

O R C

NEWS

EDITOR AA9W

OCTOBER 1981

Excellency Sez-

As is my practice when I sit down to write this page, I search thru past issues of amateur related magazines hoping for inspiration. Inspiration eludes me and frustration creeps in instead. My habit includes monitoring the '97 machine, but my ears are greeted by a chorus of squeels and squawks, while parties perhaps better left namesless are testing(?). It occurs to me that a review of 'operating practices' may be in order.

The first consideration should be to keep your equipment in operating condition, which includes more than the transmitter. If the volume and squelch are properly adjusted considerable embarrassment and 'liddie' operating can be avoided.

Once care is taken to insure that the equipment sounds as good as possible the next consideration should be when to push the transmit key. The operation of the '97 machine inspite of its' tone-burst guard on the receiver is essentially a 'community' type system. Meaning that several people are listening to any given conversation, and forming opinions at the same time. Some would argue that everytime they get 'on' the machine they can not get any responses from the 'silent majority'; well, if the equipment is working properly that should speak volumes (pun intended). Most of the amateur community is pretty forgiving, their patience is directly related to improvement (or deterioration) in operating practice.

There are numerous publication which deal with what is good operating practice and what is not, and I will not belabor the contents of those here - I intend to deal more with content of conversations. If you don't have anything to offer to a conversation in progress, interrupting it is no more impolite than if done in person, albeit safer due to the distances involved. The autopatch has come in for some abuse as well.... dumping conversations in progress, depending upon content qualify for 'malicious interference' under FCC statues. When autopatch was first instituted, the operating consensus was that "interrupting a conversation in progress would be appropriate ONLY for emergency type traffic (that usually excludes calls to exchanges other than Fire and Police). Asking permission to disrupt a conversation seems to me to be a contradiction of terms.

MORE →

I am of the opinion that most operators feel their operating practices do not need any refining, I suspect a sort of inertia builds up with years of operating. I would have to plead guilty to this also...I would like to suggest the following test - arrange with a 'friend' to have yourself tape recorded when they hear you on the air next, and to continue monitoring until they get about 30 minutes of copy, on both sides of the QSO. Review the tape with your friend and see if you would answer a CQ given by the operator on the tape. If you would, chances are you haven't read this far anyway or I've misjudged the 'Amateur Services' ability to self-regulate. Oh by the way I've done what I suggest, and the results were illuminating. 73

Terry A. Berg (WA9AWO)

FOR SALE.....ICOM IC215.....Full of crystals  
with NICAD battery and KUHLDUK  
See KB9DY

FOR SALE.....OHIO SCIENTIFIC CIP COMPUTER  
8K of RAM \$300.  
CRT \$20. with curser screen, handles  
included.

See WA9AWO

FOR SALE.....MODEL 15 with PERF PUNCH and  
READER mounted on table.  
Call KB9DY 377-3388

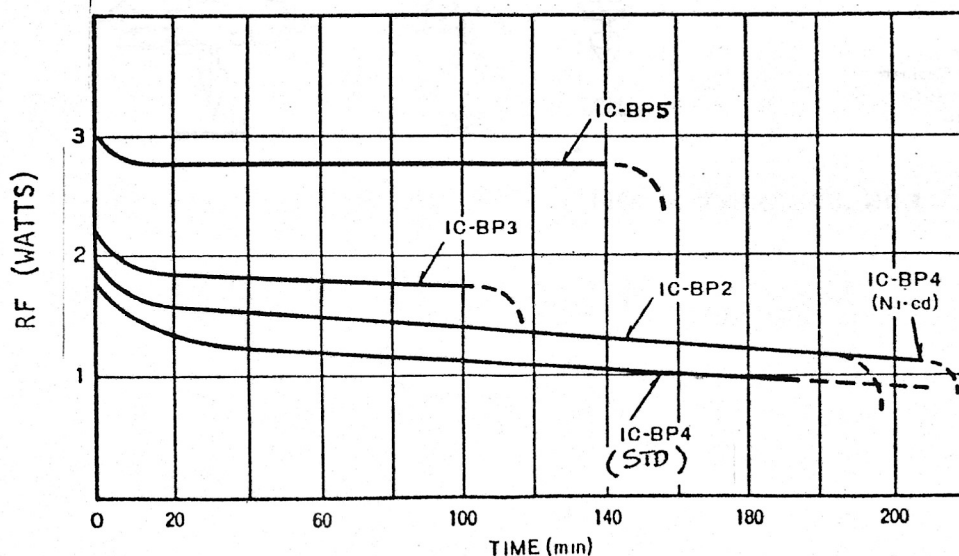
I just purchased an ICOM BP4 battery case, which holds 6 AA penlight cells. The package insert is in Japanese! However, it contains some very useful information, a bit in English plus some which I had translated, which may be of use to others with this rig. I have also included prices, quoted by Amateur Electronic Supply, as of 15 September 1981.

<u>BATTERY PACK MODEL NO.</u>	<u>ICOM RATING OF PACK</u>	<u>CONTENTS</u>	<u>LENGTH</u>	<u>CURRENT COST AT AES</u>
BP2*	400 maH	6 x 1.2 v cells = 7.2 volts	39 mm	\$39.50
BP3**	250 maH	7 x 1.2 v cells = 8.4 volts	39 mm	Comes with rig
BP4	-	Slots for 6 AA cells	49 mm	13.00
BP5*	400 maH	9 x 1.2 v cells = 10.8 volts	49 mm	49.50

\*Can be charged at 1.5C (600ma!) for 1-1.5 hrs with the BC30 drop in charger (\$69.00), or at a lower, overnight rate (15 hrs, 45ma).

\*\*Charge at 0.1C (25ma) for 15 hours.

The following graph shows RF output using the various battery packs. ICOM apparently constructed this graph by using fully charged batteries, putting the rig on receive for 3 minutes, then transmit one minute while measuring output, then receive for another 3 minutes, then transmit again, etc. Two traces are shown for the BP4 cell holder. The upper one is with the thing loaded with nicad AA cells; the lower one is with standard batteries. The original Japanese word printed on the graph means "voltage reservoir" and my translator could not determine whether it meant carbon cells or alkaline cells.



An interesting analysis can be done with this data. Below are my "eyeball" estimates of the average RF output of each pack, along with the number of minutes available before the pack drops dead. Multiplying these two numbers gives "watt-minutes", and dividing this into the pack cost yields the cost for each watt-minute. Because the BP4 holder, loaded with either nicads (estimated cost =  $\$1.50 \times 6 = \$9.00$ , plus  $\$13.00$  for the holder) or standard cells (estimated cost =  $50\text{¢} \times 6 = \$3.00$ , plus  $\$13.00$  for the holder) lasts so long, the cost is very low. On the other hand, none compete with the BP5 for high output.

PACK	AVERAGE OUTPUT IN WATTS	NUMBER OF MINUTES OF USE	WATT MINUTES	COST PER WATT-MINUTE
BP5	2.75	140	385	13¢
BP4 nicad	1.5	205	308	9¢
BP4 std	1.25	190	238	7¢
BP2	1.5	190	285	14¢
BP3	1.75	100	175	Don't know pack cost - comes with rig.

- - - 73, *Stan*

## Signals & Noise

### Additional grounds

Dear Editor:  
Mr Patstone's article on grounds (EDN, April 1, pg 79) and Mr Janson's reply (EDN, May 27, pg 27) were quite interesting. However, their lists of grounds are far from complete. Here are a few:

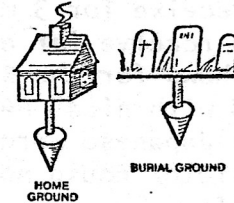
Sincerely,  
L J Paleck Jr  
Development Engineer  
Western Electric Co  
Naperville, IL



POSITIVE GROUND

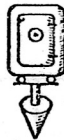


NEGATIVE GROUND



HOME GROUND

BURIAL GROUND



SAFE GROUND



CAMP GROUND



GROUND FOG

EDN SEPTEMBER 30, 1981

During my first few attempts at building a regenerative receiver, (early thirties), I ran into the vacuum tube, and was considerably impressed with it, although I really didn't know enough about it to appreciate it.

My tube line-up was a 24-A regenerative detector and a 27 AF, using hand wound coils and an impedance coupler which I scrounged from a local. The receiver worked great (for those days), and after enough debugging, I was able to copy very well. However, the local Hams were very unhappy, as the regen receiver was also a very good transmitter.

I later came up with an RF stage which cooled things down a bit, and was a boon to reception in the shack. Wonderful things these tubes, but expensive, and I still didn't know enough about them.

One of our local Hams took pity on me. Since he worked for the wonderful world of Western Electric in the tube test lab, he took me in hand, and for four Saturdays, we visited the place where they were doing special engineering on vacuum tubes. I was hooked! I was soon to go away to college, and I thought nothing would be better than to take ELECTRONICS..... Understand, that in those days, most guys hooked up everything according to the book, as close as they could with the parts they could beg, borrow or steal. Then they played with it until it worked. Test gear was almost unheard of unless you worked for Howard Radio, Wells-Gardner, or Steward-Warner.....few of us did. The early thirties saw a tremendous increase in the Ham population as no one had a job any way, so might as well being doing something. The day I went down to take the exam in Chicago (Nov 1932), there were three sessions of the code test, as we couldn't all get into the room at once. The theory test asked (among other things), "How does a vacuum tube work?". I would like to read my answer to that one today!

My first rig was a breadboard layout using a pair of 245's (triodes) as that was what my grandfather had in his BC receiver, and I could snatch them after he went to bed.

All of this time, RCA, and others, were making tubes that the average guy found it hard to afford. It was left to the Taylor Tube Co. to first produce them at a price that would get the Ham hobby off of the ground. Taylor's first 866 rectifier, sold for \$1.30 while RCA was charging \$7.50! At that time, if you were lucky, your week's pay was \$10-\$15. My first real transmitting tube was a Taylor TZ-20, a low power triode, whose modest price let me get on 20 and 40 meter cw with a respectable signal. I worked many a contact with my 47 xtal oscillator and TZ20 final.

Meanwhile, RCA was turning out more and more receiving types, and was doing research at a record pace, trying to keep up with the design engineers demands for cheaper tubes for an ever more competitive radio market. The ultimate in the AC-DC "kitchen radio" was the so-called ALL AMERICAN FIVE tube line-up. The Harrison NJ plant of RCA was going great guns, and by the mid-thirties, was turning out the marvelous new metal tube (a General Electric design). This metal design was to undergo all sorts of production innovations and was to revolutionize the radio business. Goat shields, perforated shields, and big shield bases, went on the skids as the metal tube was its own shield. One socket, the octal, replaced the need for 4,5,6, and 7 pin sockets, and eventually all long shielded grid leads and caps were replaced by the bottom connected grids, much to the delight of the cost cutters. All of this took place just in time for WWII production. The VT designations didn't

confuse us for very long and the JAN specs were little more than copies of existing characteristics.

When the 1940 crunch came, WW II demanded a fantastic increase in production to meet defense (war) needs, as well as to supply the old glass tubes to maintain the civilian radios. Brother Patrick Dowd (NJ), has written the history of the metal tube. His work has literally turned the metal tube into a collectors item. The device was responsible for major improvements in the field of electronics before, during, and after WW II. Dowd has produced a collection of display boards for his students that demonstrate function, design, and construction. I had been collecting tubes for some years when I read his article in the Antique Wireless Assn Bulletin and I was astonished to find that my humble assemblage was representative of about 80% of the tubes he had listed. Many metal tubes never got passed the pilot run stage, and some I'm sure, never got off the drawing board.

The first list of metal tubes were designed by General Electric for production by RCA. This line was released in the Fall of 1935, and was available to industry shortly thereafter.

6L7	4/29/35	Pentagrid Mixer
5Z4	5/7/35	Full wave Rectifier (high vacuum)
6F6	5/7/35	Power Pentode (audio amplifier)
6F5	8/28/35	Hi-Mu Triode
6A8	8/15/35	Pentagrid Converter
6C5	8/15/35	Medium Mu Triode
6H6	8/15/35	Twin Diode
6J7	8/15/35	Sharp cutoff Pentode
6K7	8/15/35	Remote cutoff Pentode

The tube types go on from there, thru 1955, and were released in all types and series, including specially selected series (1600) chosen for closely graded characteristics.

The giant tube plant at Harrison, NJ was put to sleep in April 1976, and ceased all production of receiving tubes on that date. This brought to a close an era of electronic development, unparalleled in the electronics history of the USA. Although the vacuum tube is dead as a production item, and its functions largely supplanted by the transistor, it will forever stand out as "The Bridge" between the Spark technology and the solid-state era.

Fred Linn W9NZF  
(Copy from WA9USA)

# INTRODUCTION

As the electronic industry has advanced in technology, the need for a faster, more reliable and inexpensive method of making electrical connections has become a necessity. In years past, it was sufficient to solder most connections since there was ample room between terminals and relatively few connections by today's standards. However, today's electronic equipment is far more complex, leading to many more terminals. The task is compounded by the reduction in equipment size. The end result is far more terminals—in much less space.

To solve this problem, the industry has had to adapt to a completely different type of connection. The solderless connection by wire-wrapping technique is now a standard method of making connections to terminals in high density electronic equipment.

## TYPES OF WRAPPING TOOLS

- Pneumatic tools are preferred for production work.
- Where compressor air is not available, electric tools are recommended.
- Battery or hand operated tools are used for service and repair work.

## EASY REMOVAL

A distinct advantage of wire-wrapping is the ease with which a wire may be removed from a terminal due to error or wiring modification. An unwrap tool is slipped over the terminal, engaging the first turn of the connection. Rotating the tool, the connection is removed in seconds, without damage to the terminal.

## WIRE

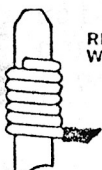
Solid wire is used for wire-wrapped connections. Copper is the most commonly used wire. Minimum elongation of 15% is required for 24 through 32 gauge, 20% for larger wire sizes.

## QUALITY ASSURANCE

There is a constant surveillance of manufacturing dimensions. Each wrapping bit is subjected to a series of "Qualification Tests." These consist of wrapping groups of wire on various types of test terminals. The wrapped wires are then subjected to a "Strip" test to determine adequate tightness. "Unwrap" tests are also performed to ensure against an "Overtight" wrap.

## TYPES OF WRAP

A "Regular" bit wraps the bare wire around the terminal. A "Modified" bit wraps a portion of insulation around the terminal in addition to the bare wire. This greatly increases the ability to withstand vibration.



REGULAR WRAP



MODIFIED WRAP

## Some Hints On Making WIRE-WRAPPED Connections

### EASY DOES IT!

Don't press too hard. Let the OK tools do the work. Excessive pressure can lead to overwrapping.

OVERWRAP



### STAY WITH IT!

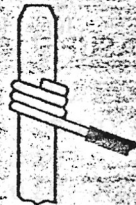
Just keep the OK tool on the terminal until the wrap is complete. Early removal can result in spiral and open wraps.



OPEN WRAP SPIRAL WRAP

### FEED WIRE CORRECTLY!

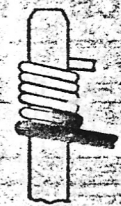
It's easy to feed wire into the slot in the OK bit correctly. Be sure the stripped end of the wire is "pushed-in" all-the-way.



INSUFFICIENT TURNS

### USE THE CORRECT BIT AND SLEEVE!

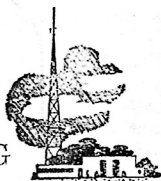
Wire-wrapping is a precision technique and the wrong bit and sleeve just can not do the job. So check the OK specification tables and use the right bit and sleeve. Improper selection can cause problems ranging from "Pigtails" to loose wraps.



PIGTAIL

## "STRIP" FORCE CHART

WIRE SIZE			min. number of turns (Bare Wire)	min. strip force	
AWG	diam. inches	diam. mm		lbs.	gms
16	.051	1.30	4	15	6800
18	.0403	1.022	4	15	6800
20	.032	.813	5	8	3600
22	.0253	.643	5	8	3600
24	.0201	.51	6	7	3200
26	.0159	.404	7	6	2700
28	.0126	.32	7	5	2200
30	.0100	.254	7	3.3	1500



MINUTES OF THE 9 SEPTEMBER MEETING

BOX 13

Port Washington, Wisconsin 53074

The Repeater meeting was opened at 7:17 PM by KA9DDN. He gave a brief description of the new solid state control circuits for the repeater, along with their physical packaging. Second Show & tell item was the NICAD battery charger described in the Aug/Sept newsletter distributed at the meeting. Circuit design by KA9DDN and construction by WB9RQR. The Wisconsin Association of Repeaters Meeting will take place in Stevens Point on Saturday 12 Sept. Skip is looking for a rack/cabinet suitable for housing the new repeater logic. W9ATK has info on one that can be had for free. Discussion about disposition of present rack was followed by adjournment at 7:26 PM.

Regular meeting called to order at 7:27 Pm by WA9AWO. Moved by WB9LNL and second by KB9OC to accept minutes of two previous meetings. Motion Carried. In the absence of WD9FQW, the treasurers report was delivered by WB9SFK;; RECEIPTS, Drawing at 12 August Meeting \$2.50, Refreshment Kitty \$17.41, One Kuhl Duck \$12.00, Holland Days Donation \$75.00, Total is \$106.71. DISBURSEMENTS:: August Meeting Refreshments \$25.06, "Tune in The World" for county Fair \$6.00, Heratage Printing for County Fair Flyers \$60.32, Insurance for County Fair \$90.00, Rent and Stickers for County Fair \$67.95, Permit for Corn Roast \$5.00, Portable Toilet Rental for Corn Roast \$67.60, Food, Beer, and Soda for Corn Roast \$216.69. Cash Flow is Negative \$431.71. Disbursement Total is \$538.62. ASSETS: Checking account \$143.93, Savings Account \$1631.46, 96 patches @ 0.75= \$72.00, Total \$1847.39. Motion to accept Treasurer's report by N9APC, Second byKA9EXY, motion Carried.

SAAGBRAW report by KA9LOJ who participated in the WashingtonIsland, to State Fair Grounds Leg. W9WQ monitored the procession at a point several miles North of Port Washington. Approx 200 bikers and 20,000 flies were counted.

CORN ROAST COMMENTS: Superior planning by those in charge resulted in very little leftover food. Consensus is that the event will be repeated next Year.

✓IMPAIRED HEARING TERMINAL: report by WB9SFK that there seems to be very little need for such a device in Ozaukee County because most of the potential beneficiaries have moved to Milwaukee County where employment opportunities for such persons are more available. No action taken.

✓FILM STRIPS: AA9W reports no progress to date but will continue to pursue the matter.

✓WALK FOR MANKIND: This year the route will be circular to eliminate bussing. It will be 18 miles long with Ccheck points every 2 miles, resulting in a need for at least 9 volunteers. Moved by KC9CJ that the club participate subject to availability of insurance coverage by the sponsors. Second by WB9SFK, motion Carried. WA9USA suggested use of the emergency government communications center for net control.

American Diabetes Association. Sport a thon 4 October. Discussion brings out that this event is poorly organized, resulting in much lost time for the communicators. Chair asked for a motion, none was made , so we will not participate.





**NEW BUSINESS:**

**SOFTBALL TEAM** WB9SFK is trying to organize a team from the club. Intent is to get into some existing league for next season. Those interested should contact Barry.

**Bowling:** WA9USA and WD9JIB are trying to organize a bowling team. Those interested should contact either of these gentlemen.

KA9GYD introduced a visitor, WB7TZN, Greg, a freshman engineering student at Marquette. New call. N9CNZ introduced himself. FCC will be in Milwaukee the end of this month to conduct license exams. Those interested should contact the FCC in Chicago for an appointment.

Bill Hazard, WD9GDG, has been approached by the Cedarburg LIONS club to arrange a HAM RADIO presentation at one of their meetings. This will be quarterbacked by WD9GDG and WB9OHY. Moved by WB9SFK to accept the challenge, Second by N9APC, motion carried.

**SWEEPSTAKES:** Computer program for logging is being updated, hopefully far enough of the contest to have some dry runs. Question about Field Day entry was answered by WA9AWO. Entry did get in on time, logs were computer processed.

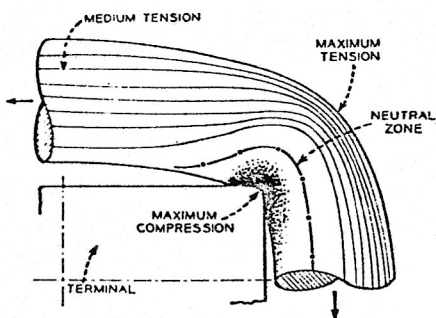
Motion to adjourn by WD9ISS, seconded by N9APC. Motion carried, meeting adjourned at 8:08PM.

*E. J. Bauer*  
E. J. Bauer, W9WQ

## The Technology of Wire-Wrapping

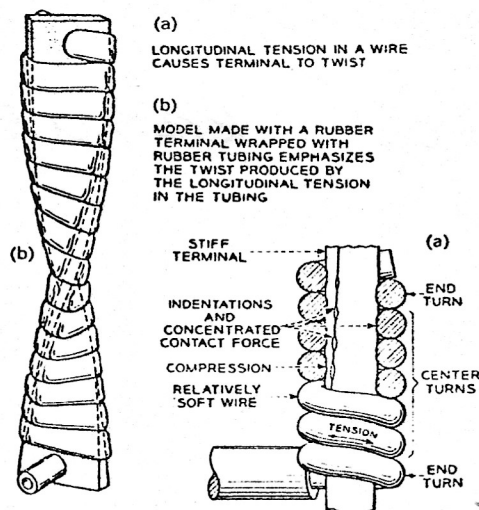
A wire-wrapped connection is made by coiling the wire around the sharp corners of a terminal under mechanical tension. This method of connection was developed by Bell Telephone Laboratories, Western Electric Company.

### METAL-TO-METAL CONTACT

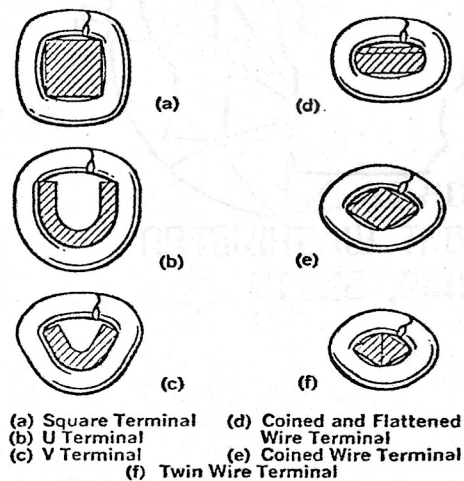


By bending the wire around the sharp corner of the terminal the oxide layer on both wire and terminal is crushed or sheared, and a clean, oxide-free metal-to-metal contact is obtained.

### HIGH PRESSURE CONTACT



### TERMINALS SUITABLE FOR SPEED-WRAP CONNECTIONS



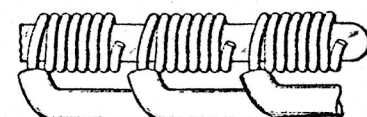
A terminal must have at least two sharp edges.

### STRENGTH OF CONNECTION

The strength of a SPEED-WRAP connection is considerably in excess of that of a soldered one. It is less easily stripped from the terminal and is less subject to breakage.

### GAS TIGHT CONTACT AREAS

The contact areas of a SPEED-WRAP connection remain gas tight when exposed to temperature changes, corrosive atmospheres, humidity and vibration.



TRIPLE CONNECTION

OCTOBER 14, 1981 7:30 PM AGENDA

KA9DDN  
WB9LNN  
KA9CSC  
WA7AWO  
WD9GDG  
KA9LOJ  
KA9HVI  
WD9JIB  
WB9SFK  
Ronnie Bank

1. INTRODUCTION
2. ADOPTION OF AGENDA *WD9JIB, KA9CSC*
3. SECRETARY'S REPORT *KE9CJ, WB9ROR*
4. TREASURER'S " *Heritage Printing \$29.12 Numbering Tickets \$114.20*
5. OLD BUSINESS
  - A. WALK FOR MANKIND (KC9CJ) *Passed Out Tickets for Haunted House*
  - B. SWEEP STAKES (WA9AWO) *KA9CSC Bridge Out on "W" Hazard / Harold King*
  - C. NOVICE & ADVANCEMENT CLASSES *→ W9WQ Wed. 7PM // WA9UVK = News Release*
  - D. FILM STRIPS (AA9W) *10 min FM Dec 1st 2hr Rpt. Micro-Processed*
  - E. SOFTBALL TEAM (WB9SFK) *Crystal Lake, Ill*
6. NEW BUSINESS
  - A. NOMINATION COMMISSAR NOMINATIONS *10 WD9GDG 1 WA9USA*
  - B. PUBLICIST *WD9FOW/KC9CJ*
  - C. OPEN TO FLOOR *6 months Ted Willett Capitol Court Jan Project*
7. ADJOURNMENT AT 8:45PM *WB9LNN relay KA9EXY OSCAR*
8. REFRESHMENTS COURTESY W9DQS, BOB WILLIAMS.

*wasuvk ke9cj -*  
*Motion: Club purchase 10 for Resale to Novice Class →*  
*N9COB John Martin KA9BAT Loyal Schaefer*



*KA9LOJ*  
*KE9CJ KB9UE*

*AA9W presentation on CB to 10 FM Conversion*