

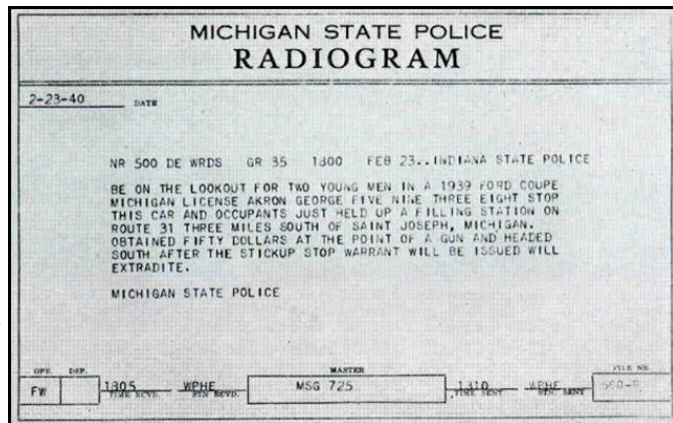
April, 2013

## Police Radiotelegraph Networks

Few today realize that for many years, our nation's larger police departments participated in a high frequency radiotelegraph network that functioned in a manner that was very similar to that of the National Traffic System.

While the first police radiotelegraph network was started in the State of Pennsylvania during the 1920s, the concept and methodology of police radiotelegraph systems didn't become standardized until the mid-1930s. In many respects, the growth of such networks paralleled the development of Amateur Radio CW traffic nets. Of course, most of the police operators were also radio amateurs who were active traffic handlers!

These HF police radiotelegraph networks remained in service into the early 1970s in some areas. Today's CW traffic operator would be quite comfortable with the techniques used on these networks, including the official "radiogram" format. Perhaps in a future issue of "QNI," we will cover the history of such networks in detail.



### Volume 2, Issue 2

#### In this issue:

Police Radiotelegraph Networks	1
QNI Mission Statement	1
NTSD—The Next Step—MBO	2
Reward Offered!	5

### Springtime Issue

Early Michigan Traffic—A Personal Recollection—Part Two	5
Captain Robert Dollar and Eimac	6
Operating Tip—CW Net Signal Reports	7
The "Hit and Bounce" CW Net	9
Recipe for Preserving Children	9

## QNI Mission Statement

QNI is an *independent* newsletter dedicated to promoting NTS and genuine emergency communications preparedness.

Our newsletter is independently published and distributed free of charge to the Amateur Radio and emergency management community. The opinions

contained herein do not reflect the policies or opinions of the ARRL, the National Association for Amateur Radio, nor those of any particular NTS net or emergency communications organization.

Our mission is to provide a forum for NTS volunteers

throughout North America. We operate on the premise that Amateur Radio public service volunteers should be, first and foremost, communicators and technicians. If you share this vision, please support QNI. Submit your news and articles for publication.

# NTS Digital—The Mailbox Operation (MBO)

By Dave Struebel, WB2FTX

## Part 1—The Next Step

I had originally planned for this to be only one article but as I started putting it together I realized that most traffic handlers have very little knowledge concerning the history of NTSD, the software we use and how it works. So I decided to split this into two articles. In this first one I will discuss the history of NTSD, the WinLink Classic software, how it works and why NTSD continues to use it.

At the outset let's define the term "MBO." It seems a little strange but it is a holdover from the early days of amateur bulletin board system operations which were designed for RTTY applications. I've heard two explanations concerning the etymology of the MBO term, one of which is "Mail Box Operation," and the other of which is "Mail Box Option." In either case they mean the same thing.

NTSD consists of a series of automated bulletin board systems ("BBS") referred to as MBOs that operate on a 24/7 basis. A BBS is a store and forward system. Messages are posted on the BBS/MBO and are stored there until downloaded or forwarded to another station.

Becoming a MBO operator requires both a time and financial commitment. A fully functioning MBO will be expected to scan at least four HF bands on a 24/7 basis (typically 80, 40, 30, and 20 meters) and it must be capable of operations at the higher data transfer speeds afforded by PACTOR 2 and preferably PACTOR 3. This means one must have a radio that is capable of being controlled by computer, a multiband antenna and most likely an automatic antenna tuner. A significant financial outlay is also required for the purchase of a SCS modem.

A MBO might initially start out with a moderate investment level using PACTOR 1 and a PK-232 MBX modem which could come from the NTSD Equipment Bank; however it is expected that an upgrade to at least PACTOR 2 will be undertaken in the near future.

It might surprise a lot of traffic handlers, but NTSD has been operating continuously now for over 20 years, starting in the early 1990's. The first systems were based on the APLINK software developed by Vic Poor (W5SMM). APLINK was a DOS based application that used AMTOR on HF and packet on VHF. Messages would be transferred via HF connections and downloaded over to the VHF packet side for placement into the network of Worldwide packet BBS that existed at that time. APLINK and AMTOR made history during the first Gulf War when Kuwaiti amateurs used it to send information out of Kuwait concerning the Iraqi military invasion. In fact, a CBS documentary, "The Last Voice from Kuwait", spearhead-

ed by Frank Moore, WA1URA, illustrates the heroic efforts of several Amateur APLINK stations, the USS Kennedy, and the Department of Defense. Here is the WANE-TV CBS documentary, in three parts.

Part 1 <http://www.youtube.com/watch?v=dG4jvV9ngWU&feature=youtu.be>

Part 2 <http://www.youtube.com/watch?v=9dB8E-1zi7c&feature=youtu.be>

Part 3 [http://www.youtube.com/watch?v=fJ\\_Ky7yQwb8&feature=youtu.be](http://www.youtube.com/watch?v=fJ_Ky7yQwb8&feature=youtu.be)

Vic W5SMM later transferred APLINK over to the then new Windows operating system, specifically

Windows 3.1 and called it WinLink. He then sort of retired from further development of the software and in 1994 turned it over to Hans Kessler, N8PGR. Hans took WinLink and refined it, adding modules for Clover and PACTOR 1, 2, and 3 as they came along keeping both the AMTOR and VHF Packet modules available and updated. At one time in the early years my MBO was simultaneously running AMTOR, PACTOR 1, and Clover on HF and Packet on 2 meters. That required a computer with at least 4 COM ports! Fortunately the Clover application was via a plug in 16-bit ISA card (a P38) from HAL, the Clover developer. Otherwise five COM ports would have been required and if you know very much about early computers, they had difficulties recognizing serial ports beyond COM 4. Clover never seemed to be very common and it seemed to tolerate frequency errors much worse than PACTOR. In addition the Clover WinLink module never seemed to be able to take advantage of the speed that Clover promised and eventually those few NTSD stations that offered it gave it up, as did most of the amateur digital community.

Later, in the 1990's, various attempts were made to add email into WinLink Classic. These included Netlink and Ilink and the NEXUS designation of a MBO that also had an Internet connection. They were mostly improvised additions that were difficult to operate and manage. In 1999 Hans stopped any further development of WinLink Classic and turned the project back over to Vic, W5SMM and others who would become the WinLink Development Team (WDT). With the final release of WinLink Classic Hans said, "WinLink-2000 will be nothing you have ever seen before. It will carry all the features you know today, plus a ton more." Unfortunately that was not entirely the case and several components of WinLink Classic that were considered rather important to NTSD were dropped and development instead emphasized the Amateur Radio email system that is WinLink 2000 (WL2K) today. Had these features been included, NTSD would have been more than happy to make the transition. This explains

why NTSD continues to use WinLink Classic today. It is not because we are old fuddy-duddies (although it is rumored that the "OFD" in "KB0OFD" really means.

In summary, WinLink Classic is a 16-bit software program originally developed to run on the Windows 3.1 system. It will run in all versions of Windows, including Windows 95, Windows 98, Windows 2000 and up to and including Windows XP, the latter requiring a bit of coaxing. It will not run on 64-bit software such as Windows Vista, 7, or 8.

The WinLink Development Team is not particularly fond of NTSD's continued use of WC for various reasons. Although I am not personally aware of any formal agreement, NTSD has unilaterally restricted distribution of WinLink Classic to those approved by a NTSD Area Digital Coordinator. We thus maintain the WinLink Classic archive, as well as archives with the current and older versions of Airmail and various Windows operating systems for similar reasons. We do not have the source code, so the net result is that the WinLink Classic Software is fixed in time. This includes interfacing with the various radios that were extant when the software development ceased (more about this is provided below in the discussion of the WinLink Classic Scanner function and auto-forwarding).

The important features of WinLink Classic are auto-routing and auto-forwarding. It is possible to operate a NTSD MBO using Airmail without these features and there are several systems that do this. However this means that all the routing and forwarding has to be manually set or initiated. Operators who originally started out running Airmail and were convinced to switch over to WinLink Classic would never go back. An area MBO often handles hundreds of messages in and out in a single day. This means that the MBO operator is going to spend a lot of his own time routing and forwarding messages and is only going to be able to do this when he or she is awake and not doing anything else. Since NTSD is capable of operating 24/7 with auto-routing and auto-forwarding, this manual operation defeats or eliminates the advantages and possibility of handling large volumes of traffic by automatic operation on a 24/7 basis.

NTSD routes via two fields contained in the digital message. These are the "to" field and the "@BBS" field. Normally the "to" field contains either the US five digit zip code or the Canadian alphanumeric postal code. (And now you know why we ask that all NTS and NTSD traffic include a zip code.) The "@BBS" field is expressed as "@Tax," where the xx stands for the two letter abbreviation for the US state or the Canadian province. Either one or both of these fields can be used.

Typically at the area NTSD level the "@NTSxx" is used because it eliminates additional entries in a forwarding file that might be needed for individual or multiple zip codes. It is usually at the region, state, or section level that the zip code routing is necessary to sort traffic by smaller groups for automatic downloading by the Digital Relay Stations (DRS) (See the December 2012

issue of QNI for more information about Digital Relay Stations.)

The easiest way to explain auto-routing is with an example. I like to call this redundant Auto-routing.

This is a typical portion of the forwarding file for California traffic at the WB2FTX MBO/hub:

NTSCA W5KAV KB0OFD WB9FHP K6RXX

What does this mean? The first entry (NTSCA) is "what" gets forwarded. The following and remaining entries are "to whom" it is forwarded. All those stations are equal in terms of receiving the traffic, which is forwarded on a "first come, first served" basis. Whichever station first establishes a successful connection will receive the traffic. Once that happens, the traffic is marked in the system as forwarded and is not available to anyone else. And this is the opportunity to explain another common misconception. It is not possible to duplicate a given piece of traffic within NTSD. The first NTSD system that receives the traffic labels it with a unique identifier consisting of a number that it assigns to each message and the call sign of the first NTSD system. It is in the form of 1001\_\_WB2FTX where the 1001 is the number assigned to the message and WB2FTX is the first NTSD station that received it.

Once a station receives 1001\_WB2FTX it will not accept any other piece of traffic that is labeled 1001\_WB2FTX. In addition to this, each NTSD system along the forwarding path adds a tag line to the beginning of each message with its call sign, the date and time it received the message and the unique similar number that each system assigns to each message in addition to the 1001\_WB2FTX. This allows us to track who received a message through the system.

The next important function of WinLink Classic is auto-forwarding and that is controlled by the WinLink Classic Scanner module. Scanner is the module that is responsible for allowing the HF radio to scan multiple frequencies in multiple bands. It can be set up to periodically make a call out for another station based on time and frequency and these are coordinated to match the expected propagation for time of day and frequency used. This auto-forwarding call to another station can be made whether there is traffic for the receiving station or not. By policy NTSD will only initiate an auto-forwarding call to another NTSD system if the calling system has traffic pending for the receiving system. This eliminates "polling" of the other station and reduces the actual amount of time a station is on the air, reducing the possibility of interference. Additionally the use of the faster PACTOR 2 and 3 modes means that both stations are on the air, connected together for as short a time as possible, just long enough to transfer any messages back and forth between them.

WinLink Scanner has a "busy detector" built into it, which cannot be disabled. When a station has traffic for another station and a scheduled connection is set, WinLink Scanner stops the radio on that frequency and listens for activity for 15 seconds. If it detects any activity on the frequency it postpones that connection for a programmable amount of time and for a programmable number of attempts. This busy detector is not foolproof, but I have personally seen it postpone a scheduled connection after hearing CW, SSB, RTTY, PSK31, carrier and, of course, PACTOR. In fact during contest weekends when participants move into the narrow automatically controlled data subbands established by US FCC regulation, the traffic transfer rate for NTSD drops. This is unfortunate because NTSD can only legally operate in automatic mode within these narrow subbands (e.g. 5 KHz on 40 meters), on fixed frequencies without the ability to automatically move in frequency. Part of this activity by the contest stations may be because they are not aware of the existence or purpose of the automatic control band segments..

So now, let's put autorouting and auto-forwarding together. We have traffic for NTSCA. We have already set up the forwarding file to send NTSCA to W5KAV KB0OFD WB9FHP or K6RXX, whichever connects first. The scheduled time comes and Scanner stops the radio on the appropriate frequency. The busy detector listens on that frequency for 15 seconds and hearing no activity tells the transmitter to start sending a call for W5KAV. If W5KAV answers and connects to our sending station any NTSCA will be sent to W5KAV in groups of five message each, error free. When W5KAV automatically acknowledges the error free reception of the first five messages, the next five will be sent and acknowledged and so on until all the traffic has been sent. The sending station will then tell W5KAV that there is no more traffic, W5KAV will acknowledge that, both stations then will make a final identification (they have been identifying back and forth in PACTOR during this whole process) and will disconnect and shut down. If either station is using a SCS modem they can be set up to also transmit a CW ID at the end of the connection.

What happens if W5KAV does not answer the call from the sending station? The systems are setup to initiate a call to one of the other stations in the forwarding file taking the expected propagation for the time of day and frequency into account. In other words, this second call does not necessarily have to be on the same frequency that was used for the unsuccessful call to W5KAV. The second call can be scheduled for almost any time period after the original failed connection but we usually use a period of 10 to 15 minutes. In the case of my station being the calling station, the first choice might be W5KAV because that it's the direct path from the East Coast to the West Coast and from the Eastern Area NTSD hub to the Pacific Area NTSD hub. However the second choice could be to call the Central Area NTSD hub, KB0OFD, because expected propagation may favor the shorter hop and then the Central Area hub can in turn relay that NTSCA traffic to W5KAV shortly thereafter, doing the transfer in two hops as opposed to one.

If the call to the Central Area hub is also unsuccessful, the system might initiate a call to either WB9FHP or K6RXX, the alternate destinations for Central and Pacific areas respectively. In most cases one of these connections will be successful and the traffic will be transferred. If not the entire process might start over again an hour or two later. So in this fashion the traffic moves point to point in a relatively short time period. Typically with good propagation, a message sent from the Eastern Area hub will be eventually received cross country in Pacific Area during a period of two hours, sometimes much less. Also remember this is only one destination that we had selected for this traffic. Other traffic for other areas, regions or states is also moving in similar fashion not only area to area but also region to region and section to section with the ultimate goal of getting the traffic to the closest delivery point via digital means where it can then be downloaded by the appropriate Digital Relay Station and taken to the manual NTS region, section, and local nets for any further needed relay and ultimate delivery

Next, let's talk about which radios are compatible for control by WinLink Classic Scanner. First you need a radio that is capable of being controlled by computer. That pretty much eliminates anything over 20 years old. The radio should have a digital frequency display and be very frequency stable with the ability to rapidly switch between transmit and receive to accommodate the back and forth transmissions of the PACTOR protocols. Finally due to the limitation of WinLink Classic the radio or computer control system must be one that existed when the continued development of WinLink Classic stopped. Most Icom radios of the past 20 years use the CI-V CAT control protocol, with only changes in the port address assignment and the baud rate of the connection. WinLink Classic Scanner can therefore control most all recent Icom models just by specifying the correct address and baud rate for each individual radio.

The Kenwood radios are similar. Some required an optional computer interface while the more recent ones have a direct serial, and now, USB connection. The parameters are very similar from model to model although we have been unsuccessful with the most recent Kenwoods, and do not understand why.

Yaesu on the other hand has used three different CAT protocols in its radios over the past 20 years. They are not compatible with each other and only the first series works with WinLink Classic scanner.

Many of these radios do require an optional level converter for computer control. The radio manufacturers would like you to purchase their expensive optional converters for this. But the converters are not very complex electronically, consisting of only a handful of parts. There are now third party aftermarket computer control cables that combine the functionality of the converter directly in the cable for a price that it typically only \$20 to \$30 versus the \$100 to \$150 price of the manufacturer's converters.

A list of radios known to work with WinLink Classic is maintained by the Area Digital Coordinators and can also be found on the NTS Digital web page at: [http://home.earthlink.net/~bscottmd/wl\\_cl.htm](http://home.earthlink.net/~bscottmd/wl_cl.htm)

To wrap this section up, you must also understand that NTSD is not permanently fixed to operate WinLink Classic forever. We fully realize that there will come a time when it is no longer possible to use WinLink Classic due to lack of compatible operating platforms or radios. We are not standing around waiting for that to happen. NTSD is constantly evaluating other potential software and protocols to use; however we require software that can perform functions similar to what we currently have available in WinLink Classic. As another point; it would be great if we could incorporate the Winmor sound card protocol and virtual TNC into NTSD, thus allowing the use of a protocol that approximates the speed and robustness of PACTOR 2 without the high cost of a SCS modem.

One such system might be the BPO platform of software that is being developed by John Wiseman, G8BPO. John is very good at incorporating different systems by request into his software. BPO is already capable of operating PACTOR 1, 2, 3 and 4 (PACTOR 4 is not legal in the United States). He has a BBS type application and a Winmor interface together with WL2K client application which would allow NTSD to handle radio-email directly rather than having to use Target Stations and also be able to import it directly into the systems. At this point, however, only time will tell which course we might take in the future.

*Part Two: Installation of WinLink Classic and Operating the MBO*

### REWARD OFFERED!

Submitted by Ed Trump, AL7N

**A reward of 500 Microfarads is being offered for information leading to the arrest of Hop-a-Long Capacity.**

**This unrectified criminal escaped from a Weston Primary Cell where he had been clamped in ions awaiting the Gauss Chamber.**

**He is charged with the induction of an 18 turn coil named Milli Henry who was found choked and robbed of valuable joules. He is armed with a carbon rod and is a potential killer. If encountered, he may offer a series of resistance.**

**Capacity is also charged with driving a DC motor over a Wheatstone Bridge and refusing to let the band-pass.**

**He was last seen riding a kilocycle with his friend Eddy Current and playing a Harmonic.**

**The electromotive force spent the night searching for him in a magnetic field, where he appeared to have gone to earth. They had no success and believe he has returned Ohm via short circuit.**

## Early Michigan Traffic—Part Two

By Don Devendorf, W8EGI (SK)

*In Part One, Don described the equipment and difficulties involved with building and operating early Amateur Radio equipment. In Part Two, Don writes of his experiences handling traffic in the early to mid 1930s.*

Traffic was handled on an individual ad hoc basis in those days. Schedules were arranged at random, usually after a chance reply to a directional "CQ." The old log shows I maintained semi-regular skeds with W8BYD in Cleveland, W8GUC in Kalamazoo and W8DYH in Detroit. Of course, there were Trunk-Lines and Transcons for the big boys, not us. We all mailed our monthly reports to the SCM (*"ARRL Section Manager" today – Ed.*) even if we weren't that organized. Actual routing of messages was left to our own initiative or just inadvertence.

The bulk of our outstate traffic was relayed, that is if we could find someone in the right direction closer to destination. Delivery was always made by the last receiving station no matter where the addressee, since even then it wasn't considered proper to hold anything over 48 hours. I don't remember anyone ever using a "cancel and file" service message; maybe it wasn't invented yet. I suppose we felt an obligation to get the traffic through.

The landline wasn't used then, simply because universal telephone service was far in the future. Only a relatively few individuals had phones so almost all deliveries, even local, were made via that late great American institution, the Penny Postcard (a First Class letter cost twice as much). In those days there were 14,000 daily passenger trains carrying the mail to every city, town and village in the United States and Canada, and each train carried a Railway Post Office in which clerks sorted mail enroute. Half of all Federal employees were mailmen and they came twice a day.

For example; we receive an apparently urgent message at 8:00 AM for Hillsdale. No relay outlet. A glance at the time table shows New York Central #38 leaving at 9:05 for Fort Wayne. We quick type up the traffic on a penny postcard, jump on our bike, pedal down to the depot and hand it right to the clerk on the train, or just drop it in the mail slot on the side of the car if the door is already closed. The card will be postmarked "RPO NYC Train 38" and delivered in Hillsdale that same afternoon. All for 1 cent including the card. For extreme urgency, an extra 10-cent stamp would give it special delivery immediately upon receipt at the destination post office. Now the trains are gone, even the tracks are gone, and the mail's gone to; well, it isn't quite the same anymore.

In 1931 all the U.S. Hams were listed in a little green booklet, 35 cents from the Superintendent of Documents. A similar pink booklet carried all the commercial stations, including Rocky Point and all the ships at sea. 1932 saw a dramatic increase in

## Captain Robert Dollar and Eimac

By James Wades, WB8SIW

the ham population, partly from those caught in the Depression looking for something to do, cheap. With more stations coming on air and correspondingly more traffic being passed, the heretofore disorganized QSP operation tended to become more systematic and orderly.

My late 1931 ORS was soon followed by a RM (*"Route Manager" – roughly the equivalent of the "Net Manager" appointment today – Ed.*) appointment and, as an Eastern Michigan "liaison" station, I found myself maintaining regular skeds with Detroit and adjacent Section RMs. I remember especially W8CEU in Detroit, VE3JT in Toronto, W8EBY in Cleveland and W9AET in Fort Wayne. Then in late 1932 the Detroit Amateur Radio Association began urging us outstate stations to participate in their ongoing local CW operation, a net of sorts "around 3700." From that beginning grew the idea which would become QMN just a few years later.

The Detroit Amateur Radio Association was Michigan's largest and most prestigious radio club; only the most highly qualified CW operators were eligible for membership. In early 1935 they voted to sponsor or establish a statewide CW traffic system to be centered in Detroit and outstate ARRL Route Managers were invited to their first organizational meeting held during the DARA Spring Hamfest at the old Naval Armory on East Jefferson Avenue in Detroit. As I recall, three RMs from southern counties were Jim Robinson, W8DVC, Monroe; Harry Hartung, W8BMG, Battle Creek; and myself from Jackson.

A few minutes into the meeting, W8DVC (to paraphrase Emerson) fired the shot heard 'round the ham world: Contrary to present message traffic practice, Jim suggested we all operate as a controlled net on precisely the SAME frequency. Dead silence. I remember we all just stared at each other, but the logic was inescapable. Jim went on to add he'd already located a dependable source of good X-cut 1" square quartz crystals – a ham up at Dollar Bay (*in Michigan's Upper Peninsula – Ed.*) would grind any number to an exact frequency for, naturally, one dollar plus another dollar for the holder if needed.

Thus was born the first one-spot traffic net, Michigan QMN. After due deliberation, the spot frequency was set at 3650 kilocycles, crystals were ordered and we operated happily ever after until a DARA QMN member, FCC Inspector Ernie Peterkin, became suspicious and measured not 3650, but 3663. [We were still there until 2007 when the FCC restructured the 80-meter band].

*In the next issue of "QNI," Don tells the story of the origin of the "QN-Signals"*

An interesting aside to Don Devendorf's "Early Michigan Traffic" article involves Dollar Bay, Michigan. Many assume that Dollar Bay was named for Robert Dollar, as is the case with nearby Dollarville, Michigan. This isn't so. However, there is an interesting connection between Captain Robert Dollar and Amateur Radio, which is interesting in its own right.

Dollar was a wealthy "self-made" lumberman cut squarely from the cloth of the gilded age and quite well fitted to an O-Henry type story. Dollar started in the lumber business in Ontario and Northern Michigan, eventually moving his operation to the Western States where he started his own steamship line to support his lumbering operations in the Pacific Northwest. This line became a major player in International shipping during the 1920s. His ships were easily identified by the large "dollar sign" painted on their stacks.

Feeling that he was being taken advantage of by the Radio Corporation of America (RCA) and its well-known monopolistic practices under the leadership of David Sarnoff, Dollar worked with two young men named Ralph Heintz and Jack Kaufman to equip his ships with shortwave apparatus that wasn't under the control of the Radio Trust. These young men, who had a prior successful track record with the fledgling Boeing Corporation would eventually form "Globe Wireless," in which Dollar purchased a majority share.

Of course, the RCA Radio Trust wouldn't sell tubes to Dollar or Globe Wireless, so Heintz and Kaufman developed proprietary vacuum tube technology and began manufacturing their own tubes in-house. These vacuum tubes were eventually marketed for sale to radio amateurs using the trade name "Gammatron."

In the early '30s, two H & K employees designed a new vacuum tube called the HK-235, which provided a high level of efficiency at lower operating voltages than required by many types then manufactured by RCA and other firms. These two young men, named Bill Eitel (W6UF) and Jack McCollough (W6CHE) would go on to start their own vacuum tube manufacturing firm, which would come to be known as "Eimac."

So there you have it, there are only a few "degrees" of separation between the lumber camps of Northern Michigan, the origins of Silicon Valley and that Eimac vacuum tube that might very well be installed in your RF amplifier!

73, Jim Wades, WB8SIW

## Operating Tip

### Signal Reports for CW Traffic Handling

CW traffic handlers are routinely sent off-frequency to clear message traffic. This allows several messages to be exchanged simultaneously while business continues on the primary net frequency.

In many cases, the operators sent off-frequency can anticipate the quality of the circuit that exists between them. For example, on a Section CW Net, one might hear all other stations fine and one can anticipate a smooth traffic exchange. However, when conditions are questionable, or when multiple stations cover a wide range of distances, such as on Region Nets, Area Nets or wide coverage independent nets, conditions may indicate that the path between any two stations exchanging traffic are marginal. Furthermore, one can't always anticipate the conditions on the other end of the circuit. That operator receiving your traffic may be suffering from a high noise floor, interference from the next door neighbor's 80-inch big screen TV, a nearby power line-leak or the like. In such cases, it can be helpful to provide a signal report to the transmitting station. This allows the transmitting operator to make allowances for marginal conditions, interference, or other limiting factors at the receiving operator's location. For example consider this example in which WB8SIW is sent down 3-KHz to receive one routine message for Detroit from W8IHX:

NCS: SIW (responds with a "dit") IHX (responds with a "dit")

NCS: QNY DWN 3 DETROIT 1

Both stations now move down 3 KHz to pass the radiogram. In such cases, the station receiving the radiogram *always* calls the operator transmitting the radiogram. This allows the receiving operator to slightly modify the assigned frequency to avoid interference at his location. In this example, WB8SIW will call W8IHX:

SIW: W8IHX de WB8SIW K

IHX: de W8IHX QRV?

SIW: de WB8SIW QRK 3 QRV K

In this case, WB8SIW, the receiving operator indicated readability using the Q-Signal "QRK." For example, "QRK-3" indicates readability is "fair." In such a case, W8IHX may choose to increase spacing between characters in unusual names, unfamiliar words, or perhaps repeat a confusing word or group to ensure the radiogram is conveyed accurately. If WB8SIW had indicated a readability of "QRK-2," W8IHX might choose to slow down considerably.

Using "QRK-1" through "QRK-5," one can indicate a range of readability. For example:

- QRK-1 = unreadable
- QRK-2 = poor (difficult)
- QRK-3 = fair
- QRK-4 = good
- QRK-5 = excellent

It should be noted that readability is NOT the same as signal strength. For example, one may have a solid signal on a circuit but nonetheless suffer from heavy interference from high band occupancy or atmospheric from nearby thunderstorms. This is why the Q-Signal "QSA" describes "audibility" whereas "QRK" describes readability. It is the latter characteristic, which is important in traffic work.

Another technique, which is useful on CW nets involves the QN-Signal "QNV." When the Net Control transmits "QNV" when dispatching two stations off-frequency to clear a radiogram, he is indicating that both stations should establish contact on the net frequency first to determine readability before moving to an assigned adjacent channel for the traffic exchange. For example, let's imagine that conditions are poor and the NCS is sending WB8SIW and W8IHX down 3 KHz to clear the message traffic. A typical exchange might be:

NCS: IHX (responds with a "dit")

NCS: QNV WB8SIW DWN 3 DETROIT 1

IHX: WB8SIW de W8IHX HW?

SIW: QRK 3 DWN 3

IHX: "dit"

If WB8SIW is on the ball, he may anticipate the process and provide a report to W8IHX before being called in order to speed things up a bit. Either way, the idea is to ensure the two stations can hear each other before moving off frequency. If contact is unsuccessful on net frequency, this provides the Net Control with an opportunity to quickly arrange a suitable relay between the two points.

#### *A Distorted Signal*

A station's signal strength may be fine, but unreadable for other reasons. For example, antenna problems, RF induced on keying circuits, or other difficulties can result in distorted keying or an intermittent signal. This happens more than one might realize despite advances in commercial transceiver design.

In such cases, the Q-Signal "QSD" ("Your keying is defective (distorted)) can be used to indicate keying problems. This alerts the other operator to technical problems that preclude accurate copy of a radiogram or reliable communications within a net configuration.

#### *Summary:*

The mark of a good CW operator is the ability to communicate concise information with a minimum of language. Ensuring the other operator is aware of one's receiving conditions ensures the radiogram is transmitted in a manner appropriate to conditions the first time, thereby saving time and promoting net efficiency. A mastery of the proper use of Q-Signals

and QN-Signals should be the goal of every competent CW operator.

## A Micamold Transmitter

By James Wades, WB8SIW

Shortly after the close of World War Two, a variety of small manufacturers entered the Amateur Radio market, hoping to capitalize on the many returning GIs looking for a hobby. During the early phases of the war, the US government had sent representatives to the homes of radio amateurs with ready cash to buy good quality commercially manufactured receivers and transmitters, meters, and similar components for use in the war effort. With advances in technology and a shortage of pre-war equipment and parts, a boom in sales was expected after the war.

One such manufacturer was *Micamold*, a well known manufacturer of capacitors. Today, Micamold is remembered primarily for its infamous paper capacitors, which look like molded Mica units, but which are, in reality, just another paper cap likely to fail in a vintage radio. What Micamold is not known for is a rather rare little transmitter kit it sold for a brief time in 1947 and '48. This is the seldom-seen Micamold XTR-1.

The circuit design of the XTR-1 is a rather conventional arrangement: a 6AG7 crystal oscillator stage followed by a 6L6 power amplifier stage. High voltage B+ is provided by a conventional capacitor-input power supply using a type 83 mercury vapor rectifier tube, which glows a beautiful blue color when the key is closed. The transformer, filter capacitor can and tubes are all mounted on an open chassis arrangement similar to that of the familiar Ameco AC-1 novice transmitter. One of the unique features of this little transmitter is the fact that the oscillator stage runs continuously. Cathode Keying is accomplished at the amplifier stage. This is definitely not a QSK rig!



Type 83 Rectifier

The Micamold XTR-1 was actually a fairly good quality kit. Yet, like many Amateur Radio products of the era, it was a marketing flop. In reality, the low to moderate price market for ham gear never materialized after the war. This was likely due to the ready availability of surplus equipment like the ubiquitous "command sets." Furthermore, the United States emerged from the war with few economic challengers, massive excess industrial capacity, and status as one of the World's few creditor nations. Prosperity was just around the corner as our Nation was poised for excellent wage growth and wealth creation. In such an environment, only those manufacturers which offered a good quality, highly innovative product would survive this era, and the simple little XTR-1 could not compete directly with the wide array of very well made surplus gear at the low-end price range and innovative new products at the high-end price range. Today, only five are known to exist.

I recently had the good fortune to obtain a Micamold XTR-1. Of

course, it was dead on arrival. After obtaining it, I set it aside on a shelf for over a year while life got in the way of my plans. When I finally had some time to restore it this past summer, the garage workshop was simply too hot to use. Eventually, on a cold, wet October Sunday, I decided to tackle the project. Over a period of three hours, I located and replaced seven defective capacitors, repaired a broken turn in the oscillator coil, removed a short across the cathode of the 6L6 VT socket, and corrected multiple cold solder joints. Whoever built this little kit years ago was NOT an experienced technician! It seems likely the transmitter was still in good condition simply because it was probably never used!

Once all of the likely technical problems were identified and repaired, it was time to power up the little unit on the bench. The transmitter was plugged into the Variac, and the line voltage was brought up slowly to 110-VAC. No smoke was present. After allowing the Mercury Vapor rectifier tube to come up to temperature after years of sitting idle, B+ was applied. A nice, clean signal was heard in the monitor at 7026-kHz, the frequency of the only FT-243 crystal I had available.

The following day, I tested the little transmitter on 40-meter CW. After being unable to raise any of the high-speed boys on 7026 with my little 20-watt signal, I found a crystal for 7055 and immediately worked several SKCC operators. The unit is a bit cumbersome to use, as one has to turn off the plate voltage to kill the oscillator stage, which "fades away" over a period of a second or two after transmissions when switching to receive. The XTR-1 is not an equal of a Johnson Viking One nor even a Lysco 600!

After initial testing, a small "station control" unit was built up. This unit consists of a keying unit, which isolates the high voltage on the Cathode circuit and a pair of transmit receive relays, which not only switch the antenna, but which also open the B+ supply to quiet the oscillator upon transferring the antenna to the receiver. Fortunately, Micamold provided two binding posts on the rear apron of the transmitter specifically for this purpose.



The Micamold XTR-1 is a fun and quirky little transmitter. It's probably not the best choice for full QSK traffic work, but it does make a fun addition to a "vintage shack." It serves as a reminder of

a time when one could enjoy ham radio using simple, inexpensive gear. With its exposed high voltage terminals on the back and its ungrounded two-prong line cord, it also serves as a reminder of a time when lawyers were much less common!



**QNI  
The NTS  
Newsletter**

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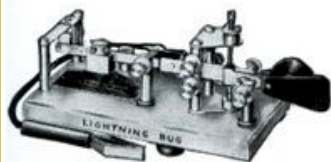
Editor: James Wades  
(WB8SIW)  
Email: jameswades@gmail.com  
Tel: 269-548-8219

Assistant Editor: Kate Hutton  
(K6HTN)  
Email: katehutton@gmail.com

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teur Radio Community.



**The Hit and Bounce Net  
by James Wades, WB8SIW**

The name may sound a bit unusual, but the *Hit and Bounce Net* is a very professionally run independent net operating daily on 40-meter CW. Many of its members are also active NTS CW traffic operators at all levels. In a way, HBN serves as an unofficial NTS cycle serving much of the United States and Canada East of the Rocky Mountains.

The procedures used on HBN are typical of those used on most NTS CW Nets. Those who are familiar with the functions of a section CW net should find HBN easy to follow.

HBN facilitates the listing of radiogram traffic for transfer to many Section Nets. Most operators list their traffic by State as opposed to area. Because HBN meets during the morning hours, it is an ideal alternative for moving time sensitive traffic, which can't wait until the following afternoon or

evening's Cycle 2 or Cycle 4 Nets. It is also a good solution for "clearing the hook" if one is holding outbound traffic at times when he will be unavailable to operate during the late afternoon or evening hours.

HBN features two net sessions. The first session is the slow-speed net, which meets at 7:30-AM EST (1230Z). The fast session meets at 8:30-AM EST (1330Z). Both nets meet on or about 7114-kHz. If you are looking for a professionally run net which offers a convenient day-time option for moving traffic, HBN may be just the ticket.

More information can be found at: <http://hitandbounce.net/>

One may also contact the HBN Net Manager:

MARK W RAPPAPORT,  
W2EAG  
104 PORTSIDE LANE  
NEW BERN, NC 28562  
nccwman@suddenlink.net

**Recipe for Preserving Children**

With the warm spring days approaching, your Editor thought it might be nice to offer this little recipe for preserving children. This handwritten "recipe" was found tucked inside an old book from the 1930s and it seemed appropriate not only to the past, but also to an era in which so many children spend beautiful summer afternoons hiding indoors before a glowing computer or television monitor.

***Recipe for Preserving Children...by  
Cathy Akins***

- 1 Large grassy field
- 6 Children
- 3 Small dogs

- **Narrow strip of brook with pebbles**
- **Hot Sun**
- **Deep Blue Sky**

**Mix the children with the dogs and empty into field stirring continuously. Sprinkle field with flowers, pour the brook gently over the pebbles. Cover all with the deep blue sky and bake in the hot sun.**

**When Children are well browned, they may be removed. Will be found right for setting away to cool in bath tub.**