1-85

ZERO BEAT

Hampden County Radio Association

Springfield, MA January 1985 ARRL Affiliated, 37th Year

Next Meeting

Friday January 4, 1985

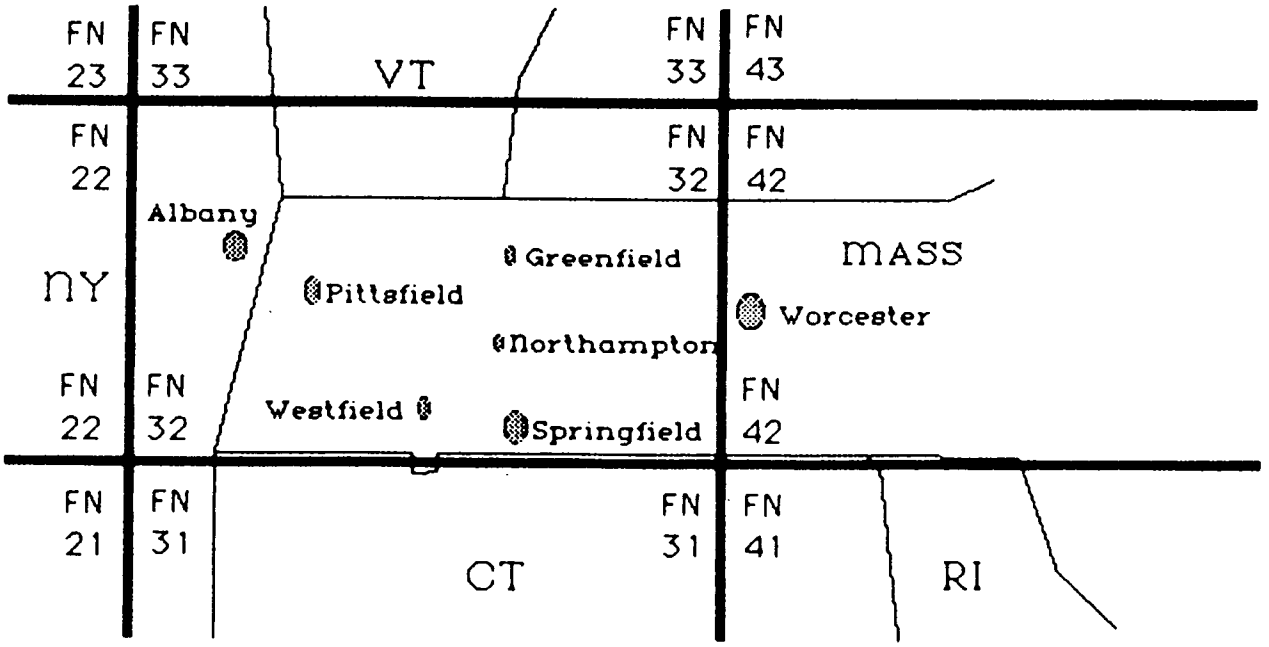
Feeding Hills Cong. Church
Center of Feeding Hills
Routes 57 and 187
Doors open at 7:30 PM
Meeting starts promptly at 8:00 PM

Steve K1FO presents:
How to Stack Antennas
just in time for the contest...

» VHF Sweeps

Its that time of year again, the snow appears and the temperatures drop and that should tell you its time to get all that VHF gear out and tuned up for the January VHF Sweepstakes. Many HCRA members have been working hard getting the club station WINY ready for the contest. WINY is set up again down at W1KK who is providing much valued support! A new tower is up and four K1FO modified 2m boomers are on top. WA1RWU has designed and installed an elevation control so that EME (moon bounce) contacts will be possible, for those *extra* grid square multipliers. KA1APR has done extensive work on the 6m station. We will also have an effort on 432 MHz and possibly above...

For those of you who are used to the January VHF contests from years before, take note! This year the rules have changed! The exchange is now just your grid square. Grid squares have been in use around the world for some time, and represent a 2° by 1° squares - everybody has one. The format of the grid square is two letters followed by two numbers. For most of us in the HCRA our grid square is FN32. If you live south of Hampden County in CT your grid square is FN31. The ARRL has grid square maps available - these are nice maps of the US with all the grid squares indicated. Great for keeping track of grid squares worked! For more information regarding the rules for the January VHF contest please see page 91 in the December 1984 issue of QST.



Dues are $9.00 per season, September thru June. Please mail to: N1AEH, Greg Stoddard, 1500 Mapleton Avenue, Suffield, CT 06078. Thank you!

DON'T LET US CRASH!

Here we go again! Into the competition maelstrom of the VHF SWEEPSTAKES! We missed out on beating our rivals by only 40,000 points in 1984. You don't want that to happen this year!

Your score should go up this contest- the ARRL has changed how the scoring is done and totally changed how this contest works. This is a blessing in disguise. Most club efforts will fall by the wayside due to this big difference in how-works-the-contest. You'll be exchanging a grid identifier instead of section this year- for most of us in Western Mass, the ID to use is FN32. No RST, no section, just that grid ID and your call! Simple and effective! And you'll be able to earn several awards- VUCC and a special certificate from the club!

So, for every contest contact, it will go like this: "AC1T , this is KA1HSP, Fox-November-Three-2, QSL?" And in this case you'd get back an FN32 from AC1T. This year every different grid ID counts as a multiplier for your score, and on every band you work, each one can be re-counted. It'll be great to work the same grids on different bands, and use the multipliers so many more times. Logs and scoring sheets are included in this issue. Return them to K1BE after the contest. He'll be glad to total up your score for you! (You're not alone in trying to decipher the system!)

Read the rules in December QST or call Jeff at 569-6739 if you have any questions. Use of 146.52 is not allowed, but any other simplex frequencies are OK. Just to avoid congestion, use 146.49, 146.55 and 146.58 simplex if you're limited only to FM on two meters. That's where we'll all look for you. If you can't get on for a lot of time, use these suggested times to operate:

2 to 3 pm (Sat & Sun)	6:30 to 8:00 pm (Sat & Sun)	9:00 to 10:00 am (Sunday)

All are in local times.

Look for multipliers to boost your score. W1VD and K1WVX will be on from FN31. (Most of Connecticut) The more bands you can work the more multipliers you can rack up! Don't miss working the club station, W1NY.

Extra log sheets, etc will be available at the January HCRA meeting.

1985 VHF SWEEPSTAKES

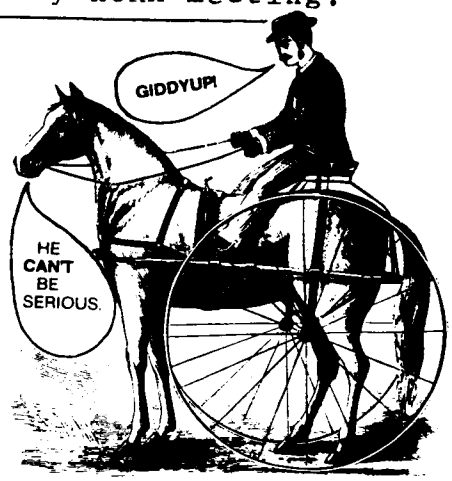
Contest Starts: 1900 UTC Saturday Jan 12th

Contest Ends: 0400 UTC Monday Jan 14th

EXCHANGE: Send a Grid Square Locator.

FN32!!

To avoid congestion on two meters FM, use:
146.49 146.55 146.58

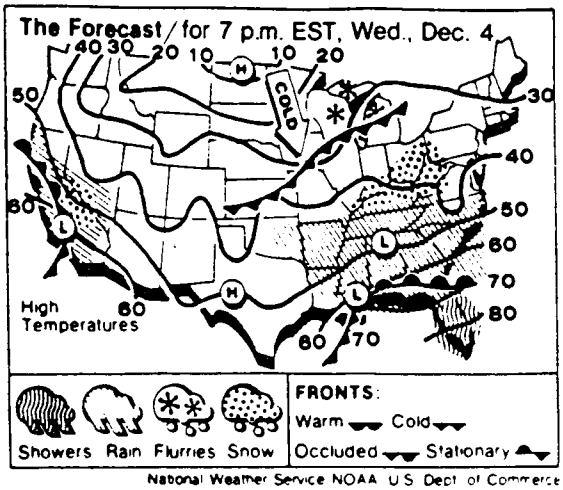


HCRA CONTEST EFFORTS!!!

VHF SWEEPSTAKES PROPAGATION

These people are desperate! The contest is winding down and they haven't made 1 million points! You're the man of the hour! (Ham-of-the-hour?) With your ten watt rig feeding a coat hanger on the kitchen table, you can work all those distant stations. How, you might ask? Desperate times call for desperate measures- they'll strain their ears to pull your signal out of the muck! How far can your signals really go?

This depends on various factors. Singlesideband, CW, and FM signals propagate in many different ways on VHF/UHF bands. When you see a weather map in the morning paper, check to see if a warm air mass is overrunning a cold air mass. Then you can expect tropospheric bending of your signal, which will come down who knows where! This weather inversion causes DX to open to incredible distances. Aim your antenna along the trailing edge and expect to hear stations in a wide coverage area.

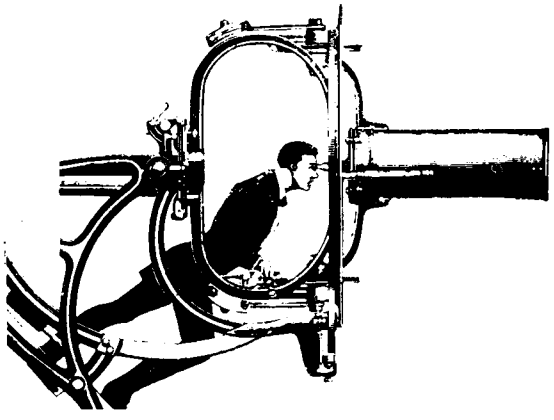


National Weather Service NOAA U.S. Dept. of Commerce

Sporadic E skip occurs when intense patches of ionization occur. Solar flares produce these and can be very strong. Listen to W1AW and WWV for the solar index or news of a solar flare. Or if you start to hear stations in California on two meters, suspect Sporadic E! F layer openings can also be spectacular, and maybe one will appear during the contest.

If Donald Duck suddenly seems to be working you on SSB, or the CW has a strange fluttery sound, you're most likely bouncing your signals off of an aurora. Look out the window for the Northern lights, or Aurora Borealis! You don't need to be a high power, super-station like KA1APR to work Washington State from Massachusetts! Once you hear auroral propagation, you won't forget it. Try pointing those antennas North at night!

Transequitorial propagation occurs along the North/South line of the sun. You can work South American stations on six meters! Tropospheric scatter on two meter CW can go over 500 miles. Signals tend to be weak and fluttery, but what some people won't do for a multiplier!



WB1ETS LOOKING FOR A BAND OPENING!

Meteor scatter is beyond the ken of most of us, but some of the club's operators will be using it. EME, or bouncing signals off the moon will be used even more. W1NY hopes to establish a new club record!

Beam antennas work best, but don't stay out of the contest because you don't feel you have a "good" station. Every year many hams rack up over 1,000 points using a rubber duck, 1 watt, and simplex FM frequencies! Keep in mind they want you, and you're doing them a favor! The "them's" have high-priced gear, and antenna farms, so get on and work 'em!

Tidbits

KA1GDV is now KX1F, congrats, Larry...Novice Round-up is coming. Will you be ready?...The club Field Day '84 score was 2,448 points on page 90, December QST. W1NY totaled up 538 contacts under 6A, and had 20 people there. Nice job, one and all... The Agawam group, going by the strange name of "Quadumphant", racked up 2,780 points using AC1T's call. Note that where they operated is where the HCRA will host Field Day, 1985...NOBARC's score was 6,558; MTARA's 1,944. FB...WA1YYW had a stroke and has become a Silent Key. It is with great regret that we note the passing of Rich Melbourne...Those old Proglines we got from the club have been put on 6 meters. Great rig for the $15.00 price!...KA1CFE does CPR with dummies...W1GQP celebrated his 80th birthday! FB, AL... WA1LES got himself an 11 element, two meter beam so he can get into the VHF SS!...K1BE would like to borrow a 220 rig for the VHF Sweeps. Can anyone helpout?...KA1JJM is the area frequency coordinator for repeaters. Ray also fills the role as liason to the National Weather Service...The HCRA now has 146 paid members. Sign up your friends... The ATV repeater is now on the air. Great job, Bob and Chet...Have you heard KA1KPH's packet repeater yet?...Last chance to order a DX or US call book! Call Ron Beauchemin at 739-5228 now. $15. each, either one.....

If you re-print this chart, you must credit ZERO BEAT and the HCRA. A full-size copy of this chart will be available at the next meeting!

FREQUENCY ALLOCATIONS FOR POPULAR AMATEUR BANDS

All in Megacycles. "X" = No Privilages. Sept. 1, 1984

CLASSES	NOVICE	TECHNICIAN		GENERAL		ADVANCED		EXTRA		SPECIAL NOTES
BANDS	CW	CW	PHONE	CW	PHONE	CW	PHONE	CW	PHONE	
80 MTRS	3.7 to 3.75	3.7 to 3.75	X	3.525 to 3.750	3.85 to 4.0	3.525 to 3.750	3.775 to 4.0	3.5 to 3.750	3.75 to 4.0	3610-3630 khz RTTY 3845 khz SSTV 3590 khz RTTY DX
40 MTRS	7.1 to 7.15	7.1 to 7.15	X	7.025 to 7.150	7.225 to 7.3	7.025 to 7.150	7.150 to 7.3	7.0 to 7.15	7.150 to 7.3	7040 khz RTTY DX 7090-7100 khz RTTY 7171 khz SSTV
30 MTRS	X	X	X	10.100 to 10.109 10.115 to 10.150	X	10.100 to 10.109 10.115 to 10.150	X	10.100 to 10.109 10.115 to 10.150	X	14.08-14.10 Mhz RTTY 14.23 Mhz SSTV
20 MTRS	X	X	X	14.025 to 14.150	14.225 to 14.350	14.025 to 14.150	14.175 to 14.350	14.0 to 14.15	14.150 to 14.350	14.08-14.10 mhz RTTY 14.23 mhz SSTV
15 MTRS	21.1 to 21.2	21.1 to 21.2	X	21.025 to 21.200	21.300 to 21.450	21.025 to 21.200	21.225 to 21.450	21.000 to 21.200	21.200 to 21.450	21.09-28.10 mhz RTTY 21.34 mhz SSTV
10 MTRS	28.1 to 28.2	28.1 to 28.2	X	28.0 to 28.3	28.3 to 29.7	28.0 to 28.3	28.3 to 29.7	28.0 to 28.3	28.3 to 29.7	28.09-28.10 mhz RTTY 28.68 SSTV 29.30-29.50 Satellite Downlinks 29.52-29.58 Repeater inputs 29.60 FM Simplex 29.62-29.68 Repeater outputs
6 MTRS	X	50.0 to 54.0	50.1 to 54.0	50.0 to 54.0	50.1 to 54.0	50.0 to 54.0	50.1 to 54.0	50.0 to 54.0	50.1 to 54.0	
2 MTRS	X	144.0 to 148.0	144.1 to 148.0	144.0 to 148.0	144.1 to 148.0	144.0 to 148.0	144.1 to 148.0	144.0 to 148.0	144.1 to 148.0	

160 METERS E,A,G PHONE 1.800 to 2.000 E,A,G,T 220-225 420-450 1215-1300 2300-2450
3300-3500 5650-5925

HAMPDEN COUNTY RADIO ASSOCIATION

Packet Radio

Amateur Digital Communications

by Bob McCormick KA1KPH

Prior to 1980, digital transmissions on the amateur bands were primarily limited to RTTY. The five bit Baudot code is widely used and is still the backbone for many commercial services, but it is old and outdated. The number of codes possible is limited to 32 and the games played with the shift-in shift-out give you something slightly less than double that for characters. Have you counted the keys on your personal computer lately?

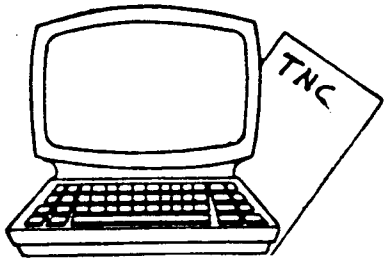
In some ways CW could also be called a digital mode as it has just two states: on and off. CW has clear and concise rules regarding timing - the lengths of the dots and dashes as well as the spacing intervals. Maybe this explains why we see a great deal of personal computers with software or firmware that provides RTTY and CW to those of us lucky enough to have a PC in the shack.

Most personal computers (and many larger ones, too) use either seven bit (128 character) or eight bit (256 character) ASCII code for at least communications if not also for storage and internal manipulation. It is a shame that it took so long for the FCC to authorize the use of ASCII on the amateur bands. We have had the pleasure now since 1980 and many people have taken advantage of the rule changes. In comparison, the FCC directives regarding digital modes show that ASCII can be transmitted up to 16 times faster than Baudot on 2m and 256 times (or more!) faster above 70cm. But higher speeds mixed with static, fading, interference and other problems can significantly limit the usefullness of high speed ASCII. Enter Packet Radio!

Indeed packet radio very much involves computers, but don't let that scare you off. You don't necessarily need a computer to use packet radio (a dumb terminal will do) nor do you need to know how to program computers to get on packet. If you can type (even using the Columbus method: find a key and land on it) and connect a few wires together you can be a successfull packeteer. On the other hand I don't mean to make this all sound so simple (boring?) either. There is plenty of room for computer hackers, modem designers and traditional ham interests to keep you going with packet for a long time to come!

The key component of any packet station today is the TNC: Terminal Node Controller. The TNC interfaces between a terminal (or a computer that looks like a terminal) and your rig. With a setup such as this you can type messages or, if you are using a computer, even transfer files to a distant station with a similar configuration.

The TNC is actually a self contained computer with one or more microprocessors, depending on which unit you obtain. TNC units run software that is stored in read only memory (ROMs) so there is no need for cassette or diskette storage and loading of programs. Turn it on and you're up and running.



One side of the TNC interfaces to your terminal or computer. This interface is called RS232, which is a standard way of connecting computers and peripherals together. If you have a dumb terminal, it more than likely will handle RS232. Most computers can also handle RS232, although the cheaper priced ones usually require some additional hardware (an interface) to accomplish this. And of course, you may wish to investigate a "modem program" - software that will make your computer look like a terminal. If you can get your computer connected to a host, possibly to something like CompuServe or the Source, then you'll have no problem connecting to a TNC. Note that you do NOT need a modem to connect to a TNC! In fact, the TNC actually performs modem functionality.

On the other side of the TNC you will connect your rig. For purposes of discussion we will assume you are the typical packet user operating on 2m. As noted, the TNC performs the function of a modem (modulator demodulator). This means that ASCII computer information is changed into intelligent information that you will transmit by the modulator function and likewise information you receive is demodulated into bits and bytes useful to your computer. To keep things simple, the TNC actually generates (and receives) AFSK, audio frequency shift keying. The speed found on 2m is 1200 baud (between 120 - 150 characters per second) and the tones and shifts used are the same used by Bell 1200 baud modems that have been in use for years connecting computer equipment over phone lines. Thus we are talking about "voice grade" signals at normal voice bandwidths. All you have to do is connect the TNC to your microphone jack, speaker and PTT (push to talk), make some level adjustments (simple) and you're ready to go.

Packet radio offers some unique characteristics over other traditional modes. These features are realized in the implementation of the AX.25 protocol in the TNC. AX.25 is the protocol approved by such organizations as the ARRL and AMSAT and is a modification of the computer industry standard X.25 protocol (the 'A' is for amateur). This protocol is where the "packet" in packet radio comes from.

AX.25 is a point to point protocol. This means that you establish a connection between your station and a distant station. After a connection is made you can transfer information in either direction and this transfer occurs *ERROR FREE!* Whatever you send will be exactly duplicated at the receiving end. When you are through you then disconnect the previously established connection, and are then free to connect to anyone else.

As you may have determined, you can only communicate using the AX.25 protocol to one station at a time. Although this may at first seem to be a drawback, it is, in fact, a feature. When you're connected to another TNC your TNC will ignore everything except packets from that distant TNC bound for you. In this way multiple people can be using the same frequency at the same time without interfering with each other's communications. In fact, one 2m frequency can support over twenty simultaneous stations QSOing with little or no degradation.

The way this all works is defined in detail in the AX.25 protocol specification which is an involved document. The following description is a simple overview of how it functions resulting in error free transmissions as well as allowing multiple stations to co-exist on the same frequency.

You sit down at the operating position in your shack and fire up your packet station. Your rig is tuned to 145.010 MHz (simplex), commonly used in many areas of the country for packet activity. You enter a command to your TNC requesting that it connect you to another station across town. For example: CONNECT KA1KPH.

The TNC in your shack meanwhile has been monitoring the audio on receive. After you enter the connect command the TNC waits until there is no activity on the frequency, transmits a connect initiate packet, and goes back into receive mode. If KA1KPH has his rig and TNC on the air it too will be continuously monitoring the frequency and will hear the connect request. It looks at the packet received and notes that it is a message bound for itself. After further inspection it sees that it is a connect request and it will reply with a message back to your TNC confirming the request. At this time your TNC will display ***CONNECTED TO KA1KPH on your screen.

Packet Radio

You then can carry on a QSO by just typing on your keyboard. The TNC will buffer information you type and assemble it into packets. A packet consists of three main pieces of information. First is the header which is like the front of an envelope. It contains the address (call) to send the packet to as well as who it is from (your call). Next is the actual data; information you may have typed or a piece of a file you may be sending. And lastly the Cyclic Redundacy Check (CRC) which is included to ensure an error free transfer.

The sending TNC uses a mathematical formula to compute the CRC on the packet and sends it as part of the packet out over the air. The receiving TNC also computes the CRC using the same formula on any packets it receives and then compares what it computed against what was sent (and received). If the compare finds two different values the received packet is assumed to be received in error and it will not be used.

As you type information, packets are assembled and sent to KA1KPH. The TNC at KA1KPH receives your packets, checks the CRC, and if good, returns an acknowledgment packet back to you. The messages you type appear at KA1KPH error free. Both your TNC and the TNC at KA1KPH may successfully receive other packets of other stations in the area on the same frequency but they are ignored since they are not properly addressed.

Your TNC expects to receive the abovementioned acknowledgment (ACK). This is used to verify that the message (packet) has been successfully recieved. This is called guarenteed delivery (return receipt requested), somewhat like what the post office offers. If your TNC does not recieve an ACK within a short period of time it will retry the transmission again. You have control over how long the TNC will wait for the ACK. Of course, if the other station's rig died your TNC could try forever sending the same packet. You also have a choice here, too. You may either abort a connection at any time or set a retry counter to limit the number of attempts. You can see that marginal conditions or intermittent interferance will only limit the throughput of packet radio. When your TNC receives the ACK it knows the packet has been recieved and its contents were intact.

When you are done with your QSO with KA1KPH, you issue a command to your TNC to DISCONNECT. A disconnect message is sent, an acknowledgement is received and both TNCs are no longer connected. You are free to connect to anyone else on frequency.

The TNC also has the ability to monitor packets it receives. For example, after you disconnected with KA1KPH you wanted to see what other activity there was on frequency. You can enter a TNC command to turn on MONITOR mode and the packets your TNC successfully receives will be displayed. You could then "listen in" or "read the mail" on any other QSOs that might be occuring on frequency.

The TNC can broadcast a beacon comprised of a message that you enter. You can also control the frequency of how often beacon messages are sent. Typical values range in the 10 to 30 minute intervals. In conjunction with the beacon feature you can also broadcast messages. Since there is no connection in this mode, thus no ACK, there is no guarentee that anyone will ever receive your packets. This can be used for calling CQ or broadcasting general OST messages.

Next month in Zero Beat we will continue the discussion on packet radio with information on how packet radio "digipeaters" can extend the range of packet radio communications, packet radio on AMSAT OSCAR-10 and future satellites including PACSAT, high speed terrestrial links, and a look at who is currently offering packet radio hardware with overviews and suggestions. Also some info on packet experiments with meteor scatter contacts, various mailbox computers with message store and forward, and a look at the KA1KPH-1 digipeater serving the greater Springfield area as a link in Eastnet, the east coast intercity ever growing network of stations.

Don't forget to mark down Friday 01-Feb-85 when the topic for the February HCRA meeting is packet radio with discussions and live demos. A computer will be raffled off with three chances for a dollar. This should make a great starter system for packet or RTTY/CW - add the interface of your choice and see you on the air!

CQ DX

by

W1DGJ

CAMBODIA: XU1SS on Sundays at 23Z on 14.225 -...- BRUNEI: VS5PM is Brunei's first ambassador to U.S. -...- ALBANIA: ZA is most needed country followed closely by Burma (XZ) and South Yemen (70) -...- SOVEREIGN MILITARY ORDER OF MALTA: 1AØKM showed on weekend of Dec. 8-9 -...- WASHINGTON: FCC to rule on town's right to restrict antennas after the Dec. 24th comment deadline -...- CLIPPERTON ISLAND: FO8C DXpedition scheduled for March -...-

160 METERS: U. N. HEADQUARTERS 4U1UN 1.825 03Z -...- BARBADOS 8P6JQ 1.846 03Z -...- GUADELOUPE FG7AM 1.828 04Z -...-

80 METERS: ALGERIA 7X2LS 3.796 07Z -...- MELILLA EA9CE 3.517 01Z -...- ANDORRA C31AF 3.794 00Z -...- FALKLANDS VP9ML 3.789 03Z -...-

40 METERS: TANZANIA 5H3BH 7.007 00Z -...- ASIATIC RUSSIA UA9CE 7.005 12Z -...- GEORGIA UG6GBD 7.007 02Z -...- NIGERIA 5N8FOC 7.021 00Z -...- MAWALI 7Q7LW 7.002 04Z -...- TAHITI FO8JR 7.009 13Z -...-

20 METERS: CHINA BY4AA 14.180 23Z -...- ST. HELENA ZD7AL 14.223 20Z -...- KUWAIT 9K2MA 14.236 19Z -...- OMAN A4XJW 14.169 13Z -...- S.M.O.M. 1AØKM 14.195 15Z -...- INDONESIA YB2ARA 14.033 00Z -...-

15 METERS: MAURITIUS 3B8FK 21.034 15Z -...- REP. OF GUINEA 3X4EX 21.318 19Z -...- UGANDA 5X5GK 21.335 18Z -...-

10 METERS: URUGUAY CX5AO 28.030 16Z -...- GRENADA J37AE 28.030 19Z

DEAR CQ DX: How many IRCs must I send to 3B8FK to receive an air mail reply? ANSWER: It tales 3 IRCs at 65¢ each but a cheaper way is to buy Mauritius stamps from the DX Stamp Service for only $1.20. Providing the correct foreign stamps affixed to your self-addressed envelope has proven to give higher QSL receipt than using IRCs. Write to W2AZX for details.

VHF-UHF-EME
LOG

HAMPDEN COUNTY RADIO ASSOCIATION

log sheet ___ of ___

CALL USED ________________

ARRL SECTION
or COUNTRY ________________

50 QSOs per side
Number each new multiplier as worked

FREQ.	MODE	DATE/TIME UTC	STATION WORKED	COMPLETE EXCHANGE		LIST NEW MULTIPLIERS	POINTS
				SENT	RCVD		

VHF Sweepstakes

Call used _____ Grid square locator _____

ARRL section _____

____ Single operator station. I wish to be listed in QST as: ____ Multi-band
(check one only) ____ Single-band _____ MHz

____ Multioperator station (show calls of all operators/loggers) _____

_____(not eligible for single-band awards)

	QSOs (minus duplicates)	QSO Points	Grid Sq. Multiplier	Claimed Score	
50 MHz (2 pts. ea.)					50 MHz
144 MHz (2 pts. ea.)					144 MHz
220 MHz (4 pts. ea.)					220 MHz
432 MHz (4 pts. ea.)					432 MHz
1296 MHz (8 pts. ea.)					1296 MHz
2300+ MHz (16 pts. ea.)					2300+ MHz
TOTAL ALL BANDS					TOTAL ALL BANDS

Figure your score for *each* band operated as well as your total score for *all* bands. Band scores equal QSO points X multiplier on that band. All-band score equals *total* QSO points X *total* multipliers from all bands operated.

Club participation? Yes
If yes, print the name of your ARRL Affiliated Club: HAMPDEN COUNTY RADIO ASSOCIATION

I have observed all contest rules, as well as all regulations established for amateur radio in my country. This report is true and accurate to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee. I am a member in good standing of the Hampden County Radio Association.

Date _____ Signature _____ Call _____

Name _____ Comments:

Address _____

_____

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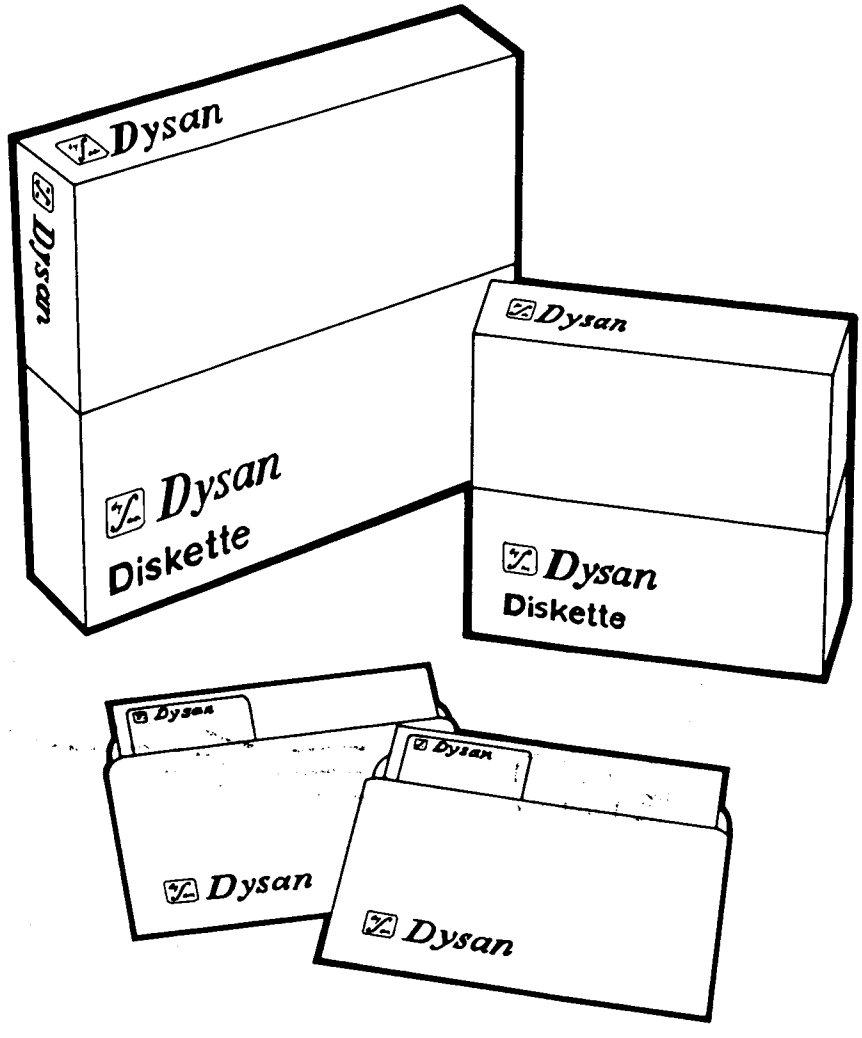

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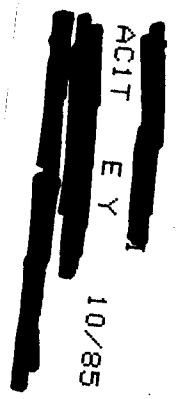

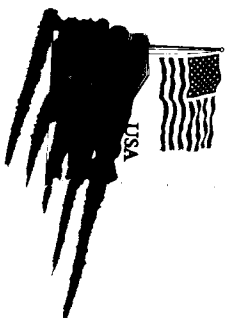

Schedule of Events

January 4 Friday	HCRA January Meeting Steve K1FO will explain how to stack those antennas
January 12 Saturday	HCRA & ARRL sponsored FCC exams - Good Luck! Wilbraham, MA
Jan 12-13 Sat-Sun	*** VHF Sweepstakes *** Logs in this issue Watch for the WINY club station.
February 1 Friday	HCRA February Meeting *** Win a VIC20 computer *** KA1KPH presents packet radio - the new frontier
Feb 16-17 Sat-Sun	*** ARRL DX Contest - CW *** Will we see you on the bands?
March 1 Friday	HCRA March Meeting Amateur Fast Scan TV - Live and in color...
March 2-3 Sat-Sun	*** ARRL DX Context - SSB *** The challenge continues...
April 12 Friday	HCRA April Meeting NASA space suits - how they are designed and built for use on the Space Shuttle.
May 5 Sunday	HCRA Spring Flea Market West Springfield Lodge of Elks
June 7 Friday	HCRA Annual Meeting Awards Ceremony
June 22-23 Sat-Sun	*** Field Day 1985 *** HCRA field day at Western Mass Law Enforcement Academy

✠MERRY CHRISTMAS✠

✠HAPPY NEW YEAR✠