

**The Official Journal of the Northern California Packet Association  
Serving Amateur Radio Digital Communications in Northern California**

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## President's Message

*Gary Mitchell, WB6YRU*

First of all, I'd like to congratulate our very own Bob Vallio W6RGG (DXSPN representative on the NCPA board) for his election to ARRL Pacific Division Vice Director.

### Bylaw change

Our bylaws were somewhat restrictive as to when we hold our annual general meeting. Experience has demonstrated that we get a better turnout if we hold our meeting at a time and place where members already tend to be -such as Pacificon. In order to take advantage of such things, we had to ease up a bit on those restrictions.

At the last general meeting the membership did just that. The bylaws now specify that there must be an annual meeting, but the board sets the date. It now also specifies that written notice must be given at least 30 days before the meeting.

It is believed this change will give us the needed flexibility to set the meeting date and place more to our advantage without diluting the basic purpose and need for an annual general meeting.

### Spectrum Management "working group" meeting.

At Pacificon '99, representatives

from NARCC, NCPA, and others held a meeting on the topic of spectrum management (i.e. band planning) for the region.

As most of you already know, we've had difficulty working with NARCC on band planning in the past. It seems we aren't the only ones. Most of the meeting consisted of an airing of past grievances and problems. The idea was to establish the kinds of problems we've all been having and figure out how to go from here.

The consensus was that we all need to work together on spectrum management. One point of contention was the structure of any spectrum management committee or group. The NARCC leadership continues to insist that NARCC should host or sponsor any such group. This isn't a new position for NARCC; however, the consensus seemed agree with the NCPA that no one entity should be in a position to dominate such a group. But the NARCC leadership was not ready to throw in the towel on this point.

It was decided (suggested by our new ARRL director Jim Maxwell) that we all exchange e-mail addresses and keep the discussion going. Jim collected the addresses and sent a brief note to all the participants with the list. I was the first to try to keep the ball rolling with a posting of my version of the minutes and invited others to do the same. Unfortunately, the whole thing seems to have stalled.

## In This Issue

<b>President's Message . . .</b>	<b>1</b>
<b>Multicast . . . . .</b>	<b>2</b>
<b>Membership Reminder . .</b>	<b>3</b>
<b>General meeting, 1999 . .</b>	<b>4</b>
<b>News from ARRL . . . . .</b>	<b>5</b>
<b>DX spotting nodes . . . .</b>	<b>6</b>
<b>Packet BBS's . . . . .</b>	<b>7</b>
<b>Remailer Excerpts . . . .</b>	<b>8</b>
<b>Digital Band Plan . . . .</b>	<b>10</b>

Later I sent a couple of messages to John K3ZJJ (current president of NARCC) including a rough draft of the complete band plan that we'd been working on...no response yet. I'm happy to report Jim Maxwell has also been trying to keep things going.

### Packet segment at 70 cm

We've been working on allocating a segment for digital at 70 cm for a long time. Despite some arguments and complications over some time, it finally got done! 433.0-434.0 is now digital.

It's about time for there to be at least one digital segment in that band, right? I thought so. However, I learned at the spectrum management meeting (above) that we had effectively re-invented the wheel on this point! Reportedly, some ten or twelve years

ago NARCC and NCPA had agreed that this very same segment would be digital.

At that meeting, representatives from NARCC and myself (NCPA) agreed to look back in what records we could find to substantiate the old plan. I found that in the early issues of the *Downlink*, there was indeed digital allocations made at this segment. There were also a few articles which talked about meeting with NARCC and establishing the 433 segment for digital.

For some reason, this segment was quietly dropped from the digital band plan a few years later. It's not clear why. The NARCC representative wasn't able to find out much more. It was his recommendation that we simply adopt the old band plan for that segment and go from there. I agreed.

The channel allocations you see in the latest digital band plan (elsewhere in this issue) for 70 cm is the result. Allocations there are still a work in progress, but at least we finally have an official place for digital at 70 cm that we can work with.

**EOF**

## Multicast

### Why Multicast on Ham Radio?

Have you ever watched the LAN send the same chat message, or the same PBBS message over and over again to multiple recipients at the same time? This is such a waste, it seems like someone should be working on a solution. The answer is that yes, people have been working on this, and the result is IP Multicasting.

IP Multicast is a technology designed to allow broadcast packets to be sent across many lans on the internet. Unlike normal broadcast packets, which are limited to the local networks, multicast packets can travel through routers and over the internet to everyone interested in receiving that data.

Applications where data needs to be sent from a single source to many

destinations are candidates for using IP multicast rather than a unicast IP program. For example, with a traditional chat room system, typically a set of computers act as chat servers. Users connect to the chat servers, and then the chat servers negotiate among themselves how data is transmitted among them. For each user connected to a chat server, the server needs to send out a packet for each user -- even if they are on the same LAN. The connections between chat servers result in difficult code in the servers themselves to arrange for routing of packets.

In comparison, with an ip multicast chat room, users would broadcast chat packets to all users with a single 'sendblock' command. The routers would be responsible for delivering the chat messages to all users. The routers should be smart enough to eliminate duplicate packets sent over the same data pipes. IP Multicast is an unreliable UDP style mechanism, so some system needs to be added to ensure the reliable, or even likely, delivery of packets. With an IP Multicast chat system, there would be no chat servers. All of the logic for distributing the chat packets across the network are moved down to the OS level. As multicast routers are added to the system, chat access then is automatically available to each new area -- since, no new chat server is required.

That is the job of scaling the size of the application is moved to the network -- and the application itself can remain relatively simple. The ease of programming multicast applications may then result in more experimentation since programmers can create the applications without having to build a network of servers across the planet -- provided there's a multicast network in place.

I believe IP Multicast is a good idea for ham radio networks -- as the data that travels over ham radio is often of a broadcast nature. Whether IP Multicast in its current form is suitable for ham radio networks remains to be seen --

however, the programming API, and socket level interfaces to IP Multicast are well-designed, and should provide a base for applications, both in Windows and Linux.

Here are some basic multicasting concepts that I've picked up.

### mrouterd

The program mrouterd provides for routing of multicast packets. It's typically used to connect multiple nets, say an ax25 net and an ethernet, or an ethernet to another ethernet via a tunnel. Mrouterd doesn't actually route the packets, but instead directs the Linux kernel to forward the packets accordingly.

### Membership

IP Multicast works according to a concept called 'Membership'. A `setsockopt` command called `IP_ADD_MEMBERSHIP` specifies which of the multicast IP addresses that machine receives packets from. An application just specifies that it wishes membership in one of the multicast IP's in the range 224.0.0.0/4, and then the routers take care of the rest, and deliver all packets for that multicast IP address that are sent anywhere on the network.

### IGMP

IGMP packets are used by applications to indicate to the routers how multicast packets should be routed.

### What are the advantages?

1. IP Multicast is optimized so that packets are sent only to the routers that need them. The latest mrouterd 3.9 implements a mechanism to reduce this traffic. IP Multicast will only send a packet once over a tunnel, even if there are multiple recipients on the other end. Compare this to traditional IP programs, which will broadcast a duplicate copy of the same data to everyone on the other end of the pipe.

2. IP Multicast is the result of lots of research and testing, and should be stable enough for ham radio networks. IP Multicast has in it a level of maturity that would be extremely difficult to duplicate with a ham radio network built from scratch.

3. IP Multicast has a very simple programming interface for the applications programmer. Most of the complexity for distributing of packets over a complicated network is placed in the operating system.

4. By building applications using the existing IP Multicast programming interface, these applications can then take advantage of future advances in IP Multicast routers.

5. IP Multicast, though not universally supported by Internet service providers, is widely supported by OS and software vendors. So, Win98 and Linux both have native support for IP Multicast.

What are the disadvantages?

1. MROUTED (the multicast router) is only available for UNIX style machines. Win98 machines can run multicast applications, but as far as I'm aware, they cannot act as routers.

2. Multicast is untested over low speed ham radio links. There are certainly tuning adjustments which will need to be made.

3. There aren't many multicast applications at this time.

4. Multicast routing isn't supported by most ISP's. Anyone interested in experimenting in multicast routing will need to build their own network.

5. IP Multicast is an IP based technology and inevitably involves the overhead associated with IP -- as compared to native AX25 systems.

6. IP Multicast does not guarantee delivery, so applications developed for

TCP/IP or reliable packet delivery will need substantial reworking to use IP multicast efficiently.

How do you get started?

First, I believe you want to be running a Linux version with multicast enabled, multicast routing enabled and ax25 also enabled. If you haven't done ham radio networking before, get your ax25 devices running first. Go to linux.org and look in the support section for the HOWTO's. There you'll find the ax25 howto and the multicast howto. Make sure to include IP Multicasting and IP Multicast routing when you build your kernel. (These options seem relatively benign, even if you don't use IP Multicasting.) Also, I turn on IP Tunneling, though I'm not absolutely sure this is necessary. My testing is on Linux 2.2.x based kernels.

Once, your AX25 network is running, you'll want to setup for IP Multicast. First, you need to set MULTICAST flag for all devices that use multicast. This is done with the following command:

```
#!/sbin/ifconfig ax0 multicast'
```

Do a command `#!/sbin/ifconfig'` and you should see the word MULTICAST following each interface that you intend to use for multicast. My eth0 devices comes up with multicast on by default.

Then, you need to change your routing. Make sure to

```
'add -net 224.0.0.0 netmask 240.0.0.0 eth0'
```

and

```
'add -net 224.0.0.0 netmask 240.0.0.0 ax0'
```

where eth0 is your local ethernet and ax0 is your ham radio network. The net of 224.0.0.0/4 is a special set of ip addresses set aside for ip multicast.

Then you'll need to get mROUTED up and running. I'll try to make versions

## Are You Still a NCPA Member?

Please check the mailing label...Has your membership expired? If so, why not renew your membership now while you're thinking about it? (There's a form on the back cover.)

**If your membership expired in 1997, then this will be your last *Downlink!***

Memberships have been extended to allow for the fact that the *Downlink* hasn't come out quarterly, but this is it for those with 1997 expirations. If you are in that category, but feel you should have more issues coming anyway, please contact us.

available here, though mROUTED is also available on the net. For mROUTED to be useful, you'll need at least 2 networks or a tunnel. That is for example an ax25 network and an ethernet network. Or an ethernet network and a tunnel to another ethernet network.

I have a beacon test program which will send out multicast packets. With a beacon monitoring program, which I'm working on now, you should be able to see your beacons travel from one net to another. If you're connected to another user via a tunnel, you should see his beacons also.

Then send me an email and either I'll connect your multicast network to my system, or hopefully find someone near you who can connect you. (I'm at [cathryn@junglevision.com](mailto:cathryn@junglevision.com))

Here's how I start IP multicast:

```
/sbin/route add -net 224.0.0.0 netmask
240.0.0.0 ax2
/sbin/route add -net 224.0.0.0 netmask
240.0.0.0 eth0
/sbin/ifconfig ax2 multicast
/usr/sbin/mrouted
```

You also might want to try

```
/usr/sbin/mrouted -d
```

To watch mrouted perform it's functions.

If /usr/sbin/mrouted looks functional, it's time to setup the tunnels. The mrouted.conf file should be at /etc/mrouted.conf. Follow the instructions in mrouted.conf. (I'm currently working this out myself -- that is how to properly setup tunnels.)

Finally, watch out for firewall issues.

This one bit me for awhile. I run IP Multicast over an interface with masqueraded IP addresses. The second line sets up the IP Masquerading and the third line is necessary, in this example, to allow the interface to forward IP Multicast packets.

```
/sbin/ipchains -P forward DENY
/sbin/ipchains -A forward -s
192.168.1.0/24 -j MASQ /sbin/ipchains
-A forward -d 224.0.0.0/4 -j ACCEPT
```

IP Multicast on Win98

I have been testing small IP Multicast applications on Win98 and AX25 using the SV2AGW software. This combination works pretty good and can talk to Linux IP multicast with no problems.

Win98 works well for running Multicast applications, but does not work as a multicast router.

The MSDN website has some sample code for IP Multicast if you're interested in creating multicast applications for Win98.

IP Multicast with NOS

I don't run currently run any NOS code, so I'm not sure if these work or not. If you're a NOS programmer, give me the scoop and I'll put that information here.

What is the Future?

1. As a short term goal, I'd say it's important to get a few tunnels up and running, and verify the basic functionality of mrouted over ax25. Let's learn the basics of running IP Multicast.

2. Develop beacons and beacon monitoring as an application. Sending and monitoring beacons is trivial from the programming side, but will give us some information on how well the tunnels are working. Also, beacons can possibly serve some use for distributing information widely across the ham radio networks around the world. A beacon system might be used to find people to meet on 20meters -- or to advertise a ham web page or something. Using ip multicast for beacons will also set up the right expectations about what the network is capable of doing.

3. Develop a chat system. IP Multicast will allow us to make more scalable chat systems. Especially chat systems where many users are in the same chat room. Chat is slightly more advanced than beaconing, since there's an expectation that users will see all the messages that people type -- and this requires some kind of information to be stored by the users or in the network.

4. Adapt existing IP Multicast multimedia applications to the ham radio network. These applications will probably run natively, but may require more bandwidth than we can give them. However, assuming some kind of bandwidth improvement in ham radio networking, (well, we can hope!) IP Multicast is a natural mechanism for delivering, for example, Newsline audio broadcasts to a wide variety of sites.

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## Minutes of the Annual Meeting

Held at Pacificon '99  
October 17, 1999

Sheraton Hotel, Concord CA

Called to order 3 PM by president Gary WB6YRU.

Attendance: Gary WB6YRU, Mike WA6ZTY, Lloyd KD6FJI, Don KF6JMQ, Mel W6BNG, Joe KA6ROM, Barry KE6LW, Cathryn KE6I, Art W6THD, and Howard N6HM.

Self introductions.

### Bylaw change regarding specification as to when we hold the general meeting

(History: At the last general meeting Howard N6HM made a motion to change the bylaws to allow having the general meeting at Pacificon. The consensus was this should be done, but a change to the bylaws requires advanced notice to the membership. This issue will be voted on at the next general meeting.)

The parts of the bylaws in question currently say:

*ARTICLE III Board of Directors*

*A. The Association shall be run by a Board of Directors (Board) which shall each year originally consist of seven individuals elected at the April General Meeting to serve for one year beginning May 1.*

*ARTICLE V General Meetings*

*A. A GENERAL MEETING shall be held, as far as practical, every April.*

The following proposed changes (first sentence of each paragraph) removes

mention of the specific month when the annual general meeting should be held. This will allow meeting in the Fall at Pacificon or whenever.

#### Article III

A. The Association shall be run by a Board of Directors (Board) which shall each year originally consist of seven individuals elected at the Annual General Meeting and have a term of one year.

#### Article V

A. An Annual General Meeting shall be held once per year, the time and date to be announced in the newsletter or by separate written notice at least 30 days in advance.

Approved unanimously.

#### Treasurer's Report

After the latest bills have been paid and the latest memberships are added, the treasury will have about \$200. Discussion followed, including the following ideas and comments:

Whether the newsletter comes out on time or not, memberships should expire "on time." We have been extending memberships to allow for the fact that the newsletter has not come out as often as it should. The consensus was to compromise between these two positions.

We could solicit equipment donations and have a table at the flea market (but we'd need sufficient volunteers which are hard to come by).

Sell kits (such as QRP, TAPR kits, etc).

Sell Intro to Packet booklets again, but would need to update them from last time--need something new.

Put 3x5 card up at HRO inviting NCPA membership.

Make the Downlink more interesting by working harder to solicit articles from packet groups. Also solicit articles on specific topics rather than a general request for articles.

#### Election of Directors

N6HM reports Bob Vallio W6RGG (not present) wishes to run again as rep. of DXPSN.

Slate:

Bob Vallio W6RGG  
Gary Mitchell WB6YRU  
Howard Krawetz N6HM  
Mel Gregonis W6BNG  
Barry Barnes KE6LW  
Mike Fahmie WA6ZTY  
Dave Harris N6UOW  
Bob Fahnestock WH6IO

Dave N6UOW and Bob WH6IO were not present, but had expressed an interest in running. Before their election is finalized, their acceptance must be received. Also mentioned was Cap Pennel as a possible alternate for APRS if Dave is not willing to run again.

Slate was approved unanimously.

[Dave and Bob accepted shortly after this. --Ed.]

#### New Digital sub-band at 433.0-434.0 MHz.

Keyboard needs two channels.

N6HM: motion to leave 70 cm channel selection up to the coordinator. Passed unanimously (board will have override authority).

#### Meeting with NARCC (few hours beforehand)

One participant mentioned our new 70 cm digital segment isn't new at all, but was agreed to be digital ten or twelve years ago between NARCC and NCPA. It's interesting that we ended up allocating (or re-allocating) the exact same segment independently.

The meeting basically was an airing of past problems and agreement that everyone needs to work together on overall band planning. The consensus seemed to be that no one organization should dominate the band planning group. NARCC's president disagreed, wanted NARCC to "host" the band planning group.

#### General Band Plan

The board has been working on a general band plan in which the NCPA will officially recognize non-digital usage. This is intended for reference

only--the NCPA is not proposing to do non-digital band planning. Consensus was that we should get NARCC in on this too. N6HM: motion to accept as is with the idea that it will be updated as new information comes in. The details will be up to the board. Passed Unanimously.

#### Downlink

Consensus is that the newsletter is very important. One idea for fund-raising is to have ads in the Downlink (want/for sale). Small ads from members would be free for the first 25 words or so, then perhaps 10 cents per word thereafter. Commercial ads would be at the "going rate" based on what other club newsletters are doing.

#### Network traffic on 145.05 (keyboard)

No new information/developments were mentioned.

Adjourned 4:27 PM

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## News from the ARRL

From *The ARRL Letter*, Sept. 10, 1999

#### FCC RELAXES RULES FOR SPREAD SPECTRUM

The FCC has relaxed rules governing the use of spread spectrum techniques by radio amateurs and opened the door to the possibility of international spread spectrum communication. The Report and Order in WT Docket 97-12 adopted August 31 concludes a proceeding that originated with an ARRL petition in December 1995 and has been pending since 1997.

The FCC adopted rules that will allow Amateur Radio stations to transmit additional spread spectrum emission types. Once the new rules become effective November 1, hams will be able to use techniques other than frequency hopping and direct sequence spreading.

# DX Spotting Nodes

June 1999

<u>Location</u>	<u>Call</u>	<u>Alias</u>	<u>Frequency</u>	<u>Coverage</u>
California City	K6ZZ		144.490	Antelope Valley area
	EARN8		144.490	Oak Peak
Castro Valley	W6RGG	DXCV	145.770	East, West, South SF Bay area
Chico	K6EL	DXC	145.670	Chico
	K6EL	DXW	145.670	Oroville, Red Bluff
	K6EL	DX	144.950	South Fork Mtn - Redding area
Hanford	K6UR	DXFRES	144.950	Bear Mtn, Fresno area
	K6UR	DX7	145.770	Mt. Adelaide, Bakersfield area
	K6UR	DX16	145.770	Oakhurst
Livermore	NF6S	DXL	145.770	Tri-Valley area
Los Gatos	N6ST	DXLG	146.580	Santa Cruz Mtns, Monterey Bay
	N6ST	DXF	146.580	Santa Cruz/Los Gatos
Mountain View	K6LLK	DXMV	144.950	Mountain View, San Jose area
Oakdale	K6OQ		146.580	Modesto area
Penngrove	K6ANP	DXANP	144.950	Sonoma County
Reno, Nevada	N7TR	RENODX	144.950, 146.58, 441.500 (2400 baud), 51.7	
	N7TR	PCDX1	146.580	Low Level in Reno
	N7TR	PCDX	144.950	Virginia City, NV
	N7TR	DX2400	441.500 (2400 baud)	
Rio Linda	W6GO	DXRL	144.950	Sacramento, Woodland, Davis
San Francisco	W6OTC	DXSF	145.670	East Bay and North

Bob Vallio - W6RGG      wsixrgg@crl.com

In addition, the new FCC rules will permit US hams to use spread spectrum techniques to communicate with amateurs in other countries that permit SS. Spread spectrum communication has been limited to stations within FCC jurisdiction.

The new rules require that spread spectrum stations running more than 1 W incorporate automatic transmitter power control. Amateur stations using SS are restricted to a maximum power of 100 W.

The Commission also amended the rules to eliminate what it called "now-unnecessary record keeping and station identification requirements" that apply only to stations using spread

spectrum. The FCC agreed to let SS stations identify themselves using conventions developed by the Amateur Radio community.

Roanoke Division Vice Director Dennis Bodson, W4PWF, who has followed the League's Spread Spectrum initiative through from start to finish was pleased with the outcome of the proceeding. "I'm very happy," he said. "The League got everything it wanted and more--all of which, I believe, will help to promote this mode on the amateur bands." Bodson served as the ARRL Board liaison with the Future Systems Committee and chaired the Ad Hoc Committee on Spread Spectrum, which was instrumental in developing the League's stance on Spread Spectrum.

Stations employing spread spectrum techniques will remain secondary to--and must accept all interference from--stations employing other authorized modes. The FCC declined to authorize the use of spread spectrum techniques on additional bands or frequencies.

A copy of the FCC's complete Report and Order is available at <http://www.arrl.org/announce/regulatory/wt97-12>.

From *The ARRL Letter*, Oct. 29, 1999

## **FCC REVISES CONDUCTED EMISSION LIMITS**

The FCC has gone along with

## Packet Sysops of Northern California Packet Bulletin Board Systems November 1999

Call-SID -----	Location -----	User Ports -----
WH6IO	Benica	144.99, 145.71&+, 145.75&, 433.43&+
N6EEG	Berkeley	144.97
KE6I	Berkeley	145.71&
KM6PX-1	Citrus Heights	145.07, 441.50
WA6YLB	Exeter	145.69
N6QMY-1	Fremont	144.31, 441.50
N6CKV	Gilroy	144.99
N6LDL	Los Gatos	144.97, 145.71&, 441.50
WA6NWE-1	North Highlands	144.93, 145.09, 145.75, 441.50
KD6DG	Redding	145.09
WD6CMU	Richmond	144.97
W6CUS-1	Richmond	145.63
N0ARY-1	San Jose	144.93*, 433.37&*
KB6MER-1	San Jose	145.73*
N6DBZ	Sebastopol	145.07, 441.50&
KD6JZZ	Sonora	144.97
WA6EWV-1	South Lake Tahoe	144.97
W6YX-9	Stanford Univ	145.75+
W6SF	Stockton	144.99
K6MFV	Walnut Creek	144.31, 145.71&+
K7WWA	Willits	144.31, 145.69
KE6LW-1	Yuba City	145.63, 441.50

**Keys:**

- & = 9600 Baud Port
- + = TCP/IP Port
- \* = Currently Inactive

recommendations from the ARRL and others to hold the line on conducted emissions below 30 MHz from unlicensed consumer electronic and industrial, scientific and medical devices operating under Parts 15 and 18 of the Commission's rules. The FCC has proposed new emission guidelines that are just slightly more stringent than the current FCC standards.

"We conclude that mandatory conducted emission limits continue to be necessary

to control interference to communications services," the FCC said in a Notice of Proposed Rule Making in ET Docket 98-80, released October 18. The Commission announced plans to "harmonize" its conducted emission standards with international standards developed by the International Electrotechnical Commission, International Special Committee on Radio Interference--known as CISPR.

The CISPR emission limits for consumer equipment are "approximately

5 dB more stringent below 5 MHz and 1 dB more stringent above 5 MHz" than the existing standards, the FCC said. "We believe that these standards address some of the concerns expressed by ARRL" and others in response to last year's FCC Notice of Inquiry on the issue, the Commission commented.

The Commission said it was not persuaded by a National Association of Broadcasters' suggestion to impose much tighter standards--22 dB greater than present--to protect AM broadcasting.

Interfering devices include such common household appliances as computers, TV sets, and microwave ovens. Conducted emissions result from RF voltages imposed on the ac power line, which can in turn act as an antenna. In general, the FCC's current conducted emissions limit is 250 uV. Equipment manufacturers had argued to relax existing limits to keep down production costs, while the ARRL and others representing spectrum users had asserted that the existing limits were not tight enough. In response to the earlier NOI, the League had commented that the proliferation of Part 15 and 18 devices over the past decade had resulted in "a marked increase in RF noise from conducted emissions generally."

The FCC said it agrees that standards on the amount of RF energy conducted onto the ac power lines "are required to control potential interference to users of the radio spectrum below 30 MHz." It also invited comments on expanding the frequency range of the conducted emission limits from the current 450 to 30 MHz to the 9 kHz to 30 MHz spelled out in the CISPR standards. The ARRL has proposed that the FCC allocate new LF amateur bands at 136 kHz and at 160 to 190 kHz.

Comments on the NPRM are due 75 days after its publication in The Federal Register, and reply comments are due 30 days later. A copy of the FCC's Notice of Proposed Rule Making in ET Docket

98-80 is available at <http://www.arrl.org/announce/regulatory/et98-80/nprm.html>.

## FCC ALLOCATES 75 MHz AT 5.9 GHz FOR ITS

As expected, the FCC has allocated 75 MHz of spectrum in the vicinity of 5.9 GHz for use by so-called "Intelligent Transportation System" services aimed at improving highway safety. The co-primary allocation for Dedicated Short Range Communications systems at 5.850 to 5.925 GHz includes the upper portion of a secondary Amateur Service allocation. Hams share 5.650 to 5.925 GHz with government radars and nongovernment fixed satellite service uplinks. The FCC already has allocated 5.725-5.825 GHz for U-NII devices to provide short-range, high-speed wireless digital communication under Part 15.

In releasing its Report and Order in ET Docket 98-95 October 22, the FCC said the 5.850-5.925 GHz band would be devoted to a variety of Part 90 DSRC uses such as traffic light control, traffic monitoring, travelers' alerts, automatic toll collection and traffic congestion detection. Other proposed uses of ITS would include electronic inspection of moving trucks and emergency vehicle traffic signal preemption. The Commission said that amateur organizations and licensees "raised the majority of DSRC spectrum sharing concerns" in their comments on last year's Notice of Proposed Rulemaking on the issue.

In its September 1998 comments, the ARRL said the FCC was proposing too much spectrum at 5.9 GHz for DSRC deployment. The League had asked that the FCC compensate the Amateur Service by elevating remaining Amateur and Amateur Satellite allocations at 5.650 to 5.725 and 5.825 to 5.850 GHz to nongovernment primary "to insure against future preemption by nongovernment services with higher allocation status." The FCC Report and Order did not specifically address the

ARRL's request for elevation to primary status, however.

In the R&O, the FCC said it was "sympathetic" with the League's concerns that the ITS and U-NII allocations could impact amateur use in the band but said hams have 275 MHz in the band and most ham use is for point-to-point networks. Given amateur radio's inherent frequency agility, the FCC said it believes "spectrum sharing between the amateur service point-to-point links and DSRC operations is viable." DSRC operations in the 5.850-5.925 GHz band "are unlikely to receive significant interference from or cause interference to amateur operations," the FCC said.

The FCC encouraged ITS entities to "informally notify the ARRL or the local amateur service community" of their intended operation. The FCC has proposed a maximum of 30 W EIRP for DSRC systems, but the rules will require ITS licensees to use the minimal power necessary.

The FCC says it will defer consideration of licensing and services rules and spectrum channelization plans to a later proceeding.

From *The ARRL Letter*, Dec. 10, 1999

## TAPR RELEASES DRAFT APRS PROTOCOL SPEC

The APRS (Automatic Position Reporting System) Working Group has completed the second public draft of the APRS Protocol Specification.

This document covers the core functionality of APRS Protocol Version 1.0 as it works today. This is the base-level specification that all implementations should comply with. It was adopted unanimously by Working Group members, who include the authors of APRS-DOS, WinAPRS, MacAPRS, X-APRS, PocketAPRS, APRS+SA, javAPRS, and APRServe, and the

developers of the Mic-E and Pic-E products.

The Specification now includes packet format diagrams, the APRS symbol tables, full details of the Mic-E encoded format, the compressed latitude/longitude position format, plus weather report and telemetry formats. Above all, the Specification contains many examples of how APRS data is formatted to make it easier to understand.

The APRS Protocol Specification draft now is available as an Adobe PDF file at <http://www.tapr.org/tapr/html/Faprswg.html>. Comments, criticisms and suggestions for improvement are invited, and the document includes details on how to file comments.

The comment deadline is midnight Pacific Time Sunday, December 19, 1999 (0800 UTC, Monday December 20, 1999). The APRS Working Group will issue the final approved version of the Specification as soon as possible after it considers all comments.

--John Ackermann, N8UR.

**EOF**

## Board of Directors Electronic Meeting

*Excerpts of the NCPA board remailer traffic, July 1999 through September 14 1999. Compiled by Gary Mitchell WB6YRU (full text of traffic is available).*

July 4, 1999

Louis Cobet, K6MDH:

The FCC assigned RM-9673 to a petition by the Central States VHF Society. I think everyone interested in band planning and digital work between 6 meters and 70 cm will be interested in this proposal for rule making. The proposed rule changes would harden into part 97 the band plan that the Central States VHF Society wants.

Zonker Harris:  
The two-meter "no data" clause seems to be a problem.

FCC has issued an NPRM number, and the comment window opened 6/28... do we want to draft something as a group, or respond individually?

From the NPRM:  
*144.3-148.0 MHz: Delete RTTY, data, test, and MCW. Also delete reference to Standard 8. Note: this would prevent packet radio from operating anywhere in the two-meter band, which is probably not intended.*

*[The latest word is that the FCC has dismissed many proposed rule changes, including this one. --Ed.]*

July 6, 1999  
Vote to accept list of simplex frequencies, except for 146.595 (to be figured out later):  
Five YES  
Zero NO  
One not voting  
The motion passes.

July 17, 1999  
R. B. Vallio, W6RGG  
Please delay any vote on 146.595 until I am able to provide you with some confirmed new information.

July 18, 1999  
R. B. Vallio, W6RGG:  
withdraws motion for 146.595 to be digital.

July 20, 1999  
Gary Mitchell, WB6YRU:  
(Listed repeater channels for band plan, plus a few comments)

August 2, 1999  
Gary Mitchell, WB6YRU:  
(Posted examples of how the band plans could be listed)

Discussion followed about how to present the information so that it would provide a lot of data at a glance, yet fit on most text screens.

Bob Vallio, W6RGG:  
Changes have been made to the reflector which should preclude the further receipt

of commercial messages. No one who is not registered on the reflector may post messages. No one is prevented from joining the reflector, as long as they are willing to confirm their address via return e-mail. I hope this proves satisfactory to everyone.

Cap Pennell, KE6AFE:  
Reports that Bill Bliss WB6LPG died.

August 5, 1999  
Gary Mitchell, WB6YRU:  
Regarding amateur usage of 33 cm... WSWSS (Western States Weak Signal) president described their usage and referred me to a SCRRBA's web page, <http://www.scrba.org/BandPlans/33cmnotes.html>.

The NCPA plan for digital at 33 cm has remained unchanged for a very long time, almost all of it is classified as experimental (i.e. not specifically allocated). Perhaps it's time we re-evaluate it.

(Listed band plan of NCPA, WSWSS, and SCRRBA for 33 cm)

August 9, 1999  
Gary Mitchell, WB6YRU:  
WH6IO and K6TPK are currently using 51.16 (a keyboard channel) for forwarding. A request has been made to allocate a six meter channel for 9600 baud TCP/IP. Once this is done, they'll move off of 51.16 to the designated channel. 51.62 - 51.68 are currently un-allocated 20 kHz digital channels.

The recommendation is to allocate 51.62 MHz to 9600 baud TCP/IP.  
Four YES  
Zero NO  
One ABSTAIN  
One not voting  
The motion passes.

August 10, 1999  
Gary Mitchell, WB6YRU  
It seems we won't be getting anything out of our editor. So, it looks like this very belated issue is going to have to start up again from scratch. I'm willing to do this issue, but we really (still) need an editor. In the mean time, does anyone have anything in the way of articles for this issue?

Charles Brabham, N5PVL  
Suggests something on FlexNet (provides web page for info)

August 26, 1999  
Gary Mitchell, WB6YRU  
(Posts sample of overall band plans for 10 through 1.25 meters, asks for comments)

(Couple of minor comments followed)

August 30, 1999  
Bob Fahnstock, WH6IO forwards message from the Ham-L@kc3ol.dynip.com list:  
*The United Kingdom will move from 25 kHz to 12.5 kHz channel spacing on 2 meters starting January 1, 2000, much in the same manner that the US went from 30-kHz to 15-kHz spacing years ago. Eventually all 2-meter repeaters in ITU Region 1 will conform to the 12.5-kHz standard. The same change is under consideration for 70-cm repeaters as well.--RSGB; Newslite*

Sept 3, 1999  
Gary WB6YRU:  
Posts rough draft of overall band plan

Howard N6HM  
Treasurers report -- we have only \$198.07, not good. Allan W6MEO, Steve KA6ETB, and Bob WH6IO pledge to donate \$25 each.

Sept. 11, 1999  
Gary WB6YRU  
Posts information on 33 cm band and how So. CA has done band planning there.

Sept 14, 1999  
Gary WB6YRU  
Announces general meeting at Pacificon NARCC has new president: John Ronan K3ZJJ (also running for Pac. Div V.P.) And many new people on their board. John mentions Spectrum management meeting at Pacificon.

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# Northern California Packet Band Plan

November 1999

## 50 MHz

50.60-50.80 (20 kHz channels, non-specific at this time)  
51.12 SCA backbone  
51.14 BBS  
51.16 Keyboard to Keyboard  
51.18 Experimental  
51.62 TCP/IP, 9600 baud  
51.64-51.68 (20 kHz channels, non-specific at this time)

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## 144 MHz

144.31 BBS  
144.33 Balloon & experimental  
144.35 Keyboard to Keyboard  
144.37 BBS LAN forwarding  
144.39 APRS (U.S. and Canada)  
144.41 duplex, lower half (145.61 upper half, 1.2 MHz split)  
144.43 TCP/IP (OK to run duplex with 145.65)  
144.91 Keyboard to Keyboard  
144.93 BBS  
144.95 DX Spotting  
144.97 BBS  
144.99 BBS  
145.01 User access  
145.03 Keyboard to Keyboard  
145.05 Keyboard to Keyboard  
145.07 BBS  
145.09 BBS  
145.61 duplex, upper half (144.41 lower half)  
145.63 BBS  
145.65 TCP/IP 9600 bps (OK to run duplex with 144.43)  
145.67 DX Spotting  
145.69 BBS  
145.71 9600 bps  
145.73 BBS  
145.75 TCP/IP  
145.77 DX Spotting  
146.58 DX Spotting

### NOTES:

- Allocations from 144.31 through 144.43 are relatively close to the weak-signal sub-band--watch your deviation.
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## 220 MHz

219.05-219.95 100 kHz channels, Backbone  
223.54 LAN  
223.56 LAN  
223.58 LAN, Gilroy (GARLIC)  
223.60 LAN, Sacramento Valley (SACVAL)  
223.62 LAN, South Bay (SBAY)  
223.64 TCP/IP  
223.66 Keyboard to Keyboard  
223.68 DX Spotting Backbone  
223.70 LAN, Monterey Bay & North Coast (MRYBAY)  
223.72 LAN, North Bay (NBAY)

223.74 Backbone, DX Spotting

### NOTES:

- 219 channels are by coordination only. There are currently political problems with using 219-220, making them unavailable in most of northern CA.
  - On 223.58, TCP/IP interlink (Sacramento) is secondary, not to interfere with node uplink.
  - 222.14 was recognized as weak signal and the existing DX spotting stations moved to 223.68 on March 7, 1999. At the same time, 223.68 was changed to DX Backbone.
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## 440 MHz

433.05 TCP/IP backbone (100 kHz)  
433.15 BBS backbone (100 kHz)  
433.25 DX Spotting backbone (100 kHz)  
433.31 - 433.35 (20 kHz channels non-specific at this time)  
433.37 BBS, 9600 baud  
433.39 DX Spotting  
433.41 BBS LAN  
433.43 9600 baud TCP/IP  
433.45 BBS LAN  
433.47 Keyboard Interlink  
433.49 TCP/IP  
433.51, 433.53 (20 kHz channels non-specific at this time)  
433.55 BBS LAN  
433.51 - 434.0 (20 kHz channels non-specific at this time)  
441.50 Any

### NOTES:

- Channel allocation in this band is currently under review.
  - There is a possibility of duplex channels being assigned in the future (probably 433.x/438.x MHz). Comments are welcome.
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## 900 MHz

903.500 1 MHz wide, TCP/IP  
904.500 1 MHz wide, TCP/IP  
915.500 1 MHz wide, experimental  
916.100 200 kHz wide, experimental  
916.300 200 kHz wide, experimental  
916.500 200 kHz wide, experimental  
916.650 100 kHz wide, experimental  
916.750 100 kHz wide, experimental  
916.810 20 kHz wide, experimental  
916.830 20 kHz wide, experimental  
916.850 20 kHz wide, experimental  
916.870 20 kHz wide, experimental  
916.890 20 kHz wide, experimental  
916.910 20 kHz wide, experimental  
916.930 20 kHz wide, experimental  
916.950 20 kHz wide, experimental  
916.970 20 kHz wide, experimental  
916.990 20 kHz wide, LAN links (Contra Costa County only)

900 MHz activity is on a non-interference basis to vehicle locator

service. This sub-band is not considered suitable for omnidirectional systems. Use for point-to-point links only.

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## 1296 MHz

1248.500 1 MHz wide, experimental\*  
1249.000-1249.450 Unchannelized, experimental  
1249.500 100 kHz wide, experimental  
1249.600 100 kHz wide, experimental  
1249.700 100 kHz wide, experimental\*  
1249.800 100 kHz wide, experimental\*  
1249.870 20 kHz wide, experimental  
1249.890 20 kHz wide, DX Packet Spotting  
1249.910 20 kHz wide, experimental\*  
1249.930 20 kHz wide, experimental\*  
1249.950 20 kHz wide, experimental\*  
1249.970 20 kHz wide, experimental\*  
1249.990 20 kHz wide, experimental\*  
1250.500 1 MHz wide, experimental  
1251.500 1 MHz wide, experimental  
1297.000-1298.000 Unchannelized, experimental  
1298.500 1 MHz wide, experimental\*  
1299.000-1299.450 Unchannelized, experimental  
1299.500 100 kHz wide, experimental  
1299.600 100 kHz wide, experimental  
1299.700 100 kHz wide, experimental\*  
1299.800 100 kHz wide, experimental\*  
1299.870 20 kHz wide, BBS LAN  
1299.890 20 kHz wide, DX Packet Spotting  
1299.910 20 kHz wide, BBS LAN  
1299.930 20 kHz wide, experimental\*  
1299.950 20 kHz wide, experimental\*  
1299.970 20 kHz wide, experimental\*  
1299.990 20 kHz wide, experimental\*

\* Full duplex channel pairs at 50 MHz separation, example:  
1249.910 ↔ 1299.910

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## Definitions

9600 BPS Stations using 9600 baud with direct FSK (G3RUH, TAPR, etc.) modems.

Backbone No uncoordinated stations. These channels are for specific purposes as defined by the NCPA and/or affiliated groups. These are frequencies where the various BBS, nodes, and networks forward traffic and are very high volume channels. Please use the normal user entry points of the network you want to access rather than these channels.

BBS These frequencies are for user access to a full-service BBS. Keyboard-to-keyboard is tolerated. Please don't put high level nodes or digipeaters on these channels since they are local. A low-level direct link or node that links into a backbone on another frequency is the proper implementation.

Duplex Simultaneous transmit and receive by a single station, including digital repeaters. Duplex channels are intended for high-volume applications. 9600 baud or higher is encouraged, but not required at this time.

DX Spotting Northern California DX packet spotting network. No other activity should be on these channels.

Experimental Anything goes except full service BBS or any 24 Hr/Day services (nodes, gateways, etc). This is where you can test new gear, programs, etc. These channels may be reassigned in the near future, so no permanent activities please.

Forwarding same as *backbone*

Keyboard to Keyboard Primarily chat channels. These are also the primary emergency channels. No high-volume activity such as full service BBS, DX Spotting, TCP/IP, etc.

Interlink same as *backbone*

LAN Local Area Network. BBS's are grouped into LAN's for more efficient forwarding. A LAN frequency is the forwarding channel within a LAN and to the backbone. Please do not attempt to access the BBS network on these channels.

Personal mailbox/mailedrop A BBS-like system, often running entirely within a TNC, with a small number of users that handles information of a personal, local or special-purpose nature. A mailbox is allowed on keyboard-to-keyboard channels ONLY if it does not forward with other BBSs. Mailboxes may forward with full-service BBSs on LAN channels at the discretion of the BBS SYSOP.

TCP/IP Stations using TCP/IP protocol on top of AX.25. Some AX.25 tolerated to communicate to TCP/IP stations if a compatible p-persistence access method used.

User Access User access to a network. This is for the next generation of packet which is expected to operate like the internet. Users would access such a network on these frequencies. The load on these channels may be rather high, like BBS channels. The activity may be any combination of BBS, keyboard, TCP/IP, or other modes.

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## Procedure for changes

Send requests for changes to either the frequency coordinator or the NCPA board. The frequency coordinator will then present the request to the board along with suggested assignments. The NCPA board, elected by you, the packet user, makes all assignments.

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## Misc. Info.

Packet tends to splatter if the deviation is set too high. Please keep your deviation to less than 5 kHz.

Except for the 219-220 MHz segment, the NCPA currently does not coordinate individual stations, nodes, etc. leaving that to the special interest groups. BBS station coordination is done by the PSNC in Northern CA. DX spotting is coordinated by DXPSN. Some digital has been coordinated on auxiliary channels by NARCC.

The NCPA board conducts most of its meeting activity electronically by internet e-mail remailer, [nepa@qth.net](mailto:nepa@qth.net). As with face-to-face board meetings, interested persons are welcome. Subscribe to the remailer by sending e-mail to [majordomo@qth.net](mailto:majordomo@qth.net) with "subscribe nepa" as the message. Subscribing to the remailer is like attending a continuous NCPA board meeting.

## Northern California Packet Association

The NCPA fosters digital communications modes of amateur radio through education, band planning, and acts as an umbrella organization for various packet special interest groups. Your annual dues helps pay for this newsletter and other educational materials activities. If you might be interested in getting more involved, please let us know.

Call: \_\_\_\_\_ Home BBS: \_\_\_\_\_ e-mail: \_\_\_\_\_

Name: \_\_\_\_\_ Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip + 4: \_\_\_\_\_ Phone: \_\_\_\_\_

- New Membership     Renewal     Change of Address     I'm an ARRL Member  
 One year: \$10     Two Years: \$20     Three years: \$30  
(make checks payable to NCPA)

Please indicate your area(s) of interest:

- BBS SysOp     BBS User     APRS     NET/ROM     TCP/IP     High-speed packet  
 DX Packet Spotting Network     Keyboard to Keyboard     FCC/legal issues     Other:
- 

**NCPA** *Downlink*

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**First Class**