Monroe County Radio Communications Association

The Hertzian Herald

SPECIAL SERVICE CLUB ARRL

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http://mcrca.org/
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www.facebook.com/groups/1643856795878368/

D Fritz Bitz:

Winter is almost over and contest season is just starting. There have been a few good contests already this year and conditions for most of them were pretty descent. I was only able to participate in a couple but I did pretty well. Montana was good and Wisconsin was better but I'm looking forward to the Michigan QSO party next month. Hope to work you there.

Hamfest season is also just getting started with the TMRA hamfest this weekend. I am trying a couple of things this year in an effort to increase attendance at the Monroe hamfest trying to get over a thousand attendees for the first time in several years. Obviously, Covid hit us, and everyone, kind of hard and we have spent the past couple of years rebounding from that and are trying to do some things to get better participation. DX Engineering has donated some door prizes and Ham radio outlet has helped us with the main prize and some other prizes so if you order anything from either one please thank them for their support of the MCRCA hamfest.

Wow! Has Dale, WA8EFK, done a great job with the programs or what! There has been something for everyone every month. The program on the Starlink antenna system, although a little technical, was very interesting and informative. Keep it coming Dale.

With both the hamfest and field day coming up in June we will be very busy for a couple of weeks. Please try to set aside a little time Saturday morning before the hamfest for setup and Sunday afternoon for cleanup. If you have never participated in Field Day, please consider stopping by to operate a radio for a while. Remember, even a Tech can participate in radio operation on Field Day so you can get free HF experience to prepare you for a license upgrade. I'll have more on both of those in the next issues. See you at the meeting,

Until then, 73

See you in the log

Don Fritz, N8BZN

President

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Inside This Issue

MCRCA Meeting Minutes for February 20, 2025

Meeting called to order at 7:30 pm, by Don N8BZN.
Pledge of Allegiance
Introductions: No new members, upgrades and guests.

MINUTES: Motion by Mike N8KUF, supported by Paul W8PI, to approve as written in the Herald. Approved.

TREASURER REPORT: Motion by Paul W8PI, supported by Wes KC8SKP, to approve the treasurer's report as passed out to the membership. Approved.

DX REPORT: Tom KG8P, We are at the height of the sun flux cycle. 6m trans equatorial should be around March. Cocos Keeling Island was never heard. Christmas Island, VK9XU is now QRT. Last QSO was on March 4th. QSL cards through the bureau still functioning but less cards.

CONTESTING: Paul W8PI, SC and NC QSO Parties Feb 23 and 24th. ARRL INTL DX SSB contest mar. 1st & 2nd. OK, WI, & VA QSO parties Mar 9th and Mar 16th. CQ WW WPX SSB Mar 29 thru 30th.

TESTING: Paul - Next session - Sat. Apr. 19, 2025. **Appointments Preferred - FRN and email req'd**

CLASSES: Sat. Apr. 12, 2025 contact Don N8BZN – **Technician class -** No Feb class, no interest. Going to cut testing down to 2 or 3 Tech and 1 General class per year, not enough interest.

ARPSC: James WD8NWF, March 1st hosting the Ohio Mesh group at EMD, registration on web site. Skywarn class at Frenchtown, check ARPSC web site for more info. Skywarn drill coming up, see Lance's notes in Herald.

RRRA: Mike N8KUF, Dues run from May 1st to May 1st Annual meeting will be held Saturday, May 3rd. Status of repeaters, all fine, two satellites are iffy.

OLD BUSINESS: Club T-shirts, Barb NM8I

NEW BUSINESS: Livonia Swap Feb. 22nd. And TMRA March 16th. Bus trip to Dayton contact ARROW Communication Association.

DOOR PRIZE DRAWING: Tony KE8NSU, and Ron KE8OSX

50/50: Delmer Taylor, donated to scholarship.

ANNOUNCEMENTS: Anyone having articles for the Hertzian Herald please email them to Fred K8EBI

PROGRAM: Discussion on the advantages and disadvantages Vertical HF antenna or a Horizontal HF antenna.

ADJOURNED: 8:16 pm

ATTENDANCE: 17

KE8PUN Aaron	WA8EFK Dale	N8BZN Don	K8EBI Fred
KB8OSU George	WD8NWF James	KJ8H Keith	N8KUF Mike
KA8PQH Neil	W8PI Paul	KE8OSX Ron	N8NYP Terry
KG8P Tom	KE8NSU Tony	KC8SKP Wes	KD8ZUI Rob
Delmer Taylor			

Committees

Club Station
Wes Busdiecker KC8SKP

DX Net
Soon

Field Day
Jeff Breitner KA8NCR

Finance
Paul Trouten W8PI (chair)
Fred VanDaele K8EBI
Dale Williams WA8EFK

HamFest
Fred VanDaele K8EBI

Hertzian Herald
Fred VanDaele K8EBI

Historian
Paul Trouten W8PI

Public Relations
Terry Kolton N8NYP

Scholarship
Fred VanDaele K8EBI

Program Chairman
Dale WA8EFK
dale.wms1@frontier.com

Membership
Terry Kolton N8NYP
n8nyp@arrl.net

Property Custodian
Paul Trouten W8PI

ARPSC Report

A Reminder that Tuesday March 18th the K8RPT repeaters will be in use for the regional Cobalt Magnet 2025 exercise from 8am to 5pm. Please allow full use during that time for the exercise. If you happen to be around your radio during the day, you may check in when net controls call for single operators. This gives us names for SIMULATED assignments as needed. You will not be dispatched to an assignment.

SKYWARN-NWS Training, County Procedures and on air drill

The Monroe County NWS SKYWARN Training will be Wednesday March 26th from 6:30pm-8:30pm at the new Frenchtown Municipal Center. Limited to 50 people. You MUST register with EMD by going to: https://www.co.monroe.mi.us/305/Sky-Warn-Spotter and filling out the registration form. Time is running out, make sure you get registered soon.

We will then discuss county SKYWARN reporting procedures at the April Meeting 4/3.

We will also hold an On Air Drill Wednesday Evening April 9th from 6:45pm until around 8pm. This will allow new operators the opportunity to see how we handle SKYWARN nets, and allow everyone a chance to practice reporting during a weather net. We will be looking for participants to be Net Control, be a liaison station for MICON Net, and also need multiple operators to inject simulated reports during the net. If you wish to participate, please email me and let me know. You do NOT have to be an ARPSC member to participate, SKYWARN nets encompass any licensed operator.

Don't forget to participate in the weekly Monday night ARPSC net at 8pm on 72 Monroe.

If you are interested in honing your skills or building new ones, please feel free to stop in to any of our meetings or training sessions, or participate on our nets. We are here to help every operator learn and perform better. It doesn't matter if your call sign was just posted on the FCC database or you have had your ticket for decades, we are always looking for additional operators.

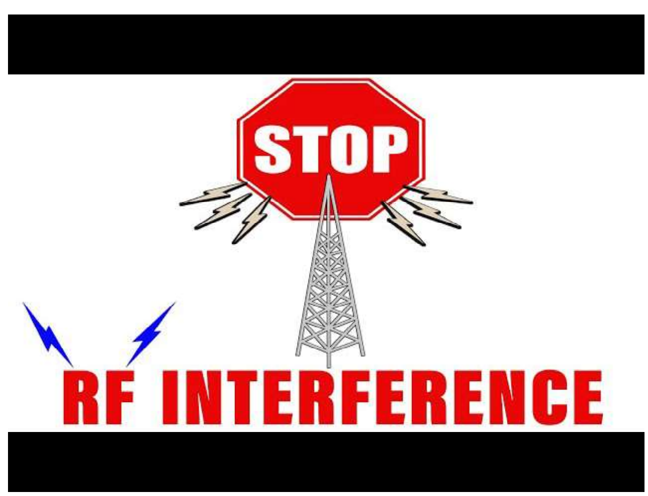
ARPSC meetings are usually the first Thursday of every month at 7:30pm at the EMD on Raisinville Rd. The next meeting is Thursday April 3rd.

As always Thanks to the club and the club webmaster for linking our FB and webpage, and to Fred for his time getting this newsletter out.

73, Lance Charter, KE8BYC
Emergency Coordinator
Monroe County Amateur Radio Public Service Corps

March and April MCRCA Programs will cover effective methods of isolating and identifying sources of Radio Frequency Interference. Our presenter, K3RFI is obviously a person serious about the problems caused to amateur operators by these often unintentional sources of interference.

Because of the detail included, the program is in two parts, so you will surely want to plan to be at both meetings. As we will see, sometimes the interference is quite apparent, while at other times it sounds like normal background noise but covers all but the strongest signals. We'll also see how to determine the type of interference, locate it and take steps to safely remedy the situation.



Don't toss this out just yet, please read on…

Thanks for using our repeaters. We just thought you might like to know some interesting things about the Repeater Association.

In early 1971, several local hams came together to solve the problem of providing reliable VHF communications across all of Monroe County. The River Raisin Repeater Assn., Inc. (RRRA) was formed to tackle this challenge, and it worked! Over these past 50+ years, the RRRA has grown and now operates several amateur radio repeaters in the Monroe County area. We have done this (and only this) since our founding. As a result, the repeaters we operate have enjoyed the benefits of a healthy sponsor.

- RRRA operates five repeater systems situated in Monroe County:
    - The "72-Monroe" repeater, on 146.72 MHz, 100 Hz PL,
    - The "224.78 Repeater",
    - The "Luna Pier Repeater" on 444.55, 100 Hz PL,
    - The "Dundee Repeater" on 442.825, (FM+DMR), 100 Hz PL,
    - The "Ida Repeater" on 442.650, 100 Hz PL,
    - The WinLink RMS Node K8RPT-10 on 144.93 MHz.

We do from time to time hear from radio amateurs who would like to become involved in learning more about repeaters and this part of the hobby, hence we are sending this letter. We encourage additional participation and welcome interested hams. RRRA membership is open to individuals who would like to become involved, and the organization can use the support of persons such as you. And support comes in the form of ideas and brainstorms as well as membership.

- RRRA has only one general meeting a year – so we don't eat up a lot of your valuable time.
- RRRA supports ARES, RACES, SKYWARN operations
- You will feel good about supporting a very active part of ham radio in Monroe County.

You can find additional information, as well as a membership application form, at https://mcrca.org/RRRA/Index

73, Your RRRA Friends

Evolution of wireless communication protocols from Morse Code to the Internet

Author: Omar Metwally, MD

Date: 27 February 2025

Objectives:

- To write a brief history of Morse Code as it relates to amateur radio
- To describe how more complex wireless protocols evolved from Morse Code
- To highlight the importance of error detection systems in modern telecommunication
- To demonstrate the importance of Phase Shift Keying (PSK) in wireless communications
- To convey the lasting relevance and utility of Morse Code

Morse Code (MC) can be framed both as an analog and a digital technology. The question of whether it is one or the other is a good starting point for interesting debate and discussion. In fact, MC is one of the earliest and perhaps longest enduring digital encoding systems that is still in use today. In MC, each character is encoded as a sequence of "short" and "long" pulses, essentially rendering MC a digital binary system. I describe MC as "digital" in the sense that modern telecommunication, such as WiFi packets and Ethernet, exist on a physical level as binary modulations of analog media such as radio waves, light pulses, or voltage changes. An important difference between MC and WiFi/Ethernet, however, is that MC has traditionally relied on human "wet-ware" (i.e. the human brain) to both encode and decode MC. From my experience with software designed to decode CW and from my observations of proficient CW operators who can skillfully decode Morse using their ears and brain, a proficient human operator can easily outperform any decoding software that I've encountered. This is rare in the era of machine learning and accelerating computational power. A veteran amateur radio operator at my radio club can outperform any decoding software any day. In contrast, protocols like the highly complex TCP/IP, which forms the basis of the modern Internet, rely entirely on complex software, computers, routers, and modems to work.

There is genius in simplicity. International Morse Code encodes the 26 letters of the English alphabet as well as the accented e ("é"), the Arabic numerals 0-9, some punctuation and procedural signs (which are known as "prosigns" in the world of amateur radio). Although there are differences between American Morse Code and International Morse Code, this is a discussion of Morse Code in general. MC does not distinguish between upper and lower case. Short impulses are traditionally called *dit*'s, and long impulses are called *dah*'s – onomatopoeic representations of the 500-800 Hz audio tone that a Morse Code (also known as CW, or Continuous Wave in the context of radio communication) transmitter makes when a keyer is actuated. This is the basis for the stereotypical beeping melody conjured by popular culture's references to Morse Code.

The duration of a dit defines 3 parameters:

- the duration of a dah
- the time interval separating dits and dahs
- the time interval between individual letters and words.

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These characteristic temporal relationships allow trained human operators to decode MC at speeds upward of 70 wpm. While the duration of a dit can vary depending on the skill of the transmitting operator and/or the receiving operator, the other temporal relationships are fixed.

Specifically, the duration of a dah is generally defined as 3 times the duration of a dit. The time interval separating two successive symbols (either dit or dah) is generally the duration of one dit. Letters are separated by a pause equal to 3 dit durations, and words are separated by a pause of 7 dit durations in length. Therefore, the duration of a dit is the atomic unit of a MC transmission and determines the transmission speed in words per minute.

The word "PARIS" is conventionally used to calculate transmission speed as a function of dit duration, as follows:

Let dit duration equal one (1) time unit. Therefore,

P=> . _ _ . (1+3+3+1=8 units, plus 1 unit between each symbol, equals 8+3= 11 units)

A=> . _ (1+3 units, plus 1 unit between each symbol, equals 4+1=5 units)

R=> . _ . (1+3+1 units, plus 1 unit between each symbol, equals 5+2=7 units)

I=> . . (1+1 units, plus 1 unit between each symbol, equals 2+1=3 units

S=> . . . (1+1+1 units, plus 1 unit between each symbol, equals 3+2=5 units

This yields a subtotal of 11+5+7+3+5 units = 31 units.

Each letter is conventionally separated by 3 time units, and words are demarcated by 7 time units. Therefore, the total length of PARIS becomes:

31 units (as calculated above) + 4*3 units (letter spacing) + 7 units (end of word) = 50 units. This can be codified as follows:

Arguments: dit_length_ms (float): length of dit in milliseconds (ms)

Returns: words per minute (wpm), rounded to 2 decimal places

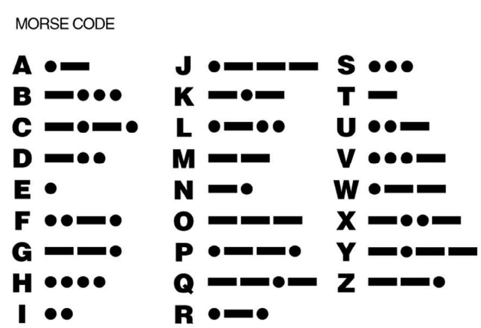
Comments are preceded by # in python.

units_per_word = 50 # for the word PARIS

dit_length_minutes = dit_length_ms / (1000 * 60) # 60,000 ms in a minute

word_time_minute = units_per_word * dit_length_minutes

wpm = 1 / word_time_minutes



If the above arithmetic is too dry, it should be noted that the word "dit" also happens to be the Vietnamese word for "fart" or "buttocks".

As amateur radio grew rapidly in popularity in the years and decades following World War II, so too did the use of MC. In fact, amateur radio operators were required to demonstrate proficiency in MC as part of the licensing process until the Federal Communications Commission (FCC) dropped this requirement in 2007.

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Many amateur radio operators learned MC during their military service. The versatility of MC made it a natural fit for military applications. Fundamentally, no equipment or electronics beyond the human brain are necessary in order to communicate via MC. MC can also take the form of light pulses. The U.S. Air Force trains 10 people every year to become proficient MC operators [http://swling.com/blog/2015/12/morse-code-training-in-the-air-force/].

Beyond the versatility and arguable human-centricity of MC, several other technical aspects further contributed to its popularity in amateur radio, even as voice modes (i.e. using one's ears and voice to communicate over the air) emerged. First, CW uses less bandwidth than voice: 150-500 Hz versus 3 kHz for single side band (SSB) voice emissions. Practically, this means that simpler, cheaper radios can transmit and receive CW over long distances using less electricity than larger, more complex and more expensive radios which need a lot of electricity to power amplifiers in order for their voices to be heard over the same distance. Low-power, long-distance contesting using CW is still popular among many amateur radio operators today. The second technical aspect of CW which makes it a still- relevant, useful, and versatile modality is that CW is less susceptible than voice to ionospheric distortion. Concretely, this means more reliable performance in challenging environments or tactical situations. Whereas an operator's voice tends to fade in and out on high frequency (HF) bands because of the way radio waves bounce around the Earth's ionosphere, the pulse-like nature of CW allows humans and machines to still decode a CW transmission despite signal degradation as it bounces around the world. This is what allows me to hear and communicate with people from nearly every continent with just a long wire strung across my backyard and a transceiver running on only a few watts of power.

The Baudot Code (BC), invented in 1870 by Émile Baudot, was a widely used successor to MC and moved wireless telecommunications in the direction of fully automated digital communication.

Although BC came into widespread use about 20 years after the introduction of International Morse Code, it is no longer used by contemporary radio operators. BC is a fixed-length code that encodes each character using 5 bits. This fixed-length encoding was instrumental to its automation and led to the evolution of encoding schemata such as ASCII and UTF-8, the most widely used encoding scheme in the modern Internet. As a side note, the term "baud rate," which is familiar to anyone lucky enough to have used early dial-up modems that connected to phone jacks, is named after Émile Baudot. The term baud rate refers to the number of signal changes per second, rather than bits per second per se.

BC allowed for 2^5 (2 to the power of 5) unique characters. To expand the number of possible characters, two special "shift" or operational characters indicate a character as either a letter or a "figure", effectively doubling the number of possible characters to 64. As another interesting side note, ASCII, the predecessor of UTF-8, allows for 128 unique characters by using 7 bits per character (2^7 = 128). In the early days of BC, operators used a 5-key keyboard to transmit a character, which was faster than sequentially producing one signal (dit or dah) at a time, as with MC. Moreover, messages encoded in BC could be automatically decoded and printed by a machine, unlike MC, which requires a trained human ear and brain to reliably decode in real-life conditions.

Personally, I am surprised by the fact that even the best decoding software available consistently underperforms CW veterans' "wet-ware". I hypothesize that this is due to two factors. One factor is the nature of MC, as I've referred to it, as a "human-centric" protocol: sequential pulses of an audible tone which stereotypically vary in duration to indicate a series of letters. Skilled CW operators are known to perceive MC-encoded words and phrases as discrete sound units [https://www.arrl.org/learning-morse- code]. In fact, Russian CW operators refer to MC-encoded letters as unique "melodies" [https://runivers.ru/bookreader/book9921/#page/1/mode/1up].

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The second factor that I hypothesize has hindered software's ability to accurately and reliably decode CW in real-life conditions, with fading and overlapping signals received from multiple stations transmitting (or spilling over) on the same frequency may be, ironically, the extremely rapid evolution of telecommunication protocols. As newer, faster, and fully automated digital modes, which automatically convert text into radio waves and back, were invented, MC became an increasingly niche mode. The result is that the pool of individuals who are both proficient in Morse Code (i.e. radio operators with decades of experience) and who are also skilled in developing software is not particularly large. Decoding MC may seem simple in theory and is in fact straightforward in a controlled laboratory setting; however for reasons touched upon earlier, decoding MC in real-life conditions is in fact very challenging. An AI-based approach to decoding MC may be an interesting and worthwhile pursuit for those so inclined.

To summarize the impact of BC on telecommunications during the golden age of MC, BC introduced certain improvements to MC such as faster communication speeds and fully automated digital communication. However, MC's lasting advantage is, again, its human-centricity, that is, the ability of a trained human operator to send and receive messages using simple hardware and a little electricity – or even no equipment at all, beyond the "wet-ware" between one's ears. The lasting legacy of MC for over a century and counting is a testament to its versatility and utility. Beyond the military and amateur radio, MC is still learned by boy scouts around the world as an important means of communication in emergency scenarios where conventional telecommunications would fail. MC is also still used as a navigational aid for maritime and aviation systems. Another important contemporary application of MC is its use by people with severe disabilities to communicate.

One notable shortcoming of MC, however, is its lack of error detection. Radio operators must constantly deal with sub-optimal conditions. Concretely, this means noise, multiple operators trying to communicate on the same or adjacent frequencies, and ever-changing propagation conditions. A band that is, for instance, open between the U.S. and France in one moment may close the next moment. The time of day, season, and solar weather are among many variables that influence radio wave propagation. The rhythmic beeps that characterize CW are constantly fading in and out and compete with one another. A strong signal can completely drown out a weak signal. If I key something like: "CQ CQ CQ DE KF8AYH K" (essentially a call to all stations signed by my FCC-issued callsign), an operator across the ocean may hear, for example, "CQ CQ CQ DE KX8AIH K." Characters get garbled, confused, or lost all the time as signals fade in and out. There are literally infinite ways that a finite-length message can be received with errors (or not received at all!). Try to imagine the unimaginable chaos of using WiFi if bits were randomly flipped or dropped while we surfed the web – without even knowing that the data we are receiving is accurate or complete! Not knowing the difference between "THE WAR IS OVER" and "THE WAR IS NOT OVER" would render telecommunications useless in a best case and detrimental in a worst case.

Fortunately, innovative minds have invented ways to detect and even correct errors in message transmission. One of the first and simplest methods of error detection is the use of a parity bit to make the total number of 1's in a binary (1's and 0's) data block even ("even parity") or odd ("odd parity"). In its simplest form, the receiver can count the number of 1-value bits received and check that this number corresponds to the parity bit. This simple form of error-checking can only detect single-bit errors, but it can easily miss half of errors that occur in real-life telecommunications. This includes errors involving an even number of bit flips. Parity bit error detection only has the potential to detect a single-bit error, but it cannot be used to identify which bit is wrong, nor can it correct a wrong bit.

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Parity bit error detection is fast, simple, and imperfect, and therefore its utility lies in situations where simple, fast error-checking is necessary (for instance, in simple serial communication). It is often combined with other error-checking methods in modern-day telecommunications.

Cyclic redundancy check (CRC) is a more robust method of error checking that is widely used in modern telecommunications, networking, computing, and satellite communication (satcom). Anyone who has used a computer or connected to the internet has benefitted, probably unknowingly, from CRC's utility. As with HF radio, satcom also uses radio waves to send and receive data, albeit with particular nuances. Bits routinely get flipped, scrambled, and lost in any form of radio communication. Fundamentally, CRC handles data as a large binary number and divides this number by a predetermined polynomial [https://web.archive.org/web/20110719042902/http://sar.informatik.hu- berlin.de/research/publications/SAR-PR-2006-05/SAR-PR-2006-05_.pdf]. The remainder, referred to as the checksum, is used to assess a received data packet for fidelity. Polynomial division is typically performed via shift registers and XOR gates and is optimized for the receiver's hardware. This means that CRC can be performed very efficiently without large computational overhead because binary- based digital computers (all hardware in use today, with few exceptions) can do these polynomial calculations efficiently. CRC is much more precise and accurate than parity bit-based error checking and can detect a much wider range of error types. CRC can be calculated on streaming data, making it very useful for a variety of data, from satellite packets to USB, Bluetooth, WiFi, and Ethernet.

Other forms of error detection which are worthy of mention are checksums (e.g. simple checksums and Fletcher checksums) and hash functions such as MD5 and SHA. Error detection is often a trade-off between error detection capability and computational speed. While a hash function such as SHA can detect errors much more accurately than a simple checksum, hash functions are much slower than checksum and CRC due to their mathematical complexity [https://patents.google.com/patent/US6829355B2/en]. Therefore, a highly accurate error detection algorithm with high computational overhead may not be feasible or practical in situations where data is being received at a fast rate.

Bits can be flipped (or entirely fabricated) either by accident, as with ionospheric distortion, or intentionally, as in recent examples of GPS spoofing, in which false GPS coordinates are broadcast to aircraft or maritime vessels to deliberately misguide them [https://www.csoonline.com/article/567233/what-is-gps-spoofing-and-how-you-can-defend-against- it.html]. The concept of error detection systems dates back to WWII-era military communication. These early military applications were focused on detecting jamming and interference. The first application of a formal error detection system in the civilian context has been attributed to IBM's Synchronous Transmit-Receive (STR) protocol, which dates back to 1960 [https://bitsavers.org/pdf/ibm/datacomm/A22-6527-1_7701_Jul61.pdf, https://ia902807.us.archive.org/28/items/bitsavers_dataprocoms2760IBMBSC_3043760/2760_IBM_B SC.pdf]. STR eventually evolved into IBM Binary Synchronizing Communication (BSC, or Bisync), the details of which are not directly relevant to the discussion at hand, beyond pointing out that these protocols used CRC and longitudinal redundancy check (LRC) for error detection. Interestingly, BSC also used special control characters such as SYN (start character synchronization), ACK (acknowledge), and NAK (negative acknowledge), which are heavily used in modern-day TCP/IP.

The evolution of MC into BC, a fully digital binary code, and the invention of error detection systems such as CRC, are milestones that paved the path for modern-day networking, telecommunications, and the Internet in its current form. Another milestone discovery in this evolution from MC to TCP/IP and modern telecommunications is Phase-Shift Keying (PSK) [https://patents.google.com/patent/US2085940A/]. While STR was designed to handle data packaging and error-checking, PSK was designed to modulate the physical signals that represent and carry data. That is, STR and PSK operate on different layers of a networking protocol and solve different problems, but their parallel growth and evolution overlap in time, particularly during the 1960s.

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Together, they comprise a complete communication protocol [https://www.iso.org/standard/20269.html].

Whereas the STR layer handled the packaging and movement of data blocks, assessing their integrity, and managing data flow using control characters, the PSK Layer was focused on representing bits as shifts in a radio wave's phase. Although these shifts occur sequentially, they can be used to transmit data at rates many fold greater than MC. Binary PSK (BPSK) used 2 phases (0 degrees and 180 degrees), whereas later and more complex variations on PSK such as Quadrature PSK (QPSK), multiplied data rates without sacrificing reliability. PSK is also integral to software-defined radio (SDR), which is driving a rapid shift from hardware-based radio circuitry to software-modulated functionality [https://wiki.gnuradio.org/index.php?title=Guided_Tutorial_PSK_Demodulation. PSK31 is a data mode used in amateur radio because of its excellent weak signal performance and, compared to CW, relatively high baud rate (31.25 baud rate). PSK31 also has a remarkably narrow bandwidth of approximately 60 Hz [https://www.arrl.org/psk31-spec]. Today, permutations of PSK are an integral part of virtually all WiFi routers and receivers, satellites and satellite antennas, digital TV, cell phones, and high speed internet. A discussion of the mathematics of PSK, while fascinating and worthy of further study, is not a primary goal of this essay [https://www.eecs.umich.edu/courses/eecs555/lect06.pdf].

One of my favorite aspects of practicing medicine is understanding and connecting with my patients as fellow humans: learning how they earn their livelihoods, how they spend their spare time, and whom they spend their time with. This aspect of doctoring is not only interesting, it's also very important to understanding why/how a person ended up in the hospital and how to keep them out of the hospital. I once had the privilege and pleasure of caring for a gentleman who began his career as a communications engineer by serving in the U.S. Army as a PSK operator in preparation for deployment in Vietnam during the 1960s. As a fresh high school graduate, he learned to manually operate radio circuitry to effect radio wave phase shifts and transmit data. He never did get the chance to apply this skill abroad due to the complexity of a PSK setup back then and all the equipment that would need to be deployed and operated in a jungle. Ultimately, despite the theoretical advantages of PSK, the simplest, cheapest, fastest, and most versatile digital method was favored in war: Morse Code.

I reflected on his stories later that day, after I hung my white coat, signed my notes, put my daughter to bed, and celebrated the start of the weekend by firing up my radio to make CW contacts.

Here are your March Dxpeditions, featuring lots of tiny islands:

Atlantic:
VP8TXF and VP8CIW are activating the Falkland Islands off of South America this week until March 10th.

Indian:
D68Z in the Comoros islands will be active until March 18th on HF bands, all modes. Elvira IV3FSG is the operator, and she is operating split on all modes (and MSHV on FT8) as she mentors some YOTA (Youth on the Air) operators.

VK9CU is active now through March 11 on Cocos Keeling Island, an Australian territory in the Indian Ocean. The islands are actually closer to Indonesia than to Australia, and they will be QRV 24/7 all bands and all modes (RTTY and FT8 Fox and Hounds for digital modes).

3B9DJ will be on Rodrigues Island, off Mauritius in the Indian Ocean, with 4 operators from March 24th until April 5th.

Caribbean:
TO1P will be active during that CQ WPX Contest, and will be active as FJ/SP9FIH before and after the contest, from the tiny country of Saint Barthélemy ("St. Barts") in the French West Indies.

Pacific:
V6WG is operating from Kosrae, in Micronesia, in the South Pacific. The op is Rikk WE9G, on all HF bands.

And one on a continent:
5H3MB is the second holiday-style Tanzanian activation in two months. Maurizio IK2GZU will be on the SSB, CW, RTTY, and FT8 modes

MCRCA Dues run from January 1st to December 31st.
Please check your name on the sheet below to see where you stand.
You can fill out the form on the next page to pay your dues.

March 20, 2025

Call	Name	Exp date
KE8PUN	Aaron Liske	2025
NM8I	Barbara Wilson	2023
KE8TPU	Bill Mercer	2022
KB8KQC	Brenda VanDaele	2025
KF8AOL	Bob Morrison	2025
WB8GUN	Bob Van Klingeren	2025
KE8WYY	Brian Paules	2025
W8BKT	Brian Tennyson	2020
KE8RCN	Brody Madlock	2021
WA8EFK	Dale Williams	2025
KC8BUD	Daniel Bain	2024
KB8AQJ	Dan Kay	2025
	Nancy Kay	2025
W8IIE	Dave Benoit	2023
K8EKG	David Hatfield	2024
KE8RXC	Debbie Bardoni	2022
KC8CCR	Debbie Forgacs	2025
	Delmer Taylor	2025
KE8ZAR	Dennis Hulvey	2025
N8BZN	Donald Fritz	2025
AC8WE	Donald Saathoff	2020
KFCCH	Doug Orr	2025
K8OF	Doug Wherry	2025
WS8Y	Ed Keller Jr	2023
K8EBI	Fred VanDaele	2025
KB8OSU	George Low	2025
KE8VLW	James Kiester	2024
WD8NWF	James Toomey	2025
KN8CR	Jeff Breitner	2024
K8OLV	Jeff Giles	2022
KE8WMY	Jefferson Mathews	2023
K9JP	Jeff Peters	2025
	Jill Miller	2025
N8RWI	John Bills	2025
N8DXR	John Copeland	2026
K8UMF	John Miller	2025
WA8YZB	John Turner	2025
KE8LRD	Ken Grooms	2024
KJ8H	Keith Hutchinson	2025

Call	Name	Exp date
KE8BYC	Lance Charter	2020
KE8OTG	Larry Lenhart	2023
KE8QGU	Madonna Burkitt	2024
W8MCW	Mark Wheeler	2027
KN6EYQ	Mark White	2022
KE8RCO	Matthew West	2021
KE8UWZ	Mike Courington	2024
KE8TYC	Mike Isbell	2022
N8KUF	Mike Karmol	2025
AD8EV	Michael Mc Peek	2021
KA8PQH	Neil Remaklus	2025
KF8AYH	Omar Metwally	2025
W8PI	Paul Trouten	2025
KC8AZZ	Peter Forgacs	2025
KE8YQE	Phil Bardoni	2025
W8NBS	Randy Meyer	2022
KE8UNH	Rick Wykle	2022
KD8ZUI	Rob Howe	2026
K8HV	Robert Lawrence	2022
KE8OSX	Ron Duvall	2025
KE8CQO	Ron Hills	2025
KD8ZNZ	Rodney Haddix	2026
WO0O	Russ DeCrease	2025
W8SMB	Scott Burkey	2024
WA8PYL	Scott Retzlaff	2025
KE8MFY	Steve Orlowski	2025
N8NYP	Terry Kolton	2028
N8OSC	Tom Cooper	2024
KE8UDH	Tom Hughey	2022
KE8KNZ	Tom Imlach	2022
KG8P	Tom Jenkins	2025
KE8NSU	Tony Griffin	2025
KC8SKP	Wes Busdiecker	2025
N8MWQ	Woody Kirkman	2023

Additional and Visitors please sign below:

Monroe County Radio Communications Association

Dues run from January 1st to December 31st of each year. As a current / Past Member, you are invited to attend our monthly meetings to find out the latest plans for our club. You may pay your dues at any regular meeting or by filling in the form below and mailing it to:

MCRCA, 4 Carl Dr, Monroe, MI 48162.

Your membership and support will help with the continued success of our club. Thank you.

MEMBERSHIP APPLICATION / RENEWAL FORM

Regular – $10 — Add'l Family – $5 each

DATE_______________ ARRL MEMBER? Y______N______ RRRA Member? Y_____N_____

NAME ____

ADDRESS ____ PHONE ___________________

CITY____ STATE _______ ZIP ________________

CALL _________________ CLASS_____ E-MAIL: _____________________________________

ADDITIONAL Family Members:____

Please Circle All That Apply:

Active Bands: 160 80 75 40 30 20 17 15 12 10 6 2 220 440 higher

Modes: CW - SSB – DIGITAL - PACKET - RTTY - FM - DX - MOBILE - EME - SAT - ATV - SSTV

Interests: Traffic - DX - Contests - Foxhunts - Satellites - Nets – Antennas - Computers Emergency - ARES/RACES - Skywarn - Classic Radios (circle all that apply)

Do you plan to upgrade your license? Y______N ______If yes, what class? _________________

What kinds of meeting programs would you like to see?

____

Other activities you would like to see the Club offer ______________________________________

____

____

General Comment's ____

____

Signature____ Date___________________

Amateur Radio Examinations Monroe, MI

Monroe County Radio Communications Association Amateur Radio examinations are held the 3rd Saturday of every even numbered month at:

American Red Cross Chapter Bldg.
1645 North Dixie Highway
Monroe, MI 48161

Registrations preferred
Call for information.
email address and FRN required

2025 Schedule:

February 15	April 19
June 21	August 16
October 18	December 20

TESTING BEGINS PROMPTLY AT 9:00 AM

Applicants are expected to have all forms filled out and be ready to take tests at that time. Coffee and doughnuts are available at 8:30 AM. For more information or to make reservations, call Paul Trouten - W8PI at 734-854-2224

Join us at the next meeting

March 20th 7:30 pm
American Red Cross Chapter Bldg.
1645 North Dixie Highway
Monroe, MI 48162

Local Net

ARPSC Net - Every Monday evening on '72-Monroe (146.72 Mhz) starting at 8:00pm.

ARPSC Meeting first Thursday of every month at the EMD office on Raisinville Rd.. 7:00 PM

One Day Bi-Monthly Technician classes

Next class will be April 12, 2025

The Monroe County Radio Communications Association (MCRCA) is offering a one-day Amateur Radio course for the **Technician** class license. The class will run from 8:30 AM to 4:00 PM on the **second Saturday of every even numbered month.** The cost is $10 and includes lunch, snacks and beverages. The test will be conducted immediately following the class and has a separate fee of $14. These classes will be held at the Red Cross building, 1645 N Dixie Hwy, Monroe, MI 48162.

There is a maximum class size of 10 people on a first come first served basis and you should sign up no later than 1 week before the class. All study material and testing paperwork will be provided at the time you sign up and you should plan on doing some pre-class studying to make things easier in the class.

If you are interested in becoming a Ham Radio Operator, please call or email me to get signed up for the next class.

N8BZN Don Fritz / (419) 345-4495 after 6PM / Donfritz56@gmail.com

New MCRCA Members

Please welcome recent new members to the club.