The FLASH
The Official Newsletter of the Mad River Radio Club
April - May 1999 Volume 28 Issue 5

From the 'Big Fish'

By Jeff Clarke, KU8E
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Greetings from the Big Fish. Well, Spring is finally upon us and all the eyes in *Mad River* country will turn to antenna work and … of course **Dayton**. This year should be different for us. Those of you that have kept up with the news know that we have discontinued the sponsorship of the hospitality suite at the **Crowne Plaza**. I have to admit I hate to see it go away. It was always nice to get away from the crowds and enjoy a conversion with some of my contesting friends in the relative quite setting it offered. It just got to the point that it was getting real hard to find people to run the thing every year. Thank you to **W8AV**, who over the past several years helped me keep it going.

In place of the hospitality suite this year we will be having a meeting / flea market spot that is being sponsored by the club. Ted, **K8AQM**, has been making the arrangements. Plans are to have pop and a place for club members to sell stuff . Stay tuned to the MRRC reflector for the latest news. The meeting will be held at the usual time/place (behind the Cushcraft display) on Saturday.

Dayton also means a changing of the guard as far as the Big Fish position. The consensus is that the new Big Fish should come from Michigan this year. Due to a family commitment I will not be at able to attend Dayton this year. I also will not be able to run for re-election due to commitments I have coming up this year. There should be a lot of discussion on the internet reflector on this issue in the coming weeks. Get in there and throw in your 2 cents worth! **K8CC** and **KE8OC** also would probably like to get some relief from being ***FLASH*** Editor and Treasurer. If you are interested let us know.

Thanks to everyone for their support and help during the past year and good luck to the new Big Fish.

73 de Jeff, KU8E

MRRC CALENDAR
April - May 1999

Michigan QSO Party
April 17, 1999

Florida QSO Party
April 24-25, 1999

1999 Dayton Hamvention
May 14-16, 1999

CQ WPX Contest - CW
May 29-30, 1999

DON'T FORGET!

We need YOUR contributions for the next MRRC Flash - start working NOW on an article!

Deadline for publication:

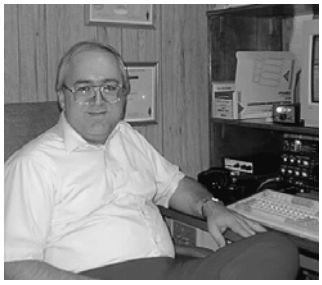
Don't miss the MRRC activities at DAYTON '99

Fleamarket Hospitality Area - Spot 3859 - Friday/Saturday

MRRC Club Meeting - Noon Saturday
Hara Arena stands above Cushcraft exhibit

The Editor's Keyboard

By Dave Pruett, K8CC
k8cc@ix.netcom.com



If it seems like a long time since the last ***FLASH***, well, it has been. The February/March issue is always the hardest one for me to get out, due to the usual flurry of activity from late January (CQ 160 CW) to March (ARRL DX/CQ WPX). This year, my first business trip to DL-land cost me activity in the CQ Sprint and ARRL DX CW. Now that my employer is officially known as DaimlerChrysler, such trips are likely to be a recurring thing for me,

However, its now April with spring in the air. We generally tend to think of the contest season extending from CQWW SSB in October to ARRL DX SSB in March, however there is a lot going on beyond those months. The KU8E WPX multi-multi crew beat their 1998 results by over 50%, although getting beat again by the N6RO station. A bunch of Michigan MRRCers got involved with the MI QSO Party and had a blast too. Thanks also to the many non-MI MRRCers that got on an provided QSOs.

Dayton is just around the corner. In the last ***FLASH***, I mentioned that MRRC would be abandoning its usual hospitality suite at the hotel and instead having a club hospitality area out at the fleamarket where contesters can drop by for a beverage and rest their weary feet. **Ted, K8AQM** has been quietly making progress on preparations for this new MRRC adventure. In the past few weeks, others on the Monday night net and the MRRC reflector have stepped up to help. **Hank, K8DD** has ordered an ARRL flag to fly at our fleamarket site . **Dave, K8CC** and **Tim, KE8OC** sweetened up the artwork for the club logo so **Tim, K9TM** could have a flag shop make us a MRRC flag to also fly (see an image of the flag design below right). **Goose, W8AV** with some help from **Don, K8MFO** has stepped up to arrange transportation of the beverages for the site. And finally, **Jim, K8MR** has volunteered to be our PR man to get announcements of our site out to the reflectors.

There still is a need for people to sign up to man the hospitality site. This mostly will involve negotiating the sale of gear set out on the swap table, answering questions about MRRC, handing out soft drinks, etc. If we man the site from 9 to 5 both days, that's sixteen hours to be covered. If people would team up in shifts of two and do one hour each day, we'd only need eight teams. Its a great way to rest up from the rigors of the fleamarket and you can help your club at the same time!

Hope to see everyone at Dayton!

73, de **Dave, K8CC**

Treasurer's Report

By Tim O'Sullivan, KE8OC
ke8oc@mediaone.net

As we wrap up the fiscal books for 1998-99, we see the club is comfortably in the black. These figures do not include Dayton preparation expenses.

Balance from 1/99	$726.74
Expenses	
Checking Acct Maintenence	$ 16.00
FLASH Printing	$ 54.00
Balance 5/99	$656.74

Respectfully Submitted,
Tim O'Sullivan, KE8OC

AGENDA FOR THE DAYTON CLUB MEETING

There are a number of items of club business to be discussed at the Dayton Hamvention MRRC meeting:

1. Election of officers for 1999-2000
2. 1999-2000 meeting schedule.
3. Discuss MRRC Challenge rules, specifically points shares for station hosts.
4. Appointing "area managers" to monitor, assist, and report an MRRC activities in Michigan, NW Ohio, NE Ohio, Southern Ohio, and Kentucky.

The New MRRC Club Flag

When the Force is Against You

By Greg Surma, K8GL

Eleven operators converged on a dream location in Western Pennsylvania in early March under the pretense of operating in the ARRL DX Phone Contest. They were there to defend their champion crown from the year before. Strategies were discussed at length. Performances from the previous contest were discussed. Suitably fortified by the carbohydrates afforded by the pre-contest pizzas, the crew bid *adieu* to the outside world for 48 hours. Nothing else would matter this weekend. Or so it seemed.

Sometimes there are circumstances that mandate that even the best planned effort is destined for failure. This was one of them. The K3LR operation was done in by a Force so strong and powerful that mere mortals are powerless in Its clutches. This Force decided, in Its infinite wisdom, that the operation was not to be. This Force negated the months of antenna work, planning, redesigning, tower climbing, upgrading and strategizing in one fell swoop. Legions of worshippers of this Force would not be surprised at the absolute Power that is a symbol of Its every action and deed.

Unfortunately, eleven disappointed operators departed that cold Saturday morning, questioning why this Force acted against them.

This "Force" is not based upon religion or mysticism. This "Force" is based on syndication, franchising and making milk carton flower vases. Yes, sad to say, the K3LR operation was done in by none other than Martha Stewart!

The early morning rain static? Nothing more than Martha Stewart brand Easter lights oscillating at the Sharon K-Mart store. The snow on the antennas? Part of a large display and demonstration of what a spray topping can do to enhance your graham cracker crusted lemon pie. The power failure? That was done for safety reasons while Ms. Stewart was taping a commercial for her line of denim dungarees (List $39.95; Available sizes 4-16) while climbing Elliot Road utility poles.

Yet…the signs were there, so here are:

THE TOP TEN SIGNS THAT
MARTHA STEWART HAD INFILTRATED
THE K3LR ARRL CONTEST EFFORT

10. Multiplier info passed on doilies between stations.
9. Water dish of (late) cat had lemon wedge in it.
8. Other stations constantly referred to K3LR not as "Big Gun", but as "Big Glue Gun".
7. 8877 finals mysteriously enclosed in pecan-crusted chimneys.
6. Reports sent from voice keyer: "5-9 P-A; And that's a good thing"
5. Annoying voice on 14150.7 that constantly announced "Please hold the frequency for Ms. Stewart".
4. All napkins in 'LR food commissary folded into miniature swans.
3. At 05Z all operators left for big dance in middle of Elliot Road (OOPS…that's only if "Martha & the Vandellas infiltrate the operation).
2. Diet Coke was "Lightly Chilled", not "Cold".
1. New CT features:
   Alt-A = Appetizer list
   Alt-W = Wine list

DAYTON
VHF WEAK SIGNAL BANQUET

The VHF Weak Signal Group that meets Monday nights at 0200 UTC on 3.843 MHZ would like to invite everyone that is coming to the Dayton Hamvention to our annual banquet.

The banquet will be held Friday night, May 14th, from 6:30 PM until 11:00 PM at the Holiday Inn North, Wagoner Ford Road, Dayton, Ohio.

The banquet will include a cash bar as well as plenty of seating to allow you to mix and mingle with other VHFers from all over the country and the world.

The will be over 50 prizes with two Grand Prizes worth over $300 each being drawn starting at 9:00 PM.

There will be a guest speaker who will present a short talk on VHF activity. There will also be a noise figure measuring table so bring your preamps to tweak.

Tickets for the banquet which includes a two entree banquet dinner are $30 per person. Seating is limited to 125 people. Tickets may be ordered by sending $30 plus an SASE to:

Tony Emanuele, WA8RJF
7156 Kory Court
Concord Township, OH, 44077

or

Tom Whitted, WA8WZG
4641 Port Clinton East Road
Port Clinton, OH 43452

Website http://www.wa8wzg.com

This is one of the largest gatherings of VHF weak signal enthusiasts in the USA, so get your tickets early and join us for an enjoyable evening at the Dayton Hamvention!

If You Can't Beat 'Em, Join 'Em!
1999 ARRL DX SSB from W3LPL

By Dave Pruett, K8CC
k8cc@ix.netcom.com

With the rennovations from Christmas at K8CC not yet complete, I had no plans for ARRL DX SSB. However, DaimlerChrysler has a special deal with a startup airline called ProAir that in addition to special rates for business travel, employees can take any ProAir flight for leisure travel on a space-available basis for $25 one-way. Although its a startup airline, ProAir flies brand new Boeing 737s, so this is a pretty good deal from the traveler viewpoint.

Since one of the places ProAir flies is Baltimore/Washington International airport, I decided Friday morning to get on a plane and by 00Z I was sitting in one of the 21 MHz chairs at W3LPL! Frank's QTH is less than 30 minutes from the airport, so getting there in a rental car was a breeze. The station is located in an area that was probably pretty rural twelve years ago when it was built, but now its pretty well developed with large homes on large lots. The towers (four 200' and four 100') are clearly visable both from a distance and from the neighbors yards. The station is a self-contained environment in the basement with its own separate entrance, bathroom and sleeping room with 5 beds. Food was brought in by the operators, with an assortment of cookies and crumb cakes that ensured our sugar levels would be elevated for the weekend (I don't wanna hear any more wise cracks from K8DD and K8AQM about Ding Dongs at K8CC!).

W3LPL is set up with the requisite six operating positions, each set up with two separate transceivers driving a single amplifier. The amps were single-band, single tube 3-1000Zs running off a common, humoungous power supply. Frank reports that he's only replaced two tubes (out of six amps) in twenty five years and 500,000 QSOs. Rugged design, conservative operation and lots of air blowing across the tubes does the trick.

The station layout and operators for the

A Typical W3LPL Amplifier

contest were as follows:

160M K1HTV, AI3M
TS950SDX , FT990
Tx: four-square
Rx: six 580' beverages, pair of boardside EU beverages

80M ES2RR, W2GG
FT1000MP x 2
2L quad NE/SW, 2L quad NW/SE, 2L quad E/W, all in square configuration, tops at 160',
beverages for rx

40M N2IC, KD4D
FT1000MP x 2
3L/3L yagis @ 200'/100', bottom fixed EU
beverages for rx

20M K3MM, K3NA, K3RA
FT1000MP x 2
5L yagi @ 200', 5L/5L yagis @ 100'/50' fixed EU, 5L/5L yagis @ 100'/50' rotary (not a typo - two sets of stacks!!!)
beverages for rx

15M K1RZ, KE3Q, K8CC
TS950SDX, FT1000
6L yagi @ 200', 6L/6L yagis @ 100'/50' fixed EU, 6L yagi @ 100' rotary, beverages for rx

10M K3MQH, N5OKR
FT1000MP x 2
7L yagi @ 200', 6L/6L yagis @ 70'/35' fixed EU, 6L yagi @ 70' rotary, beverages for rx

Miscellaneous PacketCluster and DXTelnet computers. Twelve logging computers w/DVPs running networked CT 9.38.

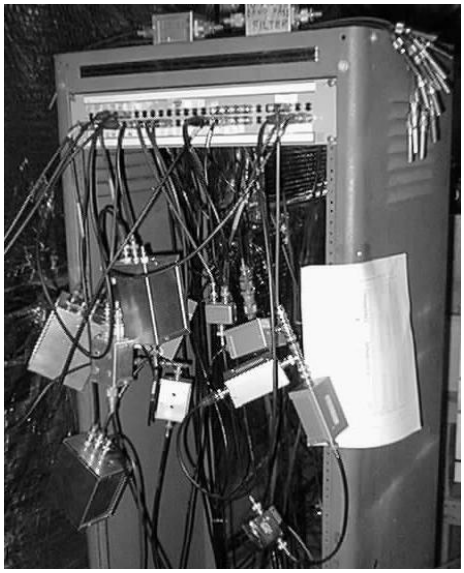
Frank's beverage system deserves description. There are six main beverages (NE, SE, NW, SW, E, W) plus a pair phased broadside to EU. Each is the single-wire type, 580' long. In addition to the "long" beverages, there are 440' and 220' Europe beverages which are used (with preamps) on the high band 2nd stations to search out QSOs while the 1st station runs. All the beverages are located on a neighbors land approximately 500' away from the main antennas which makes listening while transmitting possible. The effectiveness varies by band and by the direction of the transmitting antenna, but

The W3LPL QTH and Antenna Farm

Can't Beat 'Em
(Continued)

(Continued from page 4)

for example while running EU on 40 SSB the 2nd station CANNOT TELL THE 1ST STATION IS TRANSMITTING. The opposite is true while beaming to South America (across the beverage field). All the beverage feedlines come to a central "patch panel" where the signals are band-split (using homemade quadplexers). In this way, any beverage can be used at any station. For example, at night the two 10M radios were connected to beverages to search mults on 80M. In this way, there was the run station and then THREE OTHER SETS OF EARS listening for 80M mults. If four guys sweeping the band can't find the DX, then it must not be there...
The beverages are not the only use of neighbor's land (with permission, of course). The wire 160M four-square is



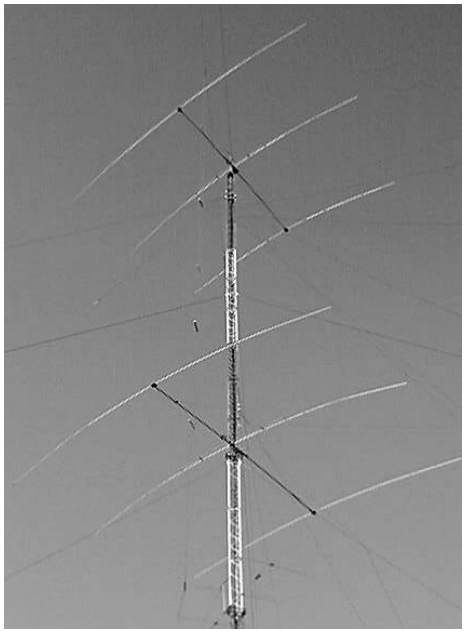
W3LPL Beverage Patch Bay

located in the back yard of Frank's neighbor to the north - however, that neighbor is QST DX editior Bernie McClenny, W3UR. (Yes, Bernie has coaxes buried from his house to Frank's so he can use the antennas for day-to-day DXing!)

I have visited or operated from a number of the big multi-multis (W7RM, N5AU, K3LR, K4VX, etc.) but W3LPL was the most unique in how its laid out. The antenna switching was very unusual. First of all, antenna selection was independent for transmit and receive - with the flick of a switch, you could transmit on one antenna while receiving on another (this could be counter-productive unless one was paying close attention). Certain antenna combinations can be used together - for example on 15M we could use the high 6L together with the fixed EU 6L/6L stack. The switching layout was confusing when you first sat down but eventually I came to understand what was going on. All of the stations were laid out in the same way, varying only by the types of antennas available on that band.

For the contest, everyone was expecting great band conditions, but the high flux was offset by the onset of geomagnetic storms which elevated the K and A indices. The contest started with the expected flurry of activity and indeed the first 24 hours were a blast. However condx the second morning were stinko. Surprisingly, 20M was very good, probably because no EU was making it thru on 15M or 10M. About 13Z I was on 21222 with the 200' yagi aimed over ZS6 and DJ4AX called me. He said I was the only NA station coming thru. 9A7A then worked me, but no other EU called in. DJ4AX came back by four times in the next 30 minutes, still reporting me as the only NA station. He put me out on the EU PacketCluster, but no other EU were worked by 15Z when I had to QRT to go catch my plane. At that time we had almost 5000 QSOs, with 1300 on 15M.

What's it like to operate from the east coast? While I can only relate my experiences from 15M, it did not seem to be that much different from W8. A great deal of the time I seemed receive-limited, or the QSOs came in bunches, just like from home. While I had no QRM problems from Ws during my EU runs, the QRM from lid Europeans was just as difficult to deal with. Some of my best rate came during the later hours of the opening when things thinned out a bit.
One thing I wanted to see (in addition to technical details and ideas for K8CC) was how the crew worked together. A number of the guys were not well-known contesters, but even the



The Biggest of the Big
The 3L/3L 40M stack at W3LPL
on a 200' tower

unknown guys seemed to know what to do and sat down to do it. The W3LPL crew has a relentless approach to getting QSOs - we'd move stations just for the contact and we'd regularly announce our other run frequencies as part of our QRZ.

One thing that was surprising was the preparation level - Frank and the rest of the ops did not arrive until 5 PM so all the last minute stuff was done in less than two hours. With twelve stations/ computers this is an amazing feat. It looked like the only gear brought in was four radios which helped for a fast setup.

I came away from my W3LPL experience with a head full of ideas. Some apply to my station layout, equipment, antennas, etc., however a lot has to do with the operating crew. First, I was impressed that everyone on the W3LPL crew (with the exception of ES2RR, N2IC and I) was familiar with the station and knew what to do. Second, everyone had their "head in the game", even when they were not there. A couple guys went home to sleep, and a couple had unscheduled work interruptions. However, each guy understood the impact his absence was having on the team and returned when they said they would, ready to operate. None of this "golly, the contest is this weekend?" or

(Continued on page 7)

TS-930 Upgrade Review

By Scott Bullock, KA1CLX
Reprinted from the April 1999 YCCC Scuttlebutt

Last summer I heard a rumor of a new TS-930 computer controlled logic board being introduced. I had been thinking of replacing my 930 for a long time, but when I heard this, it caught my attention and I decided to wait for a while and see what happened. In the fall, another rumor of the same thing. I figured it was going to be a reality and I was drooling. I like my 930 and have grown very fond of it over the past few years. Few radios I found that were affordable had the same features and performance as it does!

After the ARRL DX CW contest, there was a write up on the CQ-Contest reflector about the new board, and finally a contact for them. I e-mailed, and the next day to spoke with him by telephone, and because the proud owner of board #6 to be produced. What follows here is a short synopsis of what it takes to install the board and get it running. Breathe new life into YOUR 930!

The boards are make by Chris Seig at Piexx Co. in Hillsboro, NH. There cost is $259 plus $6 shipping. Upon first opening the box, I was immediately struck by the fact that these boards were not a homebrew piece-meal project, they were a real professionally done board utilizing the latest in surface mount technology. I was impressed to say the least!

Installation is very straightforward.. Remove the Kenwood TS-930 cover, remove the speaker bracket, and discard the old backup battery attachment. The new board is flash upgradable ROM, so it doesn't require any battery backup. Remove all existing connectors into the digital board, being careful to keep the basic arrangement the same, and then unscrew and remove the digital board. Next, unscrew the remove the plate under the digital board. Re-drill all six mounting holes slightly larger in the plate. Take the supplied standoffs and mount them onto the plate. Next mount the new control board onto the standoffs and re-mount the plate into the radio. Re-connect all the existing wiring connectors to the appropriate connectors on the new board - careful attention has been taken to keep all the connectors on the new board in the same position as the old board. Using the connector and wire supplied, solder two wires to the existing S-meter - this provides remote S-meter capability and automatic saving of memories when powering off.

The external control is via a flat telephone-style cable with a RJ-11 connector on the end. Plug this into the board and run the other end out the back of the radio, or just route it through the top sliding door for a no-extra-holes install.

Power the unit up, and you will immediate find some of the new features! The display has a standard upgrade to provide two-digit resolution to the right of the decimal point. Pressing the dial lock key will put the RIT on the main tuning dial knob. The radio now has 99 memory channels accessed by the RIT knob. The RIT can now be cleared in transmit mode. The new 930 now has auto rapid QSY - the faster you turn the main dial, the faster it changes frequency. (This is one of the best features - QSY in one second from top to bottom of the band.) And the biggest feature is computer control!

External control was a little tricky to set up at first, not knowing the baud rate which the radio worked at. But then again, I had not had the benefit of the full documentation, as it wasn't ready yet, and I didn't want to wait! Once I found out the radio was at 4800 baud, it was a breeze. The new control board emulates the TS-570 control which is popular with most programs. CT doesn't show this as an option, but it does use TS-850, which is close enough to work properly with the Piexx board. The interface cable is standard flat telephone cord, which plugs into a DB-9 adapter supplied for the back of your computer. RFI may be a problem with this, but nothing that I'm sure a few turns on the ferrite core wouldn't cure. No RFI problems were noted here at all at my station even without any filtering and 500W next to the computer.

I guess I should take the time to tell you that I installed this board the night before the contest! Approximate time was only about two hours from start to finish. I don't like to make station modifications this close to a contest, but I was excited, and wanted to finally get computer control!

The decision was well worth it! Operation was a breeze, it points and shoots just like it was supposed to, and enabled me to run multipliers very quickly. One feature that could be added is to re-use the T-F split key to monitor the transmit frequency when operating split with CT, as it's nice sometimes to listen for a good QRG in a pileup. Operation of the T-F set key is still the same when using both VFOs in conventional mode.

After speaking with developer Chris Seig again after the installation, he mentioned that he was not interested in installing the boards. Bingo! Nice little niche for me as I specialize in custom work in the two-way radio field right now. I decided then and there we would offer complete professional installation of the board for $59 including shipping for those that weren't comfortable with doing the modifications themselves.

Here is the address to buy the boards:

Chris Seig, c/o PIEXX Co.
13 Main Street, P. O. Box 123
Hillsboro, NH 03244
Voice: (603) 464-5625, Fax: (603) 464-5411
http://www.conknet.com/piexx/

And here's our address if you would like your board professionally installed:

Advantage Communications
8 Howard Road
Hudson, MA 01749
(800) 294-RADIO

Increasing Amp Relay Speed

By Bob Wolfert, K6XX
From the Internet

The first element of all my transmissions was shortened when running the amplifier. Worse, the transmitter ALC swung high, which automatically reduced transmitter power for several seconds. Both problems were traced to a slow acting TR relay in the amplifier.

The circuit shown below speeds the relay by blasting it with twice the normal coil voltage when first activated. The coil voltage decays to normal within a few milliseconds (decay time is proportional to the capacitor size; 47 uF is a good starting point). This circuit was designed by Tony, K1KP.

This circuit does its magic with amplifiers that switch a relay coil to transmit. Also, the relay must use a DC coil. Suitable amplifiers include the Drake L4B and L7, Ameritron amps, and the TL-922.

Does this harm the relay? I don't think so. For example, W6CYX has modified the relay supply voltage in his TL-922 so that is is double its design voltage full time. He has run it every day for several years without problems.

After adding these parts to the T/R cable from the rig to the amplifier, my AL-1200 no longer truncates leading dots, even at high speed. If you amplifier has slow T/R switching, try installing this simple circuit in the T/R line!

Can't Beat 'Em (Continued)

(Continued from page 5)

"my wife says I gotta come home" stuff. While we all have to fit contesting in with our "other" activities, these guys showed what can be done when they've prioritized the contest correctly.

When the smoke had cleared, the results on the 3830 reflector showed that W3LPL had won the 1999 ARRL SSB DX Contest! Here are the numbers we reported:

BAND	QSO	QSO PTS	PTS/Q	COUNTRIES		
160	87	258	3.0	47		
80	490	1467	3.0	89		
40	718	2151	3.0	109		
20	1875	5619	3.0	159		
15	1663	4986	3.0	142		
10	920	2754	3.0	126		
Totals	5753	17235	3.0	672	=	11,581,920

10M was probably hit the worst from the deteriorating condx on the second day. Also, notice the 15M total - after almost 1300 QSOs on Saturday, less than 400 QSOs on Sunday, showing just how bad things became. The surprise on 20M was almost 300 Oceania QSOs - lots of VKs & ZLs. The 40M performance is one of the best ever done from 'LPL on SSB. 80M is down slightly from what they've come to expect from the band, while 160M was just plain difficult all weekend.

You know, I would really like bump K8CC up to the level of W3LPL's involvement and make even more serious noise from W8. A few more antennas, but more radios, operators, etc. However, where will the operators come from? You would think MRRC could bring out enough good operators to support a station like this without taking away from the efforts at stations like **W8AV** and **AA8U**. How about it, MRRC?

Two of the W3LPL operating positions - 20M on the left, 40M on the right. The rack in the background just to the right of center is the 4000V power supply that powers all six final amplifiers

CLUB RESOURCES PAGE

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The Mad River Radio Club is an ARRL-affiliated club of amateur radio contesting enthusiasts. The club area is centered on Findlay, OH, and serves the surrounding states. Membership in the MRRC is open to anyone.

The ***FLASH*** is the official newsletter of the Mad River Radio Club, and is published six times per year in even-numbered months. Submissions of material for the ***FLASH*** are welcome, and may be sent to the editor at the postal or e-mail addresses shown above. The ***FLASH*** may be reprinted in whole or in part, provided proper credit is given.

CLUB DUES are $12 per year, payable May 1st with a grace period thru July 31st. Members of the same family living at the same address may elect to receive a single copy of the FLASH for one set of dues. Full time students are eligible for dues at half of the regular rate. Dues are paid to the club treasurer KE8OC at the address shown above. Please make checks out to **Tim O'Sullivan**, not MRRC.

The **CLUB ROSTER** appears in the September/October issue of the FLASH every year..

MRRC NET Monday evenings at 8:30 PM Eastern time on 3825 KHz ± QRM.

Come join in with other MRRC members on-line with the free **MRRC INTERNET REFLECTOR**. To join, send an e-mail to MRRC-REQUEST@contesting.com. The body of the e-mail should say *subscribe mrrc yourcall.* You'll receive an e-mail confirmation in a few hours.

CONTEST SCORES are sent to the club scorekeeper Jim Stahl, K8MR at the postal or e-mail addresses shown above.

MRRC MEMBER BADGES can be ordered for $10 through Buck Switzer, N8CQA at n8cqa@tir.com.

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