K9YA Telegraph

Robert F. Heytow Memorial Radio Club

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Straight Key or Not Straight Key

That is the Question

Philip Cala-Lazar, K9PL

Fight for your opinions, but do not believe that they contain the whole truth, or the only truth. Charles A. Dana (1819-1897) American journalist, author, government official.*

I've discussed some perennial Morse group questions in the past including the March 2005 article, "Jump In! The Water's Fine! *Hesitation and the Art of Radiotelegraphy*."

For the year 2010, as years in the past, and years to come, here is another question that is, was, and will be repeatedly asked in Morse groups: "I'm new to CW, should I start learning code with a straight key or paddle and electronic keyer?" It appears too many aspiring Morse operators are setting their learning hurdles too high.

"I'm new to CW…"

After 30-plus years as a CW operator, that question is rather mystifying as it requires a great deal more finesse to ably use a paddle and keyer (this also applies to the bug), especially if adding iambic keying to the mix, and before the fundamentals of code copying and sending are learned.

For me it's a matter of crawling before walking, i.e., able to make good, man-made code before skipping ahead to the machine-generated variety.

"…the 'longest way 'round the sweetest way home…'" Eric Sloane in *America Yesterday*, 1956.

A straight key is the best way to learn the sound and the *feel* of correctly made code elements. The straight key offers a purity of form not available with paddle and keyer. The paddle/keyer combination, no matter how good, introduces an intermediary, an additional factor between operator and rig. Of course, in the hands of an experienced operator the paddle/keyer combination can create perfect code, the operative being an *experienced* operator, not someone just learning the telegraphic art.

This has been the conventional wisdom for many decades as embodied by William Pierpont, NØHFF, in his *The Art and Skill of Radio-Telegraphy*. In chapter nine ("Sending and the 'Straight' Key") of that book Pierpont concurs, but adds, "…some teachers today recommend that, if possible, the beginner start out sending preferably with a keyboard (or code-programmed computer)."

Yes, those devices produce nonpareil code with every keystroke, so useful for learning the sound of exact elements, but cumbersome and of little use to QRP ops in the field and to minimalists everywhere. So much better to "bite the bullet" and master the time-proven straight key. Unlike other sending devices the straight key is light, simple, robust, unlikely to go out of adjustment and requires no external power source. No key at all? The same skill-set applies to two wires with bared ends and the microphone PTT.

In addition to Pierpont's book, any of the many editions of the ARRL's *Learning the Radiotelegraph Code* provides time-proven information for adjusting and using the straight key. According to the eighth edition's (1957) foreword by ARRL

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Superheterodyne Receivers

Part 2 of 2

Paul W. Ross, W3FIS

Amrad Neutrodyne Receiver (1920s)

To recap some of the ideas presented in my first article on superheterodyne receivers.

- Selectivity is moved from "front end" with its consequent stability and implementation problems to the IF amplifier system.
- Tuning and tracking problems for multiple tuned circuits can be reduced.
- We may have a more complex, and consequently more costly implementation.

However, like many great ideas, things are not as simple as they seem. Let's take a really simplistic example.

Consider an input signal at 1,000 kHz (1 MHz). Set the local oscillator to 1,100 kHz. The difference (IF frequency) is then 100 kHz. Amplify and detect this signal, and we are home free? Not so quick. There is one other frequency our system will detect. It is the local oscillator plus the IF frequency. In this case, it is going to be 1,200 kHz. Oops! This is known as the "image" frequency.

"Oops!"

We can get rid of that with sufficient frequency selectivity in the "front end." We are at cross-purposes here. A low IF frequency is desired so we can have our nice narrow selectivity in the IF amplifier. However, if we have a low IF frequency, we are going to have a severe image problem. How do we crack this nut?

At least one implementation is to have a regenerative front end, like our old friend the regenerative receiver. This is going to be difficult to design, operate and implement. Let's put this aside as one more in the bone yard of things that don't quite work right. I have seen that in some circuits for early Armstrong superheterodyne receivers.

The answer to this problem of images is to take our superheterodyne principle to a higher level. Make the initial IF frequency rather high, pushing the image frequency well out of the pass band of the input stage. Now, do a second superheterodyne conversion, but this time to our desired lower frequency. This is the classic "dual conversion" superheterodyne receiver we see in many amateur radio and commercial receivers. In fact, if we make the initial IF frequency very high, we can practically eliminate any tuning of the input stage, making it nothing more than a simple low-pass filter cutting off at the highest frequency we wish to receive.

Another problem lurking in the woodwork is the simple issue of the choice of an IF frequency itself. Since the IF amplifier is tuned to a specific frequency, it can receive signals at that frequency! The answer to this, other than careful design, has been to more or less standardize on specific IF frequencies. For lower frequencies, 455 kHz is the most common, 10.7 MHz is reserved for FM receivers, and various higher frequencies are used for television IF strips. Everybody then agrees not to transmit on those frequencies.

If we go back to the early days of vacuum tube designs, vacuum tubes were an expensive commodity; the increase in complexity of the superheterodyne design was going to be a problem. In fact, through

Hallicrafters S-14 SKY-CHIEF Superhet (1930s)

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the 1920s, the Neutrodyne receiver (neutralized multiple RF stages) was the dominant design. With the development of multi-electrode tubes, such as the tetrode and pentode, the groundwork was laid for the implementation of a combined oscillator-mixer, or converter stage, and stable IF amplifiers. By the 1930s, the superheterodyne had replaced TRF designs (though I did have an old table radio in the 1950s that was a TRF design using permeability tuning and a number of multi-function tubes). The end result was the "All American Five" design with a converter, single IF stage, detector/AGC/first audio, audio output, and rectifier. This design held sway until the advent of the transistor in the 1960s.

Modern technology has made the dual-conversion superheterodyne receiver the norm. We see:

- Nice mixer ICs that can include an oscillator circuit component, if we desire.
- Various IF filters in solid state form–"SAW" or Surface-Acoustic Wave ceramic resonators. This does not preclude the partial use of conventional IF transformers or varieties of quartz crystal multi-pole filters.
- Digital local oscillator implementations. This means we can use a single temperature regulated crystal oscillator for excellent stability. This is especially important with the increase in the popularity of digital modes.

Now, what about amateur radio? Today, most of us buy our receivers "ready made." Ham radio operators are notoriously cheap and great scroungers! Two of the more interesting alternate superheterodyne designs I've run into over the years were:

"…notoriously cheap…"

The "Regenodyne." The Regenodyne receiver is designed in the "more bang for a buck" category. Instead of a variable local oscillator, it uses a series of fixed crystal oscillators. The IF is then tunable over the value of the steps between the fixed oscillators, or the ranges of the HF amateur bands, or band segments. In addition, the IF is a regenerative receiver! This means that all is needed is a converter at front, consisting of a mixer and oscillator, and the regenerative detector, followed by an appropriate audio amplifier. This substantially cuts down the component count and complexity, with the only possible cost being that of finding appropriate crystals for the oscillator. I haven't seen a solid-state implementation of the circuit, as it seems to be the darling of the vacuum tube crowd.

Crosley "All American Five"

The other receiver of interest is one that appeared in various forms in the ARRL Handbook from time to time. In this case, the variable local oscillator is planted between the 40- and 80-meter amateur frequencies. This leads to a 1,700 kHz IF frequency. Selectivity was obtained through either a regenerative IF, or crystal lattice filter at 1,700 kHz. The "front end" preselector is simply a circuit that would tune either 80-meters or 40-meters. Who said you had to worry about image frequencies? Since the 40- and 80- meter bands are about 2:1, all you need is a capacitor with a 4:1 ratio. A dual-tuning capacitor and band-pass filter provides sufficient selectivity as an alternative to a single tuned circuit.

Who said superheterodyne receivers had to be complex? ■

***WAR BENEATH THE WAVES: A True Story of Courage and Leadership Aboard a World War II Submarine:* A new book by Don Keith, N4KC.**

In November 1943, Charlie Rush, a young officer, drew duty on USS *Billfish*, a submarine in the Pacific. While on war patrol in the Makassar Strait off Borneo, the Japanese spotted the sub and launched such a vicious depth charge attack that no vessel could possibly survive.

It was sixty years later before this remarkable story became known, and even then only after Charlie Rush initiated action to get recognition for his shipmates for what they did that night.

To order a copy of the book, read an excerpt, visit www.donkeith.com.

Oops!

A photo on page 5 of the August 2010 issue was incorrectly captioned as Reginald Fessenden. That radio pioneer's image inexplicably went astray. Depicted instead was radio pioneer Guglielmo Marconi. Our apologies.

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Sounds Like A Special Event to Me

Bob Cashdollar, NR8U
Central Ohio Operators Klub Extra-Novice

The "Clean-Up Crew" with Statue of Johnny Clem

"Sounds like a special event to me," Francis "Fritz" Tender, WD8E, uttered those words to me after we had attended an annual luncheon given by the Licking County Historical Society in our hometown of Newark, Ohio. The luncheon, in late June of 2006, was in honor of General John H. Clem who is a local legend.

Clem is famous for being the youngest solder in the Civil War. He ran away from home and joined a Michigan regiment of the Union Army as it passed through Newark in 1861. A local Licking County regiment that had been formed and departed prior to the Michigan group turned him down because of his age. He was 10 years old at the time. Clem participated in the early days of the war as a drummer boy and was captured and then exchanged in a prisoner swap with the Confederacy. Later in the war Clem came to the attention of General Ulysses S. Grant and was promoted to sergeant, becoming the youngest non-commissioned officer in the United States Army at age 12. Grant had him attached to his staff for the duration of the war.

After the war, Clem returned to the Newark area and graduated from the local high school. Later, unable to pass the entrance requirements of West Point he sought and was granted an appointment as a second lieutenant by then President Grant. He served the rest of his army career in the Quartermaster Corps, eventually became a major general and head of the Quartermaster Corps until his retirement in 1915. General Clem was the last active duty Civil War soldier to leave the United States Army.

Fritz and I discussed the possibility of running a special event honoring Clem after we attended the luncheon. Fritz, at the time, was president of the Central Ohio Operators Klub Extra-Novice and since I was also a member of "COOKEN" we felt a special event would be a great club activity.

Because of the lead-time of the special events listings in *QST* we had to make some quick decisions. Clem's birthday is August 13, so it was decided we would operate on a Saturday closest to his birthday. An email was quickly dispatched to *QST* and we were listed in the August 2006 *QST*.

We decided to operate "Field Day" style and looked around for a suitable location. The site of the luncheon we attended was a house built in Newark around 1851 and it along with several other historic local houses are located in a park in the downtown area of Newark. The houses are owned by the Licking County Historical Society and operated as public museums. Scouting the location we felt we had plenty of space for some simple antennas and the location was open to the public. It was decided to approach the board of directors of the historical society and ask permission to use the location.

> *"amateur radio is not CB"*

Over the years I have been involved in giving presentations to groups who have no knowledge of amateur radio. There are several hurdles to overcome in the public's mind about amateur radio.

Foremost, amateur radio is NOT CB radio. In order to reinforce this point you have to patiently explain what amateur radio is and is not. Amateurs should understand that outside the group called hams, the public at large has a fuzzy picture, at best, of what we do as amateur radio operators. You have to explain in non-technical terms and without "Hamspeak" what we find so fascinating about being a ham.

Another hurdle to overcome, in this case, was to reassure the board of directors that we would not cause any damage to their historic houses and would respect their location.

Fritz and I attended the June Licking County Historical Society's board of directors meeting and gave a presentation on amateur radio in general and special event operations in particular. We had handouts and examples of other special event station

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certificates to give members of the board who were in attendance. It worked for us and we were granted permission to use the grounds and given access to one of the historic houses for electricity and use of the facilities.

We had decided on a certificate offering as part of the special event, but neither Fritz nor I had any experience in creating a certificate. In a casual conversation Fritz had with his brother, John Tender, W3JTT, he mentioned our operation and the need to create a certificate. John volunteered to see what could be done in the way of creating a suitable certificate. Since John lives in the Coraopolis, Pa. area, the emails were alive between us and John came up with an outstanding certificate which incorporated all our goals for the special event.

It was now early July and we had a location and a certificate in hand. It was now time to determine what kind of radios and antennas we would use to put club station W8TNX on the air as the Johnny Clem Special Event.

We returned to the park where the LCHS houses were located and did a more intense site survey. We determined the porch of the house we were given access to, built in 1851 and looking like something out of *Gone With the Wind*, was selected as the station location for our multi-band operation because of the trees available to string a dipole. One side of the house would also serve as a station location because it adjoins an open space ideal for "planting" a vertical and sowing a few radials for our dedicated 40-meter operation.

The day of our special event arrived and turned out to be a bright and sunny August day. Fritz and I arrived with the radios and antennas and the custodian of the house we were going to use followed us into the parking lot. Other members of COOKEN, Tom Mauller, KC8CSQ (W8TNI); Steve Katz, N8WL; Jack Guilkey, K8CTO (K8EM); and John Mellet, W8NM, trickled into the parking lot and after finishing our coffee and hellos we set to work putting up the antennas and setting up the two operating positions.

We kicked off the operation at about 9:00 am local time and started to make contacts with both the 40-meter station and the multi-band position. Everything went fine until about 2:00 pm when the band began to fill with all kinds of noise and interference. We plugged on for about another hour and then called it quits. Altogether we made quite a few contacts and had some interesting QSOs with stations all around the United States. One of the nice things about special event stations is telling other people about what your event is celebrating. A ham in Virginia I spoke with knew about as much as I did about the Johnny Clem story and we had an extended QSO describing the setting we were operating from.

A special event operation doesn't stop when you pack up the radios and take down the antennas. Over the next several weeks, envelopes started to pile up at our mail address for W8TNX. We decided to wait for about a month or so before sending out any certificates. This would give us time to get a handle on just how many certificates we would need to finish off the operation.

Jack Guilkey, K8EM, on the Porch of Buckingham House in Newark, Ohio

One of the first things we discovered was that there are a lot of hams out there who have never heard of UTC time. Much of our time was spent translating their local time into the UTC time we used in our logging. Another problem we discovered was that a lot of people don't read the fine print at the end of the special event listings in *QST*.

> *"…never heard of UTC time."*

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send a ***9X12 SELF-ADDRESSED, STAMPED ENVELOPE*** [my emphasis] to the address listed in the announcement… etc.

There is nothing worse from a special event station point of view than to have to fold a 9x12 certificate so that it fits into a business size envelope. Aside from the above-mentioned items, it really was a positive experience for the W8TNX crew.

It was such a positive experience that a second Johnny Clem Special Event was scheduled for August of 2007. This time around the realization of the operation went like clockwork. Because of our operation the first time, a simple phone call to the president of the Licking County Historical Society was all that was needed to secure the site again. We now had previous experience operating from the site so that would not be a problem. The clock got a little sprung when a computer glitch at League headquarters left us out of

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What I Remember About That Day

Hank Kohl, K8DD (ex KN3DCB)

Hank Kohl, K8DD
February 1958

The moment I *really* knew I was a ham was a cold day in February 1958. Actually I knew I was a ham–there had not been a NOF (notice of failure) letter in the four or five weeks after my junior high school buddy, Jim, and I took our written test in his basement on Christmas vacation. Since all the paperwork went in the mail to the FCC in the same envelope we were sure our Novice tickets would arrive on the same day and be consecutive calls.

I had quit running the quarter-mile home from school to see if "that" envelope had come in the mail, and I didn't notice anything different about my mother when I got home from school that freezing day in February. Just a couple pieces of mail sitting on my little desk in front of the Hallicrafters receiver and the homebrew 6AG7 transmitter with a 3724 crystal plugged in it. There, on the bottom of the mail, was the little white envelope with a window, from the Federal Communications Commission, that had my name on it! Holy Cow–that was about the strongest language that a 14 year old could use in 1958– there it was–I was a real ham radio amateur! Very, very carefully I sliced the top of the envelope open (I still have that envelope!) and read the license, FCC Form 660, that said right there in black and white and hand-typed, that I was KN3DCB!

The next thing was to call my buddy Jim to see what his call was; it just had to be either KN3DCA or KN3DCC. Oops, he didn't get a little white envelope with a window from the FCC. We had to wait until the next day to find out he got KN3DCC. Since we had decided we would be the first QSO for each other, the next day, me with my 3724 crystal and Jim with a 3735 crystal, both with the yellow Texas International sticker on them, got on the air. That first QSO, the logbook shows 2/15/58 at 6:26 PM (EST, of course), lasted, believe it or not, until 8:15 PM. In that hour and three-quarters I don't know if we really got much more exchanged than the signal reports at, most likely, a lot less than 5-words per minute and about two gallons of perspiration every 10 minutes!

There I was, trying to copy on paper what Jim was sending, my mother looking over my shoulder saying, "What is he saying? I can't read your writing!" (Neither could I!), and my dad shaking his head most likely thinking "It will never work!" My mother did end up learning one bit of Morse code. Eight dits–Error. Boy, I sent a lot of them.

Things got better after that, I found that the following QSOs got better and my code speed came up to 5-WPM in a couple of days, and by the end of the page, three days of being a Novice, I had two other stations besides Jim in the log. Hey, logging every CQ took a few lines!

And my mother did notice I was not tapping out eight dits nearly as often after a few days. That was 52 years ago and the QSOs are still coming. And well over 70% are CW!

"I knew that God put me on this earth to be on the radio." Ed Bradley

"Me too!" ■

Ham Quips

DICK SYLVAN, W9CBT

A QSO A DAY KEEPS THE BLUES AWAY

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Another FB K9YA Field Day

A Motto or Two to Help Us Remember

Mike Dinelli, N9BOR

Field Day reminds me of the unofficial motto of the US Postal Service: *Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds.* For Team K9YA, that would be a good starting point for our unofficial Field Day motto. Perhaps we could exchange snow for *lightning* and end with *swarms of mosquitoes*.

The Robert F. Heytow Memorial Radio Club was founded late in 2002. Since 2003, we have operated every Field Day. In our eight field days, we enjoyed only one that didn't require us to QRT because of lightning.

In 2007 we made 1,234 contacts in the full 24-hours. The good news for 2010 is we bested 2007 with 1,263 QSOs, in less than 23-hours. We can't help but speculate what could have been accomplished in the full 24-hours. Oh, the humanity! Field Day isn't only about the numbers, but challenging ourselves to improve our score is one measure of success.

Our Field Day setting is Camp Lakota in Woodstock, Illinois. It's just a few miles south of the Wisconsin border and owned by the Northwest Suburban Council of the Boy Scouts of America. It's 300 wooded acres and always populated by curious Scouts. Camp Lakota's ranger, Matt Petrik, a ham, stops by often to see how we're doing.

> *"The mosquitoes were angry that day…"*

We setup under a permanent structure, open on all four sides and built on a concrete pad. We erect a portable screen room underneath in an attempt to control mosquitoes. Unfortunately, these miniature flying man eaters find their way inside. Nothing would deter them and they were relentless. *Neither screen room nor bug spray nor eight citronella candles stays these mosquitoes from the swift completion of their appointed rounds.*

Steve, N9WAT, Taking a Well Deserved Rest

John, AAØBP, (L) and Chuck, NIØC, (R)

Our 2010 team of All Stars consists of Chuck Guenther, NIØC; John Guenther, AAØBP; Steve Wolfcale, N9WAT; and me. Art Steinke, WB9JKZ, provided us with the tower and Philip Cala-Lazar, K9PL, assisted with planning. We work well together and completed setup in three and a half hours. We enlist the help of eager Boy Scouts to hoist our tower.

We listen for awhile to get a feel of the bands and are pleasantly surprised to hear loud signals on 10-meters. However after the flag drops, we find 10-meters quiet and decide to begin calling CQ on the 15-meter band.

We take turns operating, meeting visitors, talking to reporters and swatting bugs, but we're always having fun. At night we decide to tough it out by sleeping in chairs rather than setting up a tent. The ground was soaked from the storm and our sleeping bags weren't certified as flotation devices. We live to see another day, in spite of the overnight sorties by attack mosquitoes. If I may paraphrase George Costanza from *Seinfeld*, *The mosquitoes were angry that day my friends, like an old man trying to return soup at a deli.*

Throughout the event we make 231 contacts (18%) on 15-meters, 461 (37%) on 20-meters, 346 (27%) on 40-meters and 225 (18%) on 80-meters. We were expecting bigger numbers on 40- and 80-meters, but made up for it on 20-meters.

Yes, Field Day is an emergency preparedness exercise, but it's also an excuse to drop everything and have fun. ■

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the August *QST*. It was decided to involve some students from a local elementary school to help design our certificate.

Again, we had to patiently explain to the school principal what we were doing and all about amateur radio. She finally agreed to have the art teacher use the certificate as a project for her art students. The result was two students who produced two different designs for a certificate. It was decided to use both designs and have two different certificates. John, W3JTT, was again enlisted by email to help with one of the certificates. After the operation of the special event in August of 2007, we alternated certificates sent to stations requesting a certificate.

The August meeting of COOKEN was rescheduled to coincide with the Johnny Clem Special Event Operation. The event and meeting turned into a sort of picnic and radio operation. Due to the large supply of Buffalo chicken wings by 2007 COOKEN President Eldon Peterson, W5UHQ, the radios' controls got a little sticky after the club meeting. This time around contacts were down. Several explanations for this may have to do with the fact we were not listed in *QST* this second time and the general poor conditions of the ham bands.

Since the Johnny Clem operations COOKEN has done several other special events. We'll leave the details of those operations for another time. ■

2AZK, 2ABT & 2CUQ

In last month's article, "Talking with Radio Rescue's Bob Marx, 2AZK," Bob recalled two amateur radio operators: George Freisinger, 2ABT, and a young man he remembered only as 2CUQ. A bit of page turning in the *Department of Commerce, Bureau of Navigation, Radio Service, Amateur Radio Stations of the United States, Edition June 30, 1923*, revealed these details:

2ABT George G. C. Freisinger 219 W. Eighty-First St. New York, N.Y. 300 watts

2CUQ William C. K. Irwin 540 W. One Hundred and thirty-sixth St., New York, N.Y. 16 watts

For a contemporary photo of Bob Marx see *Boys' Life*, August 1927

Continued - Straight Key from Page 1

General Manager A.L. Budlong, W1BUD,† the book was first conceived to supplement the U.S. military's WWII, and then Cold War efforts to train thousands of radio operators. Through its many iterations it fulfilled its primary objective in addition to enlightening succeeding generations of hams.

Consider: If the U.S. military, responsible for training tens of thousands of radio operators in times of peace and war, thought it appropriate to start them off with some sort of automated key, it would have done so.

No matter your decision for starting out, get a straight key, you will want one for those times the paddle and bug are too fast–when you want to QRS to emphasize a word or numeral and when helping a slower op (as all good CW ops do).

I keep two keys—a Bencher BY-1 and one of several (Speed-X, J-37, J-38 and Signal Electric) straight keys— plugged into my main rig. Sometimes swapping out straight keys in mid-QSO. There's no need to spend a load of money on a key to learn on or one that eventually becomes your shack's old friend. Just be sure to purchase a sturdy, well-constructed key that offers a full range of adjustments, some very cheap keys do not offer lateral, trunnion, adjustment.

*Dana, as Assistant Secretary of War, inadvertently earned this footnote in the telegraphic history of the American Civil War. From David Homer Bates' book *Lincoln in the Telegraph Office* (The Century Co., New York, 1907):

Dana's reports by telegraph were generally full, and the cipher-operators during that period had occasion to consult the dictionary many times for the meaning of words new and strange to our ears. It was an education for us, particularly when errors occurred in transmission and words like "truculent" and "hibernating" had to be dug out of telegraphic chaos.

†Each edition's foreword was attributed to the then current general manager.

The Art and Skill of Radio-Telegraphy:
http://www.qsl.net/n9bor/n0hff.htm

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