ZERO BEAT

4-84

HAMPDEN COUNTY RADIO ASSOCIATION, INC

NEXT MEETING: FRIDAY APRIL 6th, 1984   8 PM

RADIO REVIEW NIGHT
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See some of the new goodies for
sale to radio hams! Club members
will be bringing in all sorts of
things, from transceivers to meters.
You're invited to show off that new
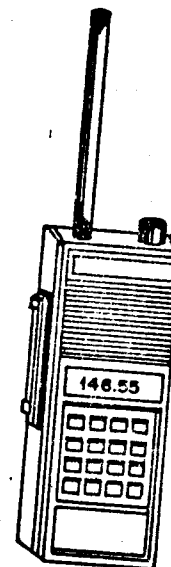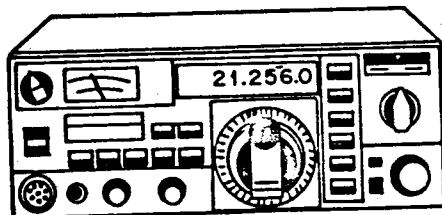rig the wife finally let you buy!

Some of what will be there to see:

KENWOOD
TR-2500

YAESU FT-726R

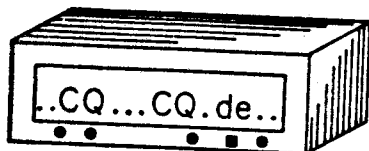HEATH HW 5400

DAIWA
METER

ICOM 745

DRAKE TR 5

AEA MORSE READER

-This is also HOME-BREW NIGHT, when the builders are
 showing off their latest projects.
-Bus tickets for the NYC trip will be on sale.
-GE Proglines on sale
    -June HCRA Banquet tickets will be
     on sale. ($8.00 each)

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EDITOR'S CORNER

   This issue of your newsletter is all about PACKET RADIO! Of course
the first thought that comes to your mind is "What's Packet Radio?".
Basically, it's communicating over the airwaves using your radio and
computer to talk to other computers. The Mount Tom club is considering
putting packet on their newest repeater going up on 220mhz. Dig in to
these articles and READ 'EM.
   Also in this issue-- Progline Radios for sale   Ham-of-the-Year
nomination blanks   Ham in Space mission   VARC newsletters

   The bus trip tickets to the ARRL National Convention are selling
very fast! Don't be disapointed!

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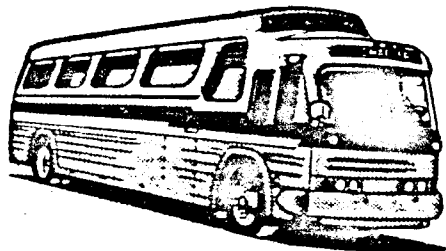
CHARTER BUS TO THE ARRL NATIONAL CONVENTION

Saturday, July 21, 1984

Leave Springfield at 7, arrive NYC, 10, Leave 10PM. This will give everyone a chance to attend the banquet, and meet Owen Garriot, W5LFL. Here's how to get seats: Until June 1st, 1984, bus tickets will be sold only to members of the Hampden County Radio Association. Members tickets- $12.00, ticket for a spouse,-$13.00 (If spouse is a member, $12.00 rate applys.)

After the June 1st Club Banquet, tickets will be sold to anyone, at $14.00 per ticket. If you are not on the club membership list and you send in the money early, you will be on a waiting list for seats, based on your postmark. Money will be refunded if all seats are not sold by July 1st, 1984. THE BUS SEATS 49 PEOPLE, DON'T WAIT 'TIL THE LAST MINUTE! Door prize to be awarded on the bus.

TO ORDER: Send a check made payable to the HCRA, with your name and address. Include an SASE, please. Use the form below, if you want.

- -

Mail to: Jeffrey J. Duquette, P.O. Box 346, Southwick, MA 01077

NAME_____   CALLSIGN_____

NAME_____   CALLSIGN_____

MAILING ADDRESS_____
    (street)   (city) (state) (zip)
AMOUNT ENCLOSED:
_____

Members $12.00 Member's Spouse $13.00 ALL TICKETS AFTER June 1st: $14.00
- -

GE PROGLINES FOR SALE!

A local company has generously decided to donate sixteen GE Progline radios which are being phased out of service. Their only stipulation was that they be put to use for the betterment of amateur radio. These radios are complete with power supply, all cables, manuals, etc and are convertable to six meter operation. They use a 6146 final tube, have a single crystal channel, and put out 35 watts.

These can be purchased by anyone, for $15.00. The club treasurer, N1AEH, will collect the money and give out these units. The money received from this sale will be used for the betterment of Amateur Radio. If we know you're going to be there, you can pay for and pick up the radio at the April meeting. No limit on the number you can purchase, first come-first served!

VALLEY AMATEUR RADIO CLUB NEWSLETTERS

I have received from W1NPL a complete set of VARC newsletters. I gather that the VARC was a radio club that is now defunct. The newsletter was excellent, and I'm going to re-print about 12 articles here in ZERO BEAT. Our backlog of articles for ZB was about an inch thick and has now swelled to 2 inches, thanks to W1NPL!

* * * PROPOSED PACKET RADIO HIGH SPEED LINKING * *

Amateur packet radio is currently being established as a viable mode of communications. Nearly 200 Tucson Amateur Packet Radio (TAPR) Terminal Node Controllers (TNCs) are in the field with the promise of more to come soon. It is believed that on the order of 100 Vancouver TNCs are also in the hands of active packeteers.

The present situation, then, has about 300 stations in about 30 locations communicating (primarily) on short-range VHF frequencies at a signalling rate of 1200 bits per second (bps). Clearly, it would be desireable to establish inter-group packet communications. Further, the availability of non-local coverage would enhance the viability and probably acceptance of packet radio as a primary Amateur communications technique.

Recently, some experiments have been conducted between the east and west coasts of the United States, as well as between the US and New Zealand. A channel has been allocated to digital experimentation on the Phase 3B satellite. A packet radio satellite has been proposed and is currently being designed by AMSAT. All of these systems are aimed at expanding the geographical coverage of packet radio stations.

One problem with all of these methods is that the achievable signalling rate is relatively slow. The Phase 3B satellite channel is both bandwidth and power limited, making a 1200 bps signalling rate about the best we can hope for. HF links are also limited by regulation and ionospheric propagation to a maximum of 1200 baud and typically 100 to 300 baud. PACSAT is primarily a non-real-time system, with a maximum data rate of perhaps 9600 baud.

One of the touted advantages of packet communications is the concept of resource sharing. Conceptually, the simplest of packet stations should be able to use the resources of the gateway to extend its own coverage, somewhat akin to the user of a handheld VHF rig using a mountaintop repeater, or an autopatch, toextend his coverage.

While AMSAT is concentrating its resources in the development of satellite techniques, and AMRAD is working on an adaptive modem design for HF use, TAPR has committed itself to the development of high speed UHF/microwave linking equipment. This concept is not new, but it is new within the amateur radio environment, and that same environment places unique constraints on the equipment itself. The remainder of this paper will address the system requirements followed by suggested approaches to implementation.

TOPOLOGY

The current packet centers of operation are widely scattered geographically, and widely separated from one another in terms of VHF coverage. The patterns that seem to emerge are generally consistent with population density. It may be that, as packet radio takes hold, its station distribution will more closely align with the general population distribution.

Present centers of activity include San Francisco, Los Angeles, San Diego, Phoenix, Tucson, Colorado Springs, St. Louis, Little Rock, Chicago, Minneapolis, Racine, Ann Arbor, Indianapolis, Dayton, Washington DC, New Jersey, Connecticut, eastern Massachusetts and Florida. In addition, there is activity in Vancouver, Hamilton, upstate New York and expected activity in Dallas, Atlanta and North Carolina.

It can be seen that some sites could conceivably link using UHF frequencies with little trouble, such as LA/San Diego and Phoenix/Tucson. Other groups could link via one or two additional hops, such as LA/San Francisco, San Diego/Tucson, St. Louis/Little Rock, St. Louis/Chicago, Chicago/Racine, Chicago/Ann Arbor, etc. As more activity develops, more sites

could, and presumably would, link into this web.

Again, looking at the above examples, it is clear that some centers tend to form a hub, such as Chicago, St. Louis and San Diego. Fortunately, these sites include some of the most active and enthusiastic packet groups.

SYSTEM OBJECTIVES

In order to link these existing sites, and allow for anticipated growth, some estimate of traffice offered the system must be made, and acceptable traffic delays estimated. The excess capacity needed for throughput delay can then be factored in and a goal defined.

If we assume that (1) packet activity is going to explode in the next five to ten years (from, say, 300 users now to 3000 in five years, and 15000 in ten), (2) that the increasing presence of computers in the ham shack is a trend and not a fad and (3) traffic nets will take advantage of fast, reliable means of communications when available, then the traffic offered the system will likely be enormous in a few years time.

On the average, an active packeteer may be expected to operate a few nights a week, and will likely be accessing local bulletin boards and other local activities. He may attempt conversation with other stations in the larger netwrok, or participate in multiparty nets a couple of nights a week. If he is on an hour a night, he may generate a few thousand characters of data. While all of this is somewhat nebulous, if used as a rough guide, our typical packeteer may offer the larger network upwards of 10,000 bytes/hour in bursts but only about 400 bytes/hour average on active days, or about 100 bytes/hour on long term average. This is well under 1 baud.

At the present packet population, this means the network may be offered a peak burst rate of 3,000,000 bytes/hour (about 50,000 bytes/min or about 6600 baud). In five years this can be expected to increase by an order of magnitude to about 66 kilobaud and in ten years to around 330 kilobaud. Naturally, this assumes that everyone is on at once and wants to use the network at the same time -- not likely, but a yardstick.

If we assume that the more sophisticated amateurs will take advantage of packet radio's data integrity to ship length files, as opposed to RTTY-like chit-chat, the system loading will increase even more dramatically. If every packeteer were to try to back up his Winchester disk, the system could experience severe constipation almost immediately.

In order to reduce system delays, it is common to design in excess capabity so that the system is lightly loaded. From the above, assuming the users not on the system are compensated for by the file-dumpers, it would appear that a capacity to handle upwards of 50 kbaud is desireable for the "trunks" to meet the five-year demand. 250 kbaud would be better.

A final assumption is that, as activity picks up, parallel trunks may be established, much as VHF FM repeaters often have similar coverage to reduce the loading on any specific machine.

HARDWARE REQUIREMENTS

Based on the above topological and loading considerations, the following specifications are offered as a guide in implementing a high speed amateur packet radio linking system.

Each relay link will operate on 220 Mhz or above. The FCC allows us a 100 kHz data bandwidth on this band. Above 1215 MHz, bandwidth does not become a practical limitation. If a 50 kbaud link is to be built, 220 MHz is recommended for the following reasons:

1) RF gear is easily built for this frequency.
2) RF gear is cheap at these frequencies.
3) RF gear for these frequencies can be easily maintained.

4) The 100 kHz bandwidth limitation will easily accomodate 50 kbaud. Use of fairly sophisticated modulation techniques could realistically extend this data rate to around 200 kbps.

If significantly higher data rates are otherwise practical, L-band (1215 MHz) is suggested due to less crowding than 440 MHz and no practical bandwidth limitations. Equipment for this band is not cheap, however, and the rf circuitry is not easily maintained (perhaps due to lack of familiarity with microwave techniques by amateurs).

Topology suggests that the high speed equipment be multiport to efficiently handle an n-way branch. Further, an input port is needed for the local area to have access. Provision for up to four high speed channels is suggested.

In the interests of (1) spreading the design task around and (2) flexibility, a modular design is proposed. The modules are as follows:

1) RF deck. This is to be a single-channel, crystal-controlled unit of about 10-watts power output, class C, well protected from antenna faults and the like. The transmitter will accept an if signal at 10.7 MHz. The receiver will be controlled by the same oscillator and have an output of 10.7 MHz.

2) IF deck. This is to contain the modem. It will accept the necessary logic signals and convert them to a modulated signal at 10.7 MHz. Similarly, the incoming IF signal at 10.7 MHz will be decoded to the proper logic level output(s).

3) Digital deck. This unit will contain the microprocessor, memory and logic-level I/O ports. Due to the speeds involved, a fast 16-bit processor is suggested. Possible candidates include the 68000 or perhaps the 8086. Software development tools are a real consideration here. The memory should be large enough to buffer the incoming channel(s) traffic. If half-duplex operation is required, then it must store up to 4 channels worth at the maximum data rate until channel turnaround. It may be that the controlling software will be RAM resident with some sort of bootstrap circuit. It is proposed that the RAM be on the order of 1/4 megabyte, error-detecting, and sufficient byte-wide sockets be provided for up to 64K bytes of EPROM. If full duplex operation is instead used, the buffering requirements may be lessened and system RAM on the order of 64K to 128K bytes may be acceptable.

In addition, the equipment must be easily duplicable, maintainable and cost effective. It is anticipated that local groups will support their machine in much the same fashion as repeater groups support repeaters. This equipment doesn't have to be designed to be financed and supported by a single individual, and a total cost ceiling may be on the order of $1500 to $2000. To this must be added the costs of power, access, antennas, site fees and so forth.

SOFTWARE CONSIDERATIONS

Higher level protocols have not yet been defined for amateur packet radio. The first high-speed linking devices will of necessity be test-beds for protocol experimentation, and therefore must be very flexible. It is not inconceivable that software development tools may best reside on the digital unit itself, along with mass storage. Once things are defined and the network grows, the sophistication of the "linker" may be reduced by the removal of such features.

Alternatively, the linker may be tightly coupled to an accessable development system with upload/download capabilities for fast turnaround during the development cycle. It is not practical to assume that the linker itself will be easily accessible if it is to provide wide-range coverage.

NOMINATIONS FOR HAMPDEN COUNTY RADIO ASSOCIATION

-HAM OF THE YEAR-

Return the form below, or a postcard to ZERO BEAT, c/o the
address on the upper left of your mailing label.

Rules:

1. Any licensed radio amateur can be nominated.
2. Only HCRA members may nominate someone.
3. Only HCRA members may vote in the election.

***SPECIAL NOTE: The Board of Directors feels very strongly, that
activities the membership does not support should be dropped.
Membership interest has been very poor in the Ham-of-the-Year, and
voting sparce. IF a minimum of six nominations are not received
from the club members, this award will be cancelled this year.
Of course, it is possible that there is no one you feel should be
nominated.

If enough interest in shown, ballots will be in the May issue of
ZERO BEAT, and voting wi_l be at the May Flea Market. The award
is traditionally given out at the June Banquet. 'Nuff said.....

I nominate_____, _____
        NAME   CALLSIGN

to be placed on the ballot for the Hampden County Radio
Association Ham-of-the-Year award.

                        Signed:_____Date:_____

Packet Radio —continued

Any language selected should be capable of (1) support and (2)
efficient compilation. The linker may have to perform routing decisions and
do so during peak traffic conditions, so slow or inefficient algorithms or
compilers may not work.

IMPLEMENTATION
It is suggested that this paper be kicked around, counter-proposals made,
investigations into modulation techniques and hardware be undertaken, and in
general discussion be entered by those with an interest. After some finite
period, hopefully on the order of two or three months, TAPR should make some
definite decisions and begin the design task.
By modular design, various hardware systems can be designed at
various TAPR and TAPR-affiliated sites. Similarly, the software effort must
be coordinated and tasks passed around to those with the ability to help. It
is expected that TAPR will coordinate the efforts of the volunteer sites.
We have witnessed the birth of a new era in amateur radio
communications. It is up to us to assure its health and growth. It is up to
us to assure its health and growth. "PACLINK" is needed. TAPR possesses the
necessary skills and motivation to implement it. An opportunity to have a
lasting impact on amateur radio beckons, and we must once again rise to the
challenge.

                (From Compuserve Information Network)

HOW TO ORDER PACKET RADIO TNC BOARDS

Well, folks, hopefully the Packet Radio Tutorial has helped explain this exciting new technology and whet your appetite to participate in this digital revolution of amateur·radio! If so, the following announcement from the Tucson Amateur Packet Radio Corporation will definitely be of interest. Before getting to the text of the announcement, I'd like to comment again on the outstanding work done to date by this dedicated group of volunteers – not just in Tucson but around the country. These are the folks who really worked to bring you packet radio. They're now ready to share this exciting technology with all of us – for a very modest price. I'd strongly encourage you to get your orders in as quickly as possible – although there will be now production limit this time as there was with the Beta test board, you'll definitely want to get an early copy and get yourself on the air quickly!

ANNOUNCEMENT

Tucson Amateur Packet Radio Corporation has conducted extensive testing of a Terminal Node Controller (TNC) design over the last several months. TAPr TNCs are in the field, and the "Beta" design has been in continuous testing since early November, 1982.

In order to more fully discharge our charter in developing and refining packet radio communications. TAPR is on the brink of releasing the TAPR TNC to the general Amateur community. The TNC will be provided as a kit that includes all parts; comprehensive manual including detailed kit assembly instructions; custom power transformer with multitap primary for those in low- or high-voltage areas; electrically pre-tested printed circuit board with silk screened parts locations; built-in modem, power supply, RS232 interface and radio interface.

REFINED DESIGN

For those familiar with the Beta design, the following improvements have been implemented in the hardware design:
1. 32K bytes of EPROM (vs Beta's 24K).
2. 8K bytes of RAM (vs Beta's 6K).
3. Two 512-bit banks of NOVRAM (vs Beta's single 256-bits).
4. Modem disconnect, with all applicable HDLC connections.
5. Improved modem design, with lower noise floor, greater input signal range, greater mic audio adjustment range, improved signal level indicator circuitry, LED monitoring of additional signal lines (such as Data Carrier Detect), configuration of modem parameters via DIP carrier.
6. Serial I/O port access is via a right angle PC mount DB25S connector at the edge of the board.
7. Parallel port access is via a right angle PC mount DB25P connector at the edge of the board.
8. Radio I/O port access is via a right angle PC mount DB9S connector at the edge of the board.
9. Power connection is via an 8-pin "Molex" style power connector.
10. The +5 volt supply uses 3 amp diodes instead of the IN4001s found on the Beta board.
11. The +5 volt supply has a jumper, along with additional power supply connector pins, to support an off-board 5 volt regulator.
12. The power transformer has been redesigned with 105/115/125 volt AC primary taps and corrected secondary windings.

13. The serial I/O port uses pullup resistors so no jumpers are needed to support partial RS232 interfaces (such as "three-wire" terminals).
14. Revised circuitry for calibrating the 1700 Hz PLL demodulator.

TAPR is currently generating the updated manual and the board layout is being revised. At the conclusion of board layout, a trial run of 25 kits will be supplied to a limited number of Beta sites for testing. This is anticipated in the late-July to mid-August time frame. We are limiting this initial release to a few boards per selected existing site to ensure a rapid turnaround in the testing. It is not our intent during this initial test to bring more sites up. Once we have determined that the revised design is working properly and the documentation is adequate for a reasonably adept Amateur to properly assemble, calibrate, interface and place the TNC into operation, the kits will be made available to all on a more-or-less first-come, first-served basis.

DISTRIBUTION, SCHEDULING AND COST
The mechanism for distribution is simple. The orders will be handled based on the order in which they are teceived. TAPR members will have a degree of priority. Orders for multiple units will be spaced out somewhat so no one can order a huge block and tie up distribution.

How do you get on the list? Send your order to:
Tucson Amateur Packet Radio Corporation
PO Box 22888
Tucson, AZ 85734-2888
and include your name, shipping address, etc., along with a deposit of $25. Upon receipt of your deposit (including 16 days for clearing of non-cashier's checks), you will be placed in the queue. You will be advised by return mail of your expected shipping date. Balance of payment is due at least one week before scheduled ship date (or you may get bumped!).

TAPR will attempt to have a daytime telephone number where Visa/ MasterCard orders can be placed (with an approximate 3% adder for such orders)

The price of the complete kit is $240 plus $7 shipping and handling. This is $29 more than the Beta boards, and the increase is for the following reasons:

1. There is more memory on the board.
2. We are having the PC boards electrically tested.
3. There is a 30-days-after-shipment warranty on the parts (and we have to make this good, not the chip manufacturer).
4. We lost thousands of dollars on Beta.
5. We need money to launch our R & D effort for high-speed UHF linking systems.
6. We are having a commercial firm do the kitting for us to conserve our time for technical work.

Since many of the parts on the TNC are now on allocation, we have taken the steps to schedule a number of kits. However, we need IMMEDIATE feedback on your expected needs, as well as deposits, so we can better plan.

Our present schedule calls for general kit deliveries starting in late August/ early September. We are planning on 25 kits the first month, followed by 50 kits for each of the following three months. That is only 175 kits, so if you are interested, act promptly! If we get sufficient orders, we will modify the schedule to take care of things as expeditiously as possible.

PRODUCT SUPPORT

Please note that support of the TNC, including such things as service bulletins, modifications for improved performance, announcements of software and hardware updates, etc., will be done via the Packet Status Register, TAPR's official newsletter. Thus, it is suggested that purchasers of the TNC consider becoming members of TAPR.

Thank you for your interest,,,,.
Lyle Johnson WA7GXD
President, TAPR
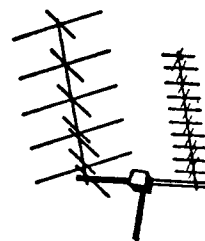
ANOTHER HAM SPACE MISSION PLANNED

While all this is a little premature, another "ham-in-space" mission appears to be in the planning stage. Astronaut Anthony W. ("Tony") England, W0 ORE, is planning to take a hand-held amateur radio transceiver with him on his upcoming Spacelab Mission tentatively scheduled for March 1985. It will probably be the same one that Owen Garriott took during STS-9. The Spring '85 mission is dubbed "51S" as NASA no longer uses the "STS" nomenclature.

Dr. Tony England recently got together with Astronaut Owen Garriott, W5LFL, and they jointly decided that any amatuer operation aboard 51S should be "experiment oriented." They have asked the ARRL and AMSAT to propose some VHF radio experiments that Tony could participate in while in space.

Readers of this newsletter are also invited to submit experiments that might be accomplished during the Spacelab mission. Both Tony and Owen will evaluate the experiments and will work with the ham on the proposed experiment.

The upcoming Spacelab mission will be a little different than the previous Garriott/W5LFL operation in that the astronauts will conduct their experiements from the crew compartment rather than the Spacelab module which fits in the cargo bay.

If you have any ideas for a VHF experiment - particularly one that you can participate in yourself, send them to: Johnson Space Center Amateur Radio Club; Attn: Dick Fenner W5AVI; Houston, Texas 77058. (No street address is required since the ham club has a special mailbox at 77058 - the Johnson Space Center special Zip code). It was Fenner that wrote the original 2-meter hand-held radio specifications for NASA. These specs were used by Motorola when building the ham transceiver that was carried aboard STS-9.
(From the W5YI Report)

✓ World Radio Amateurs Day has been established by IARU as April 18, but no plan for its recognition is known. In the absence of other proposals, and to deliberately avoid a contest activity, the New Zealand Association of Radio Transmitters offers the following suggestion:

"This is not a contest, but an activity in which every radio amateur can take part and should be encouraged to do so. The idea is to recognize the founding of the International Amateur Radio Union on April 18, 1925 by doing something you have not done before, between 1200 UTC on April 17 and 1200 UTC on April 19 each year. These dates represent the start and finish of the day of April 18 at the International Date Line, and are chosen to show unification of all radio amateurs by observing the same period for this global activity.

"Your special activity could be to work new stations, to try a new mode or a new band, to at least listen to a satellite, to build a piece of gear, or just to exchange greetings with someone new. Anything to make World Radio Amateurs Day a "special day" in your amateur radio experience. There are no prizes, no awards, no certificates, just the satisfaction of knowing that you have reactivated some amateur spirit; that you have recognized World Radio Amateurs Day and acknowledge the debt you owe to the International Amateur Radio Union for its achievements on your behalf. World Radio Amateurs Day need do no more than that for its aim to have been achieved.

"So go to it, do your particular thing, individually or as one of a group, to make April 18th a very special day on the amateur radio calendar. April 18, 1985 is the Diamond Jubilee of the founding of IARU. Let 1984 be an experimental year leading up to mass participation in 1985." -- ZL2AMJ

✓ Ed Ingber, WA6AXX, of Advanced Computer Controls has very graciously donated the RC-850 computerized controller to W1AW/R for use on the 2-meter repeater. During the period it was being reviewed for QST Product Review, the RC-850 elicited comments to the effect that the controller had tremendously enhanced the image of W1AW/R.

The rf-equipment portion of W1AW/R was anything but state-of-the-art, though. Fortunately, Frank Maggiore, K3GQC, of Maggiore Electronic Laboratory has donated a Hi Pro Mk I repeater to W1AW/R. Thanks to these two gentlemen and the ARRL Technical Department personnel who married the controller to the repeater, visitors to ARRL Hq. will have a first class 2-meter repeater to use while in the area. W1AW/R operates from a hill one mile east of Hq. on 144.85 in and 145.45 out.

TNX ARRL LETTER

Massachusetts

TIDBITS

KA1CPG passed the exam for Amateur Extra Class! FB, Leo... There were 8,876 members in the ARRL New England division in 1983. Were you one? ...N1AGV and wife Beth (also a ham!) have a new baby boy, great to hear it...K1BXE will coordinate the VEC program and the HCRA's efforts with the League...K1BUB is also an amateur astronomer, and is getting ready with other hobbiests for the appearance of Haley's Comet in 1986. Great VHF meteor showers are expected. How about running some kind of special event station, Bob?...ZERO BEAT is a big issue this month in an effort to reduce some of our backlog. The high costs of putting out the issue, ($125+), will put us back to four pages for the rest of this season. Take the time to read even the long articles, a lot in this issue.... A club member is buying a mountaintop home that overlooks the Pioneer Valley, and has offered the use of the site if the HCRA ever puts up a repeater... The MTARA did their usual great job of providing communications at the Holyoke St. Patrick's Day Parade!...KA1GDV bought a new ICOM 745, you'll get a look at it during the April 6th meeting...
N1AFY is studying the dynamic energy contained in potholes for a NASA paper...

WILL YOU PARTICIPATE IN

FIELD DAY '84????

FIELD DAY 1984 JUNE 23-24
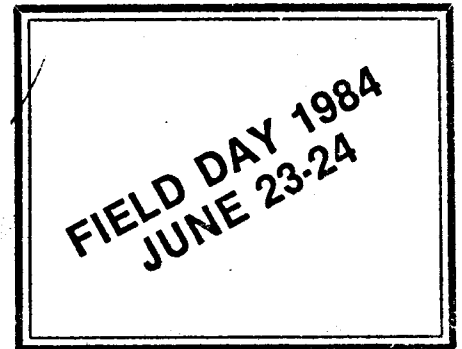
DID YOU FIND THE "SECRET SENTENCE"????

If you think you did, send it on a postcard to ZERO BEAT, with your name and call, before the April 6th meeting. The prize is a "no-frills" ICOM 2-AT! (Hint: It's a play on words about a famous ham) It does not have to be written horizontally. Only HCRA members may enter. ZB editor not eligable to win. In case of a tie, name will be drawn from a hat. No limit to the number of entries. Winner is liable for all taxes.
No purchase necessary to win.
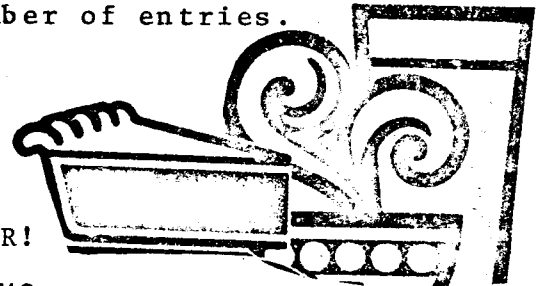
TICKETS NOW ON SALE FROM ANY BOARD MEMBER!

HAMPDEN COUNTY RADIO ASSOCIATION, INC

ANNUAL   BANQUET

FEEDING HILLS CONGREGATIONAL CHURCH, FH, MA
FRIDAY,   JUNE   FIRST

"SALUTE TO ALL PAST/PRESENT QSL BUREAU SORTERS"

7:30 ROAST BEEF DINNER WITH ALL THE FIXINGS
6:30-7:30 PM hors d'oeuvres

Menu:
Roast Beef
Baked Potato
Green Beans
Salad
Bread
Coffee/Tea
Dessert

& Seconds, of course!

DOOR PRIZES $8.00 person

THE SPRINGFIELD RADIO ASSOCIATION

An Organization for the Regulation and Promotion of Amateur Communication

RADIO STATION 1BWY 19 ORLEANS ST.

Editor's Note:
  . This is the original stationary
of one of the clubs on which
the HCRA was created after
World War II! We'd be the
oldest radio club in the
country if we'd kept the name.

Springfield, Mass.,———————————192

HOW I GOT STARTED- By Larry Reilly

Only a few days ago Jeff Duquette paid me a visit. We became acquainted
thanks to our mutual friend, Jim Spates, W1ARA. Jeff took for distribution
some gear I accumulated more than fifty years ago. I hope some youngster
just starting out can use it. Jeff left with me some back issues of
ZERO BEAT -- the most memorable of all was the issue tracing the history
of the Hampden County Radio Association. I found it fascinating and
was reminded of the verse from the Rubaiyat of Omar Khayyam (stanza 69)

> The Moving Finger writes; and, having writ,
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line,
> Nor all your tears wash out a Word of it.

Our get-acquainted visit covered a range of topics and I'm not sure how,
but I volunteered to tell ZERO BEAT how a "ham" got started over fifty
years ago! So, here we go.

I'm sure you want to know if amateur radio had an influence on my life.
The answer has to be "LOTS!" . Accompanying this article is a copy
of my first license, issued when I was 17 years old.   A year or so
before that license was issued, another teenager and I tried to teach
each other the Continental Code. We hooked up a pair of home-made keys
to a buzzer we both could hear, using the ARRL's Radio Amateur Handbook
for guidance. Not a bad guide, but we didn't get very far, for neither
of us knew a dit from a dah! Sort of the blind leading the blind.

Then came a newspaper piece calling my attention to the Springfield Radio
Association. Recruits were welcome, and I became one immediately.
Meetings were held every Saturday evening in a small building, (about
the size of a one-car garage) located behind Ike Creaser's home on
Cortland Street.   This was less than a mile from my parents home.

Joining the SRA shaped my life. The members, (all much older than
I), were experienced hams and very helpful to a headstrong lad not yet
ready to shave. But topping them all was the man who meant the most to
me: Isaiah "Ike" Creaser. After our first meeting I spent as much time
as possible at that "shack". At that time you either walked or took
the family car--no choice for me, we didn't have one.

SPRINGFIELD RADIO ASSOCIATION

President: Fowler Wilbur   SPRINGFIELD, MASS.   Vice President: Howard Gurney

Secretary: Willis McGown   Treasurer: George Pierce

Instructor: Isaiah Creaser

Ike was a great teacher. In a few weeks (he worked in Stamford, and was
only home on weekends,) he got me up to ten words-per-minute so I could
pass the exam. Three years later I won an award at a Boston Hamfest
for copying 60 W.P.M.! I was then newly married. When my future wife
and I got engaged, I did't have enough money to buy her a diamond. Instead
I gave her a medal I had won in an ARRL Sweepstakes Contest! She later
got her diamond and a wedding band, but that medal is still in her collection
of keepsakes.

When Mrs. Reilly heard me banging out these memoirs at the typewriter, she
asked if I remember the time (before our marriage) I asked her to hold
a spool of wire while I wound a coil for something I was assembling.
Memories, memories!

With Ike Creaser's recommendation, I landed a job at WBZ(A) as an
apprentice radio operator and that led to a life-long career in radio.
My ham call was W1BVP. Then the Pearl Harbor disaster ended it all!
As directed by our government, I dismantled all my gear, including a new
rig I was building, and I never put it back together again. I was into radio
broadcasting, building stations, and let my ham call lapse. Not sure I
could copy 10 WPM, let alone 60 today! After my ham days ended, I was
building commercial stations in Connecticut, New York, and Massachusetts,
both AM and FM.

Nearly all, if not all, of those Depression-era members of the SRA are gone
now. Today I find it hard to remember their names or call letters. Just
the same, they were a good influence on a growing-up kid. They gave me
something unpurchasable: a grip on myself. I am grateful for the career
that ham radio led me to, even if my fiance had to help me wind coils
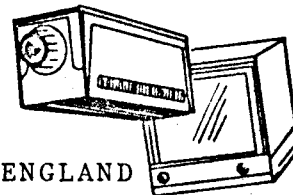before I could buy a diamond ring for her!

Now we're retired. My boating days are also just membories. Mrs. Reilly
and I used to cruise our boat, PRIME TIME, to and from Florida. All good
things must come to an end. Resting on my desk is a semi-automatic
sending key modeled after the Vibroplex, that I used in my ham days.
At WBZA we were linked to WBZ in Boston by wire line. We got to use
a genuine Vibroplex. I wanted one in the worst way for my ham station
but my $78.00 a month salary was otherwise committed. So I made as near
a replica as I could contrive! Just a few days ago I fingered the paddles
to see if it still works. It does, but I'm back to 10 WPM!

When I was a lad, it was ham radio. Now the grandchildren are into
computers. What next?
                        73,
                        Larry Reilly ex-(W1BVP)

Editor's Note: The top of this page is the other type of stationary the
                SRA used in the 1920's. Tnx to W1NPL for saving it.
                Are there any other SRA members in the present membership?
                Let us hear from you!

File No. _____ License No. 1-9-2973 _____

Form L-AM.
(Revised 9-29-30)

UNITED STATES OF AMERICA

FEDERAL RADIO COMMISSION
___

AMATEUR RADIO STATION LICENSE

Subject to the provisions of the Radio Act of 1927, as amended, subsequent acts and treaties, and all regulations heretofore or hereafter made by this Commission, the Licensee:

Lawrence A. Reilly
St.
Springfield, Mass.
Call letters   W1BVP

is hereby authorized to use and operate the radio transmitting apparatus at the location and under the call letters stated herein, for the term beginning March 10, 1931 and ending March 9, 1932.

The licensee shall use and operate said apparatus only in accordance with the provisions of the Revised Amateur Regulations.

This license shall not vest in the licensee any right to operate the station nor any right to the use of the frequencies authorized in the license beyond the term hereof, nor in any other manner than authorized herein. Neither the license nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Radio Act of 1927, as amended. This license is subject to the right of use or control by the Government of the United States conferred by Section 6 of the Radio Act of 1927.

Dated March 6, 1931 _____

By direction of the FEDERAL RADIO COMMISSION

James W. Baldwin,

Photostatically reduced
picture of W1BVP's original
ham ticket in 1932!

TRANE- TELEVISION
REPEATER ASSOCIATION OF NEW ENGLAND

Welcome all amateurs to the world of fast-scan television! Get involved with this phase of our hobby- broadcast live pictures, slides, photos, and even computer programs.

It's lots of fun and very interesting to see the person you're talking to. You can even show your favorite computer programs, graphics, games, etc.

A television repeater is in the building stage, and it should be in operation in the late spring. Coverage will be in the immediate Massachusetts-Connecticut areas.

Interested? Attend the ATV meetings! They are held the second Thursday of every month, at 7:30 pm, at the Granger School, Feeding Hills, Mass. (Intersection of routes 57 & 187)

For more information, contact:
   Chet Kruczek, W1HGJ
   29 Brookhaven Drive
   East Longmeadow, Ma 01028

AMATEUR   RADIO

FLEA   MARKET!!!!   FRIDAY MAY 11TH

FEEDING HILLS CONGREGATIONAL CHURCH, FH, MASS
    (Intersection of Routes 57 and 187)

7:30 pm   Only $3.00 per Table!
          (Sellers can set-up at 6:30 pm)

We need your help to make this a success! Please plan on renting a table.
****

FOR SALE: TEN TEC DELTA 580, 160-10 meter HF rig, including WARC bands,
            QSK, digital readout. Compact and portable CW station,
            complete with manuals and Deluxe power supply. $650.00
            YAESU LINEAR FL2100B, with pair of spare 572B finals, and
            manuals. Covers the HF bands 80-10 meters. mint condition,
            $350.00
            Contact Art Zavarella, W1KK, at 786-9115
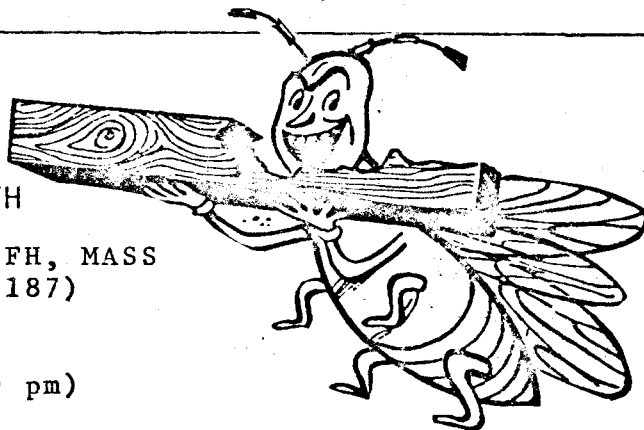
Dysan. The Finest Quality Diskettes Available.
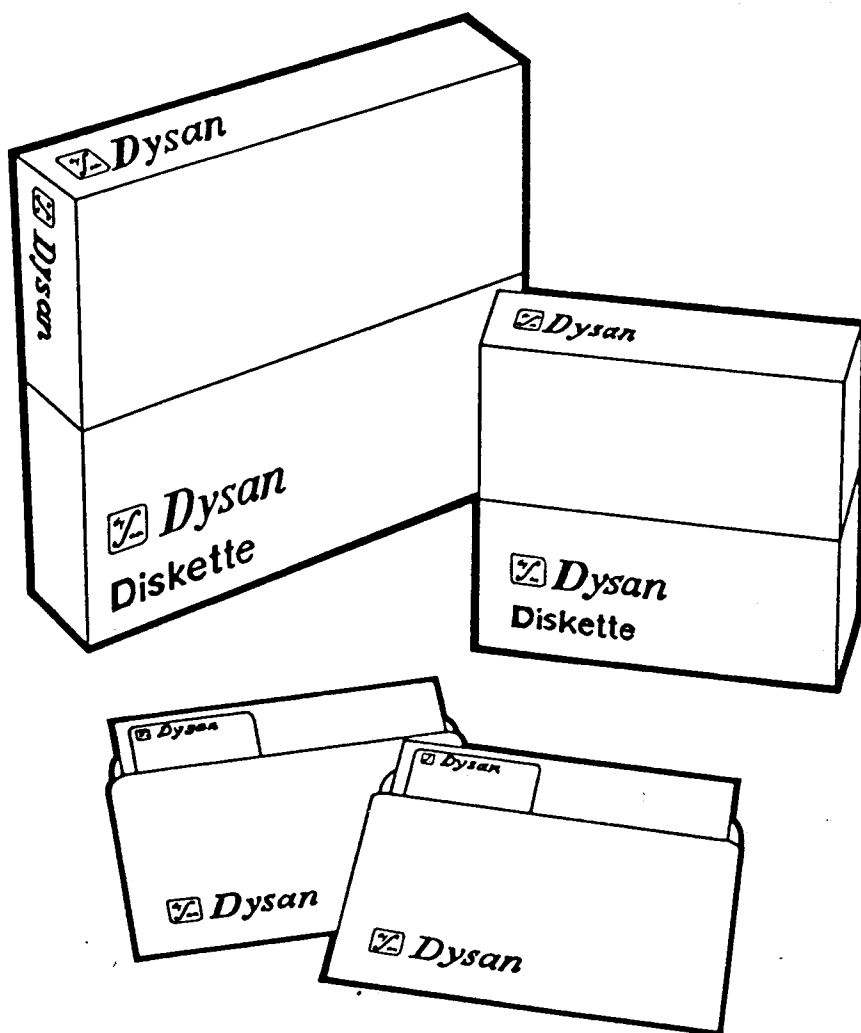
Dysan's 5¼" or 8" diskettes are available single- or double-sided, and in single- or double-density formats.

Dysan's advanced production techniques assure that each Dysan diskette is certified 100% error free. So you can count on Dysan for your IBM*, Apple*, Tandy*, Atari*, Commodore*, Osborne* or other personal computers.

So give us a call. Or stop by. We have a complete inventory of the finest quality diskettes on hand.

Dysan diskettes.

Why pay more when you can have the best for less!

BUSINESS COMPUTER SYSTEMS OF
NEW ENGLAND
P.O. Box 2285
Springfield, Mass 01101

Our friend JERRY GRIFFIN, WA1PGT is your local
dealer! Call for special prices.
413-567-0367 (Evenings)

Dysan CORPORATION ®

√ ARRL Hq. now has a packet repeater operating on 145.01 MHz. The protocol used is AX.25 level 2. Jeff Ward, K8KA, designed the one-chip modem, which is Bell 202 compatible. At present it is operating from the Hq. building under the callsign W1INF/R. Once the system is completely debugged, we anticipate moving it to a better site and possibly changing the callsign.

√ If all goes according to schedule, at press time (1759 UTC), the UoSAT-B spacecraft should be airborne. Launched from Vandenberg AFB in California, the Delta launch vehicle is carrying UoSAT-B and the primary payload, LANDSAT D', into orbit. (LANDSAT D' is a land-resources satellite.)

The UoSAT mission has three objectives: Space education, space science, and demonstrating "cost effective" space engineering. Several experiments are on board the spacecraft; among them are an earth-imaging experiment, using a two-dimensional charge-coupled device (CCD) imaging array mounted on the bottom of the satellite. This camera should provide pictures of the Earth over a 500 km square area. The spectral response of the imager is in the visible/red range and should provide good haze penetration. Another interesting feature is the synthesized voice telemetry - this would enable just about anyone with an HT (UoSAT has three beacons: 145.825, 435.025 and 2401.1 MHz) to receive and decode the satellite's telemetry data.

√ Wayne Green, W2NSD, filed a petition with the FCC February 10 requesting that all Amateur Radio operators be retested for their Morse code skill every two years. Green also proposed that the code requirements be increased in increments of 5 wpm at each retesting until the applicant reaches 35 wpm. Any amateur not able to pass his biannual code test would be given an additional 60 days to improve his speed or turn in his license. Green said, "In view of the overwhelming amateur response to the No-Code docket wherein hundreds of individual amateurs and many amateur radio clubs endorsed the continued importance of Morse code skills for amateurs; it would seem that this importance should be reflected better in the amateur rules and regulations."

VEC FUNCTIONS DEFINED.

The HCRA hopes to be the VEC in the Greater Springfield area. We'll be working on this during the summer of 1984. The FCC recently issued a list of VEC now ready to go and also defined what they expect of the VEC's.

The Commission also released the instructions for Volunteer Examiner Coodinators on February 27. This eight-page document specifies sixteen VEC functions. The Commission recommends that VECs recruit as many Extra class Volunteer Examiners (VEs), as possible, since only Extras can administer all amateur tests.

The VEC will be responsible for just about all aspects of Amateur Radio exams. The Commission also points out that the VECs must impress upon the VEs that they play a key role in the integrity of the Volunteer Examiner program. FCC suggests that the VECs train the examiners on how to administer and conduct exam sessions.

The Volunteer Examiner Coordinators' functions are:
1. Provide contact person and alternate.
2. Recruit VEs.
3. Issue accreditation documents.
4. Coordinate examination sessions.
5. Notify FCC of examination sessions.
6. Provide application forms.
7. Provide written examination materials.
8. Provide telegraphy examination materials, when requested by VEs.
9. Provide Certificate of Successful Completion of Examination, when requested by VEs.
10. Establish examination session unique identifier.
11. Collect test materials.
12. Screen applications and resolve defects.
13. Compile examination session Test Report.
14. Forward applications to FCC.
15. Maintain record keeping system.
16. Provide annual question evaluation reports.

Net Name	Freq.	Days	UTC	Coverage
Apple Computer Net	7260	S	1400	Eastern US
	14329	Sn	0100	Nationwide
	14329	Sn	1700	Nationwide
Atari Microcomputer Net	3960	Th	0100	Eastern US
	7230	Sn	1400	Eastern US
	21400	Alt.Th.	2330	Worldwide
Kantronics Users Net	14316	S+Sn	1430	Nationwide
Pet/Commodore Net	7156	S	1330	Eastern US
	14240	Sn	0500	Nationwide
	1424u	S	1730	Nationwide
SInclair/Timex Users Net	3980	F	2300	Nationwide
	3980	S	0000	Eastern US
	7228	S+Sn	1800	Eastern US
	7240	Sn	1600	Eastern US
	7245	W	0200	Nationwide
	14329	Sn	2100	Nationwide
	14345	Th	0200	Nationwide
TRS-80 Color Computer Net	14342	Sn	2000	Nationwide
TRS-80 Users Net	14342	Sn	2100	Eastern US

New England Packet Radio Association

Proposal to Provide an Amateur Digital Network
for the Greater New England Area
December 29, 1983

Phase I - Massachusetts East/West Link

The New England Packet Radio Association (NEPRA) is developing plans to provide amateur packet radio network services throughout the greater New England area, with links into other populated regions. A variety of connecting mechanisms will be used to give access to hams with an interest in digital, computer-controlled comunications.

As a first step in establishing access to the New England Packet Radio Network (New England Net), groups of digipeaters must be installed at sites which provide large-scale coverage. A first step has been made in the greater Lowell area, with over 25 digpeaters planned to be in operation in the January 1984 timeframe, with several in very advantageous locations. Similar networks are in the plannng or installation stages in a number of New England areas and surounding regions.

The next steps must include providing a mechanism which will allow linkages between the groups expected to be most active by the spring of 1984, while simultaneously creating new coverage areas. An important benefit will be coverage in regions which do not have sufficient interest and resources to provide local and regional linking mechanisms.

NEPRA therefore proposes to cooperate with other groups in the greater New England area to build an access/linking system which will provide, at its inception, coverage to a number of population centers, with remote link access to an even greater region.

Figure 1 shows a Massachusetts East/West link proposal which would be able to provide the above-mentioned services. A "local" 2 meter digital repeater (digipeater) would be placed in service on the top of Mt. Greylock, if possible. This unit would operate in a low power mode (one watt typically), with a receiver having sensitivity to match. Low power mode would reduce potential interference to the NOBARC 146.91 repeater,

and would limit the number of 2 meter stations using direct access instead of linking through regional nodes. Remote sites could access this digipeater through the use of gain antennas, however. A second digipeater would operate on 220 MHz at higher power, with a goal of allowing a number of links from several New York and New England stations. A second pair of digipeaters would be located in the Lowell, Massachusetts area. Other regions could use similar arrangements.
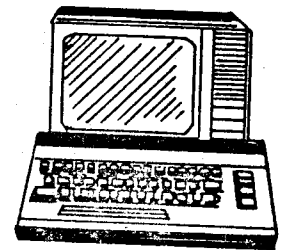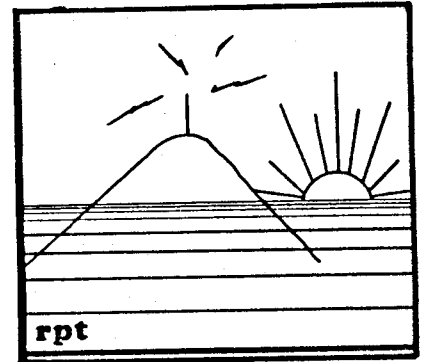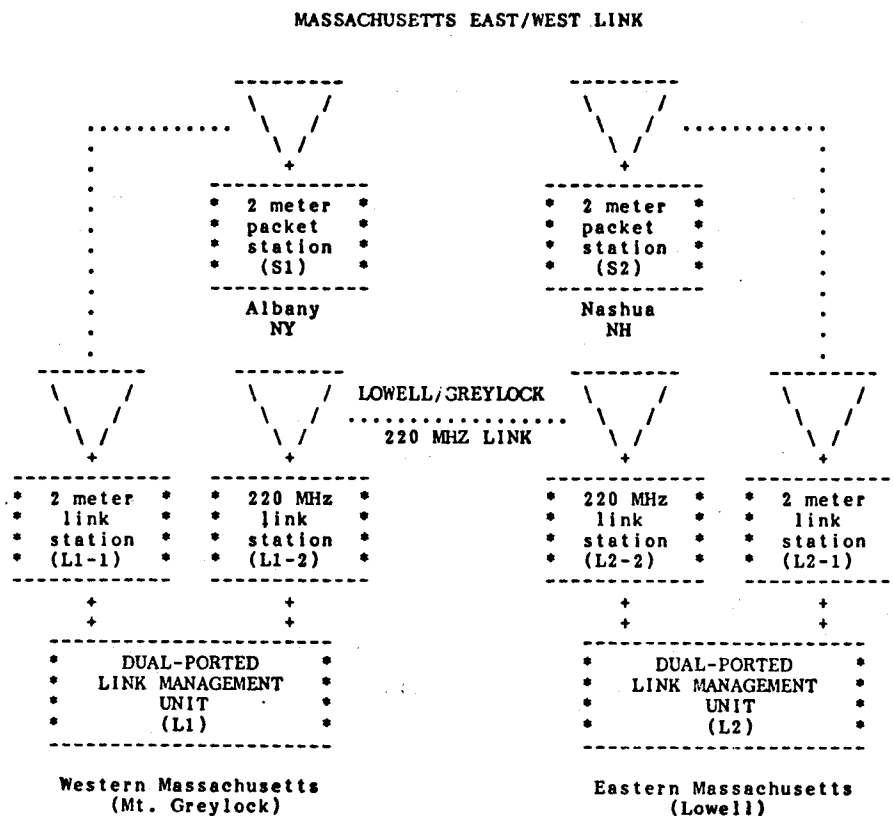

figure 1

Figure 2 shows the logical connections of one of the link sites. The primary control element is the dual-ported link management unit. The link box is a very simple microprocessor-controlled network link, with connections to provide terminal emulation to one or two TNCs. This box is designed to provide the following functions:

o automatic bootstrap of both TNCs on power up (especially important following a power failure at a remote site)

o automatic configuring of each TNC for the type of operation required by users, typically digipeat, remote link or maintainence modes

o remote link control user interface to stations coming in on any of the link radios

o special control sequence generation to allow the TNCs to provide network level protocols without reprogramming of the TNCs (good for proof-of-concept experiments while TNCs are being reprogrammed)

o network protocol implementation (see protocol appendix)... multiple virtual circuits may be provided on inter-site links, again without reprogramming of the TNCs
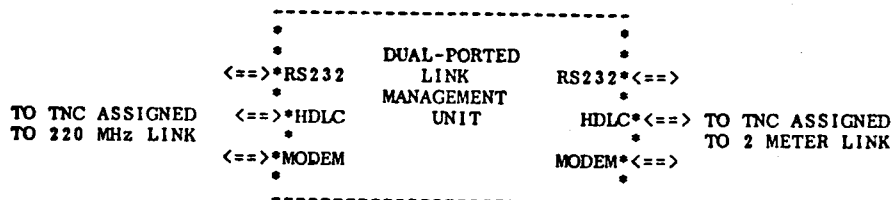
```
             -----------------------------
             *                           *
   <==>*RS232      DUAL-PORTED     RS232*<==>
             *    LINK                    *
TO TNC ASSIGNED  MANAGEMENT
TO 220 MHz LINK  <==>*HDLC    UNIT    HDLC*<==>  TO TNC ASSIGNED
             *                           *       TO 2 METER LINK
   <==>*MODEM                    MODEM*<==>
             *                           *
             -----------------------------
```

figure 2

The construction of the dual-ported link management unit is quite simple and should prove easy to implement in a time frame to match this proposal. RS-232 connections are required to the TNCs, and may be routed instead to other devices that may interface via RS-232 ports, including computers, AMTOR, ASCII, RTTY and CW stations. Switching of HDLC and modem inputs and outputs is available for two purposes; local loopback testing of the two TNCs would be available, and they may be connected together (off the air) to provide special link connections between the TNCs which might be required for some experiments. The 16K of PROM and 8K of RAM provide a minimal facility for software develped in a higher-level language ("C").

Some aspects of the protocol required to make and break remote link connections are detailed in other documents. In general, a user interested in linking remotely with another station would call the local link controller via one of the link radios. The link management unit would accept link requests, translate those requests into a series of packets to other stations involved in the connection, then disconnect with the originating user after creating the requested connection. The link box would then emulate the remote station whenever traffic for that station had to be handled.

The link management unit would be required to keep a directory of all connections currently in progress across any of the links, with entries for each end-to-end station pair, the route currently in use and link-level state information to allow multiplexing virtual links across a common physical link.

The NEPRA Remote Link Network (RLN) protocol may provide the first transparent internode routing multihop service. Initial experiments could use simple multi-hop digipeating (with dual TNCs connecting directly to each other via the link box's audio switching), with gradual implementation of the more efficient RLN protocol as the system develops.

LIST OF PACKET STATIONS ON-LINE IN THE
NEW ENGLAND PACKET RADIO NETWORK
January 31, 1984

N1ACA	digipeater (TAPR)
KA1AS	digipeater (TAPR)
K1BC	digipeater (TAPR)
K1BC-1	(GLB)
WB1CEA	digipeater (TAPR)
N1CQJ	digipeater (TAPR)
KQ1E	(VADCG)
KQ1E-1	(VADCG)
KQ1E-2	AMTOR link (TAPR)
WA1FOK	digipeater (TAPR)
WD4FZJ	digipeater (TAPR)
WA1GRC	digipeater/automatic (TAPR)
W1HDX	digipeater (TAPR)
W1HDX-1	digipeater (TAPR)
W1HH	digipeater (TAPR)
WA1HUM	digipeater (TAPR)
WA1JGU	digipeater (TAPR)
KA1IU	digipeater (TAPR)
K1JUN	(home-brew)
KA1KPN	digipeater (TAPR)
K1KSY	digipeater/automatic (TAPR)
G8LCK	digipeater (TAPR)

KA1M	digipeater (TAPR)	
KA1MI	digipeater (TAPR)	[BARS digipeater]
K1OJH	digipeater/BBS (TAPR)	
K1PAD	digipeater/automatic (TAPR)	
WB2OSZ	digipeater/automatic (TAPR)	
KAPN	digipeater (TAPR)	
W0RLI	digipeater/BBS (TAPR)	
KD2S	digipeater/automatic (TAPR)	
KD2S-1	digipeater/automatic (TAPR)	[Wang ARC digipeater]
KD2S-2 &	(TAPR) ,QWg ARC	
KD2S-3	(TAPR) Wang ARC	
WB7VJK	(GLB)	
WB7VJK-1	(GLB)	
W1XR	(home-brew)	
W1XR-1	digipeater (TAPR)	[FARC digipeater]
KE1Y	digipeater/automatic (TAPR)	
KE1Y-1	digipeater (TAPR)	

Statistics

TNC model: TAPR - 32 / VADCG - 2 / GLB - 3 / homebrew - 2
digipeaters: 29
BBS units: 2
automatic operation: 7

SCHEDULE OF EVENTS

April 6th	Radio Review Night, Home-Brew Night (K1BE) *Bring in a goodie to show your friends!*
April 9th	Board of Director's Meeting (WA1EYF's QTH)
May 11th	ANNUAL FLEA MARKET at Feeding Hills Church, FH Mass (Friday!)
May 14th	Board of Director's Meeting (AC1T's QTH)
June 1st	Annual Club Banquet - Roast Beef Dinner with all the fixings. $8.00 per ticket, on sale now.
June 23-24	FIELD DAY (Middlefield Fair grounds, Middlefield, Mass)
July 21st	Club bus trip to the ARRL National Convention in NYC.

(SUBJECT TO CHANGE)

New Club Mailing Address:

Hampden County Radio Association, Inc
P.O. Box 482
West Springfield, Mass 01090

(For routine club business, do not send anything intended for Zero Beat here!)

HAMPDEN COUNTY RADIO ASSOCIATION
c/o Jeffrey J. Duquette K1BE
P.O. Box 546
Southwick, Mass 01077

APRIL ZERO BEAT

FIRST CLASS