak the antenna circuit by ear.

If you have any trouble with BC stations overloading the mixer, increase R8 to 1000 ohms. This will reduce the gain of the mixer and you may need to add more gain by bypassing R18 or installing R20 and C16.

The transmitter circuit requires only the adjustment of C5 to get it working. Use 75pf as a starting value for C2. Insert a crystal and key the oscillator with the TX/TR switch in the RX position. You can adjust C5 until you hear the oscillator in a receiver. Use a dummy load and an RF wattmeter to fine tune C5 until you get the best output. You may have to adjust the value of C2 for best oscillator keying.

I have separated the receiver and transmitter power supplies so that the transmitter voltage can be increased without bothering the receiver. I usually operate off two 10 volt, 500 mAHr batteries in series. The receiver runs off the first battery at 10 volts, while the transmitter runs off the two in series at 20 volts. I have tried running the transmitter at 28 volts and blew the final in several seconds. This was probably from overdriving the base of Q2 and could be remedied by reducing the number of turns on the secondary of T1.

continued p. 25

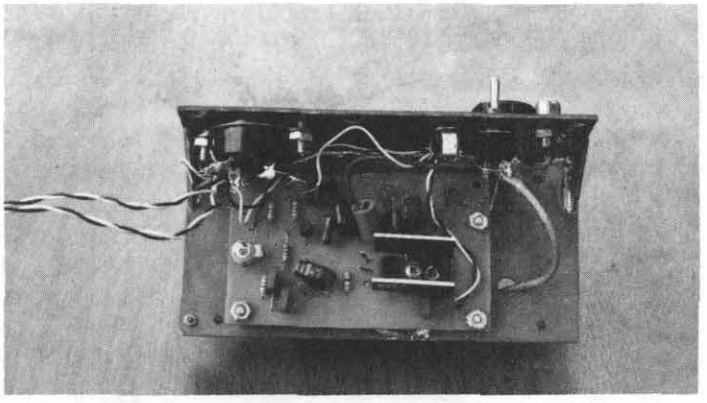


Figure 3: Transmitter board is attached to the underside.

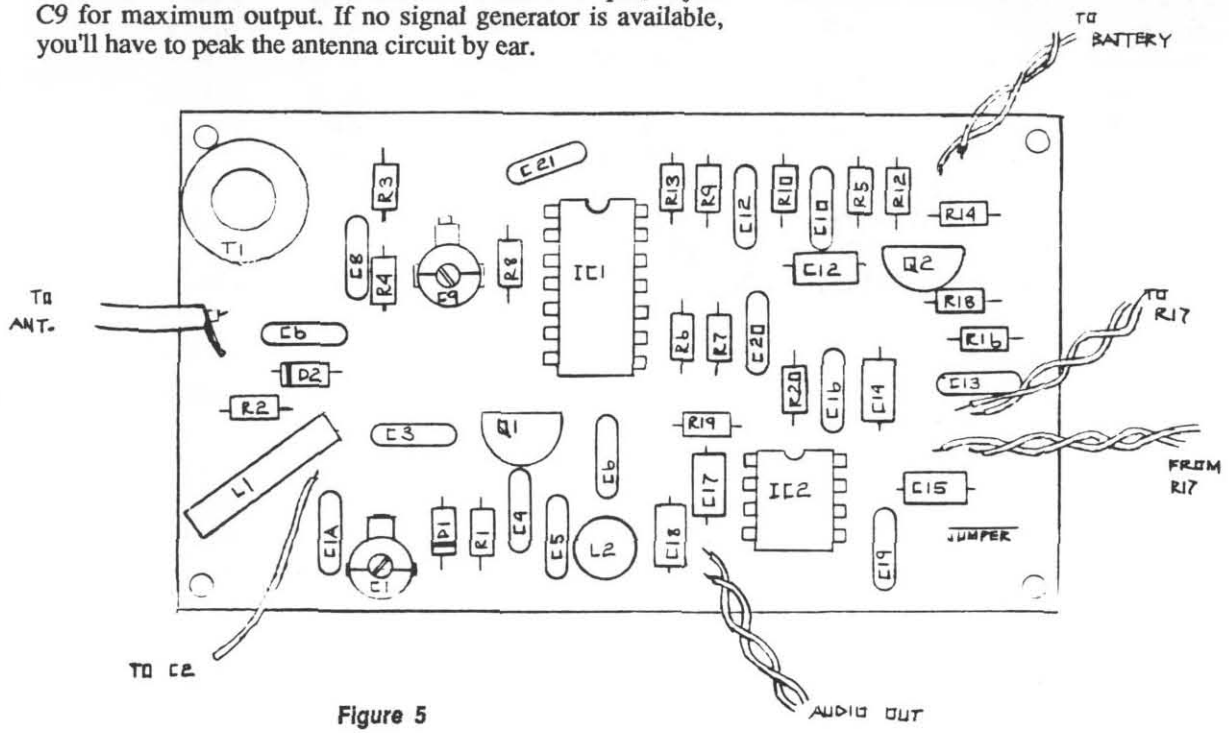


Figure 5

Note to constructors:
Difficulty in reproducing drawings and space limitations were unavoidable. Some figures referred to may not have been included. Anyone wishing a complete set of full size drawings should sent an SASE to Paula Franke, WB9TBU.

Awards

Awards Manager Fred Turpin K6MDJ
Box 9145
Cedarpines Park, CA 92322

Call	Date	Basic	Endors., M/W, notes etc.	Power	Mode	Band
KM/W						
KE7JH	02-10-87	978	To ON7ZM/EA8, 21K M/W	5.0	SSB	14MHz
AA2U	02-10-87	979	To N5RM 16.181 Mega M/W	.000080	CW	14MHz
WB9TBU	02-28-87	980	To ZS6YW, 1735 M/W	5.0	CW	14MHz
WD9BGA	02-28-87	982	To N7EUT 2456 M/W	.5	CW	7MHz
KA9UVD	04-19-87	984	To WX4V (data)	5.0	CW	3.5MHz
WS6L	04-19-87	985	To JA7OYF (data)	5.0	CW	14MHz
GOBVZ	04-19-87	986	To WB2GAY, 1111 M/W	3.0	CW	14MHz
KF5OW	05-23-87	987	To ZL1BHG, 7360 M/W	4.0	SSB	7MHz
N2GGW	05-23-87	988	To KB7ID, 2691 M/W	.75	CW	7MHz
KD2JC	06-10-87	989	To 9Q5KI, 2119 M/W	3.0	CW	14MHz
K2UD	06-10-87	990	To K4ADI, 4667 M/W	.150	SSB	50MHz
KF5OW	06-11-87	991	To KH6JEB, 1385 M/W	3.0	SSB	21MHz
WF6D	06-11-87	992	To VK2BHG, 1484 M/W	5.0	CW	7MHz
AI2S	06-17-87	993	To KH6XX, 1564 M/W	5.0	CW	21MHz
JP1NDO	06-17-87	994	To AH2U, 5370 M/W	.3	SSB	21MHz
KA3OQQ	07-02-87	995	To WA5ZKL, 3360 M/W	.35	CW	14MHz
K3DML	07-12-87	996	To NM7M, 2746 M/W	1.0	CW	14Mhz
JA1VDJ	07-28-87	997	To ZS1H, 4170 M/W	2.16	CW	14MHz
N1EAV	09-11-87	998	To PY5BAB, 1513 M/W	3.0	CW	14MHz
KF5OW	09-11-87	999	To SM6CVX, 1037 M/W	5.0	SSB	14MHz
G4XVE	09-12-87	1000	To W8RSW, 1631 M/W	2.4	CW	14MHz
NXOQ	09-12-87	1001	To VK4UG, 1558 M/W	5.0	CW	14MHz
KF5OW	09-25-87	1002	To J37AH, 1079 M/W	3.0	SSB	3.9MHz
KF5OW	09-25-87	1003	To TI2LCR, 2238 M/W	1.0	SSB	28MH
KF5OW	09-25-87	1004	To EA8ACH, 1021 M/W	5.0	SSB	7MHz
KF5OW	09-28-87	1005	To KX6AO, 1435 M/W	4.0	SSB	14MHz
KAOMGR	09-25-87	1006	To CT2AK, 1043 M/W (KF5OW)	4.0	RTTY	21MHz
KF5OW	10-10-87	1007	To VE4CW, 1100 M/W	2.0	SSB	50MHz
VE6AML	11-08-87	1011	To CE3ZU, 11,377 M/W	.562	CW	14MHz
WA7SCW	11-15-87	1012	To JJ1FSK, 1092 M/W	5.0	CW	14MHz
W9SCH	11-22-87	1013	To F6DKQ, 14,153 M/W	.300	CW	28MHz
OK1DKW	12-12-87	1014	To OH9RE, 2.96 Mega M/W	.00038	CW	21MHz
WA1KWJ	12-12-87	1015	To KROU, 1783 M/W	3.0	CW	14MHz
KD8FR	12-12-87	1016	To F3NB, 1374 M/W	3.0	CW	10MHz
DXCC						
OK1DKW	12-12-87	82c		5.0	CW	14MHz
WAS						
KA5PVB	11-07-87	256c	WAS 10,20,30 5W & less	5.0	Mix	Mix
WB5QQF	11-21-87	257c	WAS 10,20,30 2XQRP	5.0	CW	Mix
WA1KWJ	12-12-87	258c	WAS 10,20,30	3.0	CW	Mix
Special Achievement Certificate						
WB9TBU	11-07-87	01	First **"QNI Clean Sweep"** achievement in one week. Nominated by; Danny Gingell, K3TKS, Nets Manager.			

Call	Date	Basic	Endors.	Mode Band
QRP-25				
KT1H	11-07-87	987	QRP-25	CW 3.5MHZ
KD8FR	11-21-87	988	QRP-25	CW Mix
KD8FR	11-21-87	989	QRP-25	
WA1KWJ	12-21-87	990	QRP-25	
KT1H	11-07-87	527	QRP-50	CW Mix
KD8FR	11-27-87	528	QRP-50	
KD5VD	11-07-87	313	QRP-100	
W1XH	11-07-87	314	QRP-100	
WB5QQF	11-21-87	315	QRP-100	
WB9TBU	11-07-87	107	QRP-200	
KH6CP/1	11-07-87	48	QRP-300	
QNI-25				
WB9TBU	12-18-87	55	NEN-40	
N3DQN	12-18-87	56	TCN-20	
QNI-100 Club				
W5TTE	10-10-87	25	QNI-100	

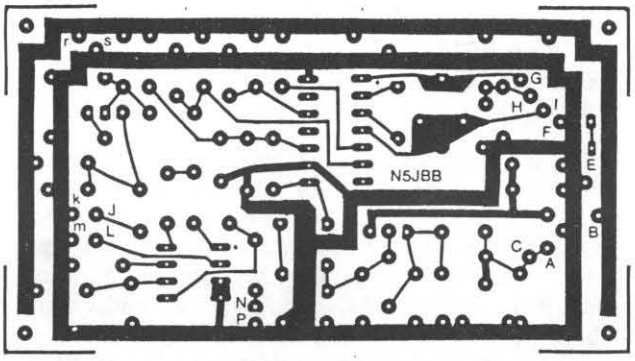


figure 5B ↑

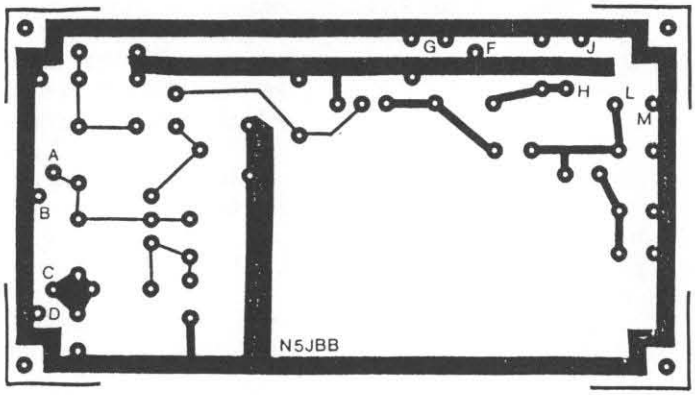


figure 7B ↑

40 Meter Cardbox continued from page 23

To operate the unit you'll need to attach a key, antenna, phones and crystal. With the TX/RX switch in the RX position, press the key and tune in the oscillator signal in the receiver. You are now ready to call CQ or listen for awhile until you hear a CQ within one or two kHz.

I only have about 5 hours operating time on this rig and have worked about 15 states so far with it. I have been able to get both the East and West coasts from my Tulsa, Oklahoma QTH. This is the third version of the receiver however and I used it as my primary station receiver most of last winter after the transformer in my BC-342 melted down.

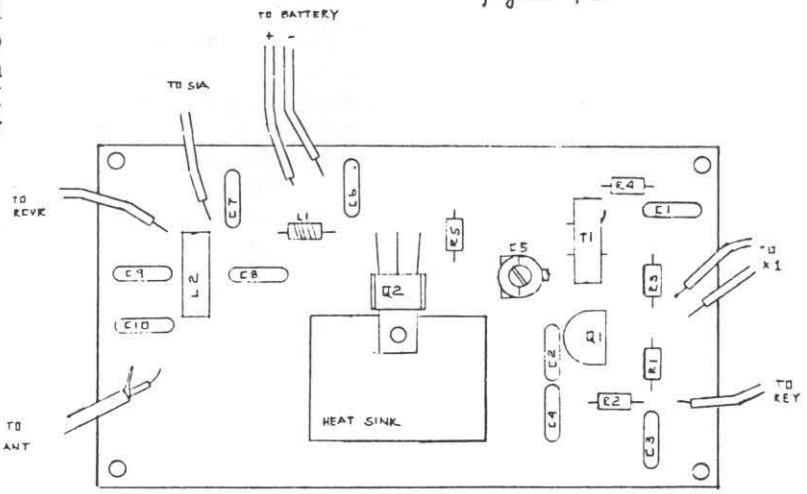


Figure 7

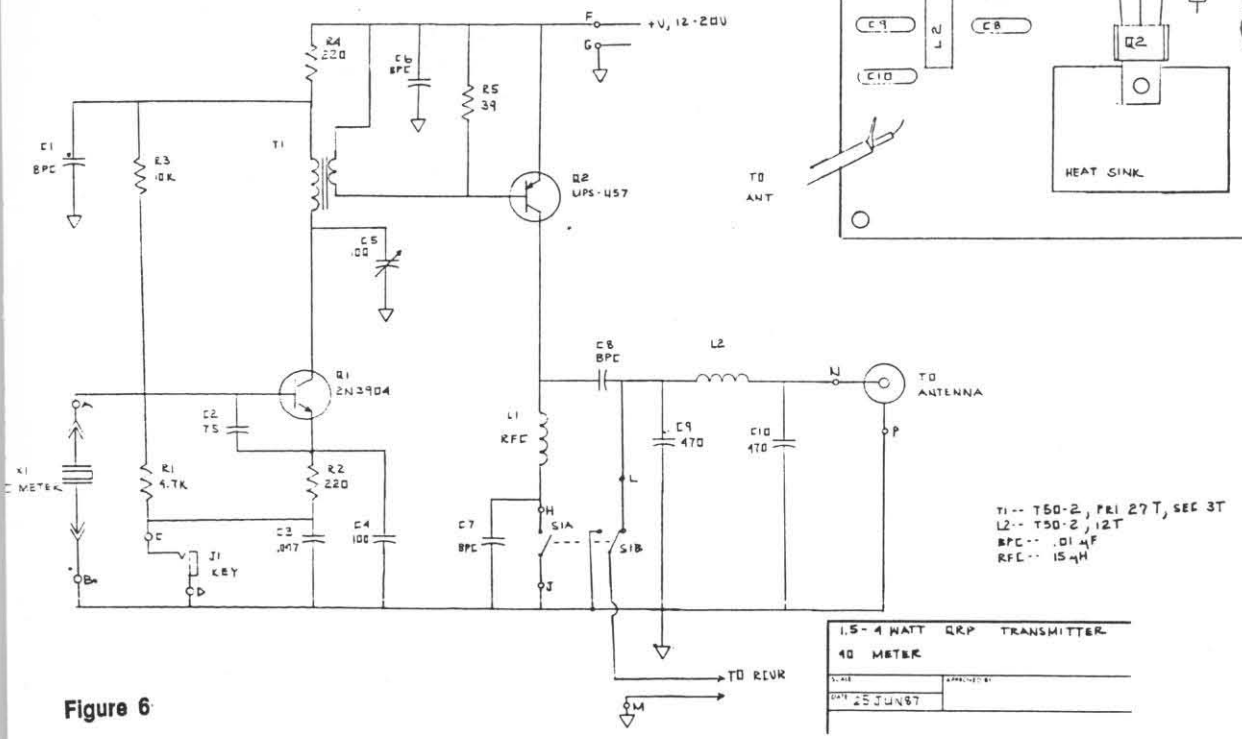


Figure 6

An Arizona QRP Field Day

Mark J. Brown, ND7A
3447 East Laurel Lane
Phoenix, AZ 85028

The sun came up early the day before Field Day (FD). The Phoenix weather forecast for the weekend was hot, with highs near 110 degrees. With this in mind, it was not too difficult to load up the car and head north to cooler temperatures to operate the 1987 Field Day .My destination was the Mogollon Rim near Woods Canyon Lake, a popular camping area about 90 miles north of Phoenix. My friend and FD partner, Greg, NC7B, and I have operated Field Day from this location 3 of the last 4 years. The advantages of this location are many. First, the site lies on the Mogollon Rim, a high plateau 7600 feet in elevation. The higher elevation means cooler temperatures and lots of tall pine trees. Our FD site is nestled in the Coconino National Forest and is far from any sources of manmade noise. Finally our location provides practically an unobstructed shot to any part of the country. I arrived at the FD site about noon the day before FD. Greg arrived a day earlier with his travel trailer to stake out our site. He already had put up a 75 meter dipole near the top of a 90 foot pine tree. In past years we operated FD with 100 watts SSB. This year we planned to change our strategy and operate QRP with 5 watts. Using a solar panel to charge a pair of deep cycle RV batteries, we hoped to take advantage of the natural power bonus.

With 10 points for each QRP CW contact, we hoped to better our previous years' scores. Operating QRP suggested the need, if not the necessity, for some "killer" antennas. I had just finished an antennas course at Arizona State University and was eager to try out a new antenna design. Greg and I had considered using a rhombic or a V-beam, but settled for Delta Loops on 20 and 40 meters. Advantages of the delta loop include gain over a dipole, ease of construction, and the requirement for only 1 high support. A quick comparison test showed the delta loop to have about 3 db more than a dipole. I was very pleased to find the antennas I cut in Phoenix measured 1.2 to 1. Not bad! After surveying our site, we began the serious business of putting up our antennas. We have found using a "wrist rocket", the most effective way of getting our antennas up high in the trees. Greg has nearly made an art out of shooting fishing line precisely over the proper branch.

By sundown we had most of the antennas up. At 1700 UTC on Saturday we finished putting up the last antenna. This is, incidentally, about 59 minutes earlier than previous years. In all we had dipole on 75 through 15, 2 delta loops on 20 meters, and one 40 meters.At 1800 UTC we threw the big switch and were greeted by an explosion of signals. We narrowed Greg's IC735 down to 700 Hz bandwidth, and still often copied 4 or 5 stations at a time. Despite the crowded conditions, we managed to work a QSO every couple of minutes. At about 20 minutes into the contest, I peeked out the operating tent and stared Murphy straight in the eye. A wall of thunderclouds had formed and was heading right for us.

Soon the rain began to pelt the tent. QRM from the thunder reached 40 dB over S9. Copy was impossible, even with headphones. So we went QRT for what seemed an agonizing 30 minutes until the stormed passed through. We resumed operating, but continued to be plagued by heavy QRM. We then switched from Greg's IC735 to mine. I had purchased the rig a month earlier and had only installed an optional CW filter 1 o'clock the night before I left. The narrower bandwidth and steeper filter skirts helped eliminate quite a bit of the QRM problem. We did notice, however, some slight distortion on 20 meters receive. This later proved to be a defective capacitor in one of the oscillators. No doubt Murphy's work!

We found operating QRP quite a bit different than operating QRO. Instead of dominating a frequency, we found "hunting and pouncing" to be more effective. Operating nearly 100 % CW made it very difficult for us to sleep without the hearing hundreds of CW signals echoing in our heads.

At about 2 am I worked my friend Steve, NU7B. Steve was operating solo about 10 miles away from us with a rhombic and a longwire. Despite nearly being blown away by the earlier storm, he managed to better our QSO total by 29. Just before the end of the contest we managed to work about a dozen 6-land stations on 40 SSB. Then at 1800 UTC, after a full 24 hours of sheer madness, we went QRT.

After analyzing our logs we found we had worked 274 QSOs and had scored 3030 points. This score is better than any of our QRO efforts! The following are our results:

Call Area	80CW	40CW	20CW	15CW	40SSB	15SSB	Total
1		3	6	2		1	12
2		1	8	1			10
3		4	5	1			10
4		2	14				16
5	5	2	20	7	1		35
6		32	26	3	14		75
7		11	11	4	3	1	30
8		4	9	3			16
9		3	15	3		1	22
0	1	11	21	14	1		19
Total	6	73	135	38	19	3	274

As the chart shows, our big bands were 20 and 40 CW. We did well in zero and six land, but did poorly east of the Mississippi. Comparing our logs with nearby NU7B showed that he did much better in the East than us.

So what did we learn from operating Field Day QRP? We discovered operating Field Day QRP is a challenge requiring good antennas, narrow CW filters, and the mental savvy to pull a weak station out of a crowd. We found the delta loops to outperform dipoles. We also learned that QRN on 75 meters was so heavy that it probably wasn't worth dedicating a dipole to the band. What about next year? We have already bought a transmatch to load a multiband wire antenna. We might even use it with a rhombic (pointed to the Northeast) next year. I also bought a memory keyer to help us with late night CW. One thing for sure, we will certainly operate Field Day QRP next year. Once you've tried it, it's the only way to go!

Attention QRPers who are also in Mensa: The amateur radio special interest group was reactivated in 1987. Those interested in signing up for the SIG can contact Art Candell, N4PCK, 4153 N. E. 130 Court, Silver Springs, Florida 32688. Yearly dues are $7.50, which includes the quarterly newsletter. (Info provided by WA8MCQ.)

QRP ARCI CONTEST SUMMARY SHEET

QRP ARCI CONTEST_____; MODE_____

CALL_____; S-P-C_____; QRP NR / POWER_____; ENTRY: MULTI-BAND_____

: SINGLE-BAND_____

	BAND	POINTS	S-P-C
	160		
	80		
	40		
	20		
	15		
	10		
	6		
	TOTALS		

1. Enter all data above and indicate entry class and band.
2. Enter all points and S-P-C by band.
3. Add total points and S-P-C.
4. Multiply points, S-P-C, power multiplier and bonus multiplier (power source) and add bonus points for final score.
5. Send entries to:

RED REYNOLDS, K5VOL
QRP ARCI CONTEST MANAGER
835 SURRYSE ROAD
LAKE ZURICH, IL. 60047
U. S. A.

SCORING:

TOTAL POINTS		TOTAL S-P-C		POWER MULT		BONUS MULT		BONUS POINTS		FINAL SCORE
_____	X	_____	X	____	X	____	+	_____	=	

TOTAL OPERATING TIME_____; DUPLICATE SHEETS INCLUDED_____

TRANSMITTER/XCVR:_____; OUTPUT:_____

RECEIVER:_____; POWER SOURCE:_____

ANTENNA(S):_____

COMMENTS:_____

_____

NAME:_____; CALL:_____

ADDRESS:_____

CITY:_____; STATE:_____; ZIP:_____

QRP ARCI CONTEST_____; PAGE_____

CALL_____; S-P-C_____; QRP NR / POWER_____; BAND_____; MODE_____

	DATE	TIME	CALL	RST R	SPC	QRP NR	RST S	POINTS	MULT
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
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21									
22									
23									
24									
25									

Zuni Looper Style...continued from page 13.

There are drawbacks to this method, however, that I should note before you go out and attempt it in your backyard. One is that it definitely requires two people, because the spool has to be aimed as carefully as the sling shot or the nylon monofilament will refuse to take part in the exercise. The other drawback is that if you miss your objective, which will happen often, it's a royal pain to rewind a couple hundred feet of monofilament onto its spool by hand.

These drawbacks, plus some added pressure from my XYL (who does not care to be the "second person" during our camping trips) forced me to brew up a gadget that would facilitate tree-topping by one person. I cannot take credit for this gizmo, for I have seen it in use elsewhere, but I thought it might be of use to many more who are latent tree-toppers.

It consists very simply of a sling shot with a fishing reel attached. The reel is attached to an aluminum L-shaped bracket with a couple small hose clamps, and the bracket is bolted to the handle of the sling shot. Instantly, two problems of the two-man method of tree-topping are cleared up. It requires only one operator, and reeling in the line after a missed shot is as easy as reeling in your next meal from the lake.

Operating the gizmo is very simple, but does take a bit of practice. I find it works best to unreel just enough line so that when I draw the shot back to shoot, the line is taut, and doesn't hang up on anything on the way by. It also takes a few tries to find the best place to lead the line back from the reel so that it is clear to fly free when you let loose.

We've had the best luck with a three-line system for antenna raising. For the initial shot, ten pound monofilament with a 3/4- or 1 ounce egg sinker seems to work the best. Once this line is over the tree at the best possible location, we use it to pull up a medium size line, such as parachute cord or a heavier woven nylon cord. This second line is in turn used to pull over the final heavy line that is used to support the array.

Be prepared to lose a few weights along the way. At Field Day this year we had six lines to shoot, and probably used three times that many sinkers. The monofilament will snap at the least sign of a snag, and you will be amazed at how far a sinker will fly when it doesn't have a fishing line in tow!

Volunteers Needed!

What does ARCI membership mean to you? Active membership is now well over 1000 world-wide. It takes a lot of work to make an organization run smoothly. When all of the work is handled by only a handful of members the fun can quickly be displaced by overwork and burnout.

Volunteers are always needed to help the ARCI grow and prosper. Do you have access to an IBM/clone computer? We can use you to help prepare manuscripts for the Quarterly. Do you have access to a laser printer? The editor can definitely use your help! Technically oriented or like marketing? Perhaps you can spare a few hours for the Two-fer project or the Candy Store. A people person? Volunteers are needed to help arrange and staff forums, information booths, etc. at ham conventions such as Dayton or Dallas or even smaller, local hamfests.

Other ARCI projects have been suggested, but volunteers are needed to make all of this a reality. If you can spare the time, please drop a line to Jim Fitton W1FMR, PO Box 2226, NH 03079. Tell us what you can do. Tell us what you'd like to do. Or just tell us that you are available to help out.

ARRL QN- Signals For CW Net Use

QNA*	Answer in prearranged order.
QNB*	Act as relay between..and..
QNC	All net stations copy. I have a message for all net stations.
QND*	Net is directed (controlled by NCS).
QNE*	Entire net standby.
QNF	Net is free (not controlled).
QNG	Take over as NCS.
QNH	Your net frequency is high.
QNI	Net stations report in * I am reporting into the net. (Follow with a list of traffic or QRU.)
QNJ	Can you copy me? Can you copy...?
QNK*	Transmit messages for...to...
QNL	Your net frequency is low.
QNM*	You are QRMing the net. Stand by.
QNN	Net Control Station is... What station is Net Control?
QNO	Station is leaving the net.
QNP	Unable to copy you. Unable to copy...
QNQ*	Move frequency to...and wait for...to finish handling traffic. Then send him traffic for...
QNR*	Answer...and receive traffic.
QNS	Following stations are in the net.* (Follow with list.) Request list of stations in the net.
QNT	I request permission to leave the net for ...minutes.
QNU*	The net has traffic for you. Stand by.
QNV*	Establish contact with...on this frequency. If successful, move to...and send him traffic for...
QNW	How do I route messages for...?
QNX	You are excused from the net.* Request to be excused from the net.
QNY*	Shift to another frequency (or to ...kHz) to
clear	traffic with...
QNZ	Zero beat your signal with mine.

*** For use by the Net Control Station (NCS)**
Note: QN signals need not be follwed by a question mark, even though the meaning may be interrogatory.

✉✉ Letters To The Editor ✉✉

Argonaut 515

Dear Paula,

Concerning the letter to the editor about the Argonaut 515, I would inform the membership of the following:

In a phone conversation today with Sid Kitrell of TenTec, he and I discussed the prospects of a rerun of the Argonaut 515. A rerun or reissue is impractical for several reasons, including outdated technology and new assembly line equipment that makes some of the handwork done on the 515 impractical.

However, TenTec is considering a new entry in the QRP field, with a modern receiver, smaller size and super energy efficiency; utilizing newer technology than when the 515 was issued. Preliminary conversations indicate that this project could end up in the neighborhood of the new Kenwood 140 transceiver.

Kitrell and Joe Redwine, also of TenTec, have received some requests for the 515, which sug-gests that there may be a market for a newer QRP rig. Kitrell said that they would definitely be influ-enced by the receipt of postcards expressing interest in a new QRP rig. So, if you would like to see a new QRP rig, drop a postcard to Sid Kitrell at TenTec, Industrial Park, Sevierville, TN 37862.

David Heintzleman, N0BQW
Grant, Nebraska

Welcome Back

Dear Paula,

I recently got back on the air running one watt with an HW-8.

I sent Bill my QRP ARCI dues for '88, but not in time to get on the list for the newsletter. I have enclosed an SASE. If possible, I would appreciate a copy of the latest newsletter. If you happen to have anything on the club's award program, I would appreciate that, too.

"Doc" Drake, W5TB
Arlington, Texas

Welcome back to the club, Doc. I've sent off a copy of the January issue to you. NOw, let me clarify things a bit for everyone else. I only have a small supply of each issue of the Quarterly and they get used up pretty quick as complimentary copies to non-member contributors, etc. Anyone who needs a particular recent issue--perhaps your copy was lost in the mail or, like Doc, your dues arrived too late for the most recent issue--please send you requests, along with $1, to our publicity manager, name and address listed on the table of contents page. Awards information is available from our awards manager. Also, if you want to introduce someone to the club, $1 to our publicity manager will get an information packet (including a recent issue of the Quarterly) to him or her.

The word "laser" is an acronym for Light Amplification by Stimulated Emission of Radiation.

DX QSL Help

Hello Paula,

QRP greetings from the great white north. Just a quick note to say hello, plus a query on something that's been driving me batty.

On May 31, 1987, during the CQ WPX Contest, I worked HL7T on 20 meters. Was I proud of that one! However, working 'em and confirming 'em are two different things, and I haven't been able to turn up any address or QSL info to date. I see in the September issue of the Five Watter that you worked HL7T also, and I'm hoping you may have been fortunate enough to turn up a QSL route for this one (my fingers are crossed).

Peter Purdy, VE3NVP
Cornwall, Ontario

Well, Pete, at the moment my fingers are crossed as well. Like you, I had my doubts about the legitimacy of the callsign. I'm glad to hear someone else worked him! Anyways, I'm still searching for a QSL route myself, just in case the Bureau route doesn't pan out. Maybe one of our readers can help. Anyone?

✉✉ A Quick Book Review ✉✉

by Paula Franke, WB9TBU

History of QRP in the U.S., 1924-1960
by Adrian Weiss, W0RSP

One of my favorite places to be is in the library "stacks"--a dusty, semi-organized place where old and forgotten volumes and treasures of the past abide. So, I was delighted to find that the experience of reading Ade's latest book was almost like haunting the stacks. All that was missing was the dust and the musty smell of old paper.

Many times, history books can be very dry reading. Not so with this book! Ade lets the past do quite a bit of speaking for itself by quoting extensively from articles and letters that appeared in early amateur radio journals. While technology has changed through the decade, the spirit of QRP has not. Then, as now, the subjects of concern were the same: QRP vs. QRO, DX-ing, homebrewing, antennas, etc.

After reading the book, I felt as though I had inadvertently walked in on a QRP gathering and was glad for having the opportunity to "meet" everyone Ade took the trouble to introduce.

Not surprising, History of QRP is destined to become another classic "must" volume for every QRPer's bookshelf. Why not get a copy for your favorite QROer as well?

The book is 208 paperback pages with 56 photos and 16 diagrams. Price is $9.95 ($2 extra for First Class postage), $8 for senior citizens and $12.95 foreign. Order from Milliwatt Books, 833 Duke St. #83, Vermillion, S.D. 57069 U.S.A. I'm sure Ade will also have a plentiful supply on hand at Dayton.

The QRP Candy Store

Operated for QRP ARCI by Bob Spidell, W6SKQ 45020 N. Camolin Ave., Lancaster, CA. 93534

The QRP Candy Store is a clearing house for all member or ARCI sponsored, QRP related products. Promote QRP in your area; send your ideas, suggestions and a sase to Bob Spidell, W6SKQ for store flyer.
LOGO: T-Shirts, Ball Caps, Hat Pins, Stickers, Stationary & more.

Exclusive!

QRP'ers

BASIC Propagation Tool Kit
by Bob Brown, NM7M
$6.50 ppd the Candy Store.

New Member/ Renewal Data Sheet

Call Recommended by
Age Occupation
License Class Held Since
Other Calls Held
Bands Most Used

Please circle your interests and elaborate, if desired, on a separate sheet. Thanks!
Ragchewing, DXing, Contests, Traffic, Awards, Homebrew, Experimenting, CW, SSB, RTTY, ATV, Packet, VHF/UHF, Satellite, Other

Do you plan to participate in club acitivities? Y/N
Would you like to be a club officer director? Y/N
Do you have access to duplicating equipment? Y/N
Are you interested in our award program? Y/N
Have you applied for any of the club awards Y/N
Are you in favor of QRP calling frequencies? Y/N
Are you in favor of member QSO parties? Y/N
Would you help write for the Quarterly? Y/N
What subjects?
What QRP awards/achievements have you won?

Why do you run low power?

[ ] Renewal (U.S. $10, DX $12) [ ] New Address
[ ] New Member (U.S. $12, DX $14) [ ] New Call

Name:_____Address_____

City:_____State/Country_____Postal Code_____

Amount Enclosed:_____QRP ARCI #_____Callsign_____

Please make your check or money order payable to:
QRP Amateur Radio Club, International
*****Please do not send cash*****

Mail to: Bill Harding, K4AHK
10923 Carters Oak Way
Burke, VA 22015 USA

QRP #_____Inc Rec_____Apl Rec_____
List File_____MCert_____Rep Cpy_____

Winter Net Schedule

TCN*	14060	W5LXS	Sunday	2200 Z
SEN**	7030	K3TKS	#Wednesday	0100 Z
GSN	3560	W5LXS	#Thursday	0200 Z
GLN	3560	K2JT	#Thursday	0200 Z
WSN-80	3558	NM7M	#Saturday	0400 Z
NEN	7040	W1FMR	Saturday	1300 Z
WSN-40	7040	NM7M	Saturday	1700 Z

* On weekends of major contests, TCN will meet one hour later.
** If conditions on 7030kHz are poor, QSY to 3535 at 0130 Z (0030 Z Spring/Summer).
# Evening of the day before for W/VE

Spring/Summer Net Schedule

(changes with Daylight Savings Time)

TCN*	14060	W5LXS	Sunday	2300 Z
SEN**	7030	K3TKS	#Wednesday	0001 Z
GSN	3560	W5LXS	#Thursday	0100 Z
GLN	3560	K2JT	#Thursday	0100 Z
WSN-80	3558	NM7M	#Saturday	0300 Z
NEN	7040	W1FMR	Saturday	1200 Z
WSN-80	7040	NM7M	Saturday	1600 Z

Other QRP Nets

MQRP	3535	K8JRO	#Wednesday	0200 Z (0100 S/S)
WSNSSB	7285	NJ7M	Wednesday	2000 Z (1900 S/S)
VEQRP	14060	VE6BLY	Sunday	1900 Z (1800 S/S)

Upcoming Contests

Spring QSO Party (CW)	1200Z April 9 - 2400Z April 10
Hootowl Sprint (CW)	2000-2400Z (local time) May 28
Milliwatt Field Day	June 25 - June 26 (ARRL FD time period)
Summer Homebrew Sprint (CW)	2000-2400Z July 10
Summer Daze Sprint (SSB)	2000-2400Z August 14

First Sunday QSO Party

(every first Sunday)

UTC	CW	SSB	Novice
1400-1600	14.060	14.285	
1600-1700	21.060	21.385	21.110
1700-1800	28.060	28.885	28.110
1800-1900	7.040	7.285	7.110
1900-2000	14.060	14.285	
2000-2100	21.060	21.385	21.110
2100-2200	28.060	28.885	28.110
2200-2300	7.040	7.285	7.110
2300-0000	14.060	14.285	
0000-0100	7.040	7.285	7.110
0100-0300	3.560	3.985	3.710

QRP Quarterly
P.O. Box 776
Alpine, Texas 79831