# CQ Chatter

**NOVEMBER 2020** **VOLUME B20 •ISSUE 9**

## WOOD COUNTY AMATEUR RADIO CLUB

| | | |
|---|---|---|
| **President** | **WB8NQW** | **Bob Willman** |
| **Vice President** | **KD8VWU** | **Doug Perez** |
| **Secretary** | **N1RB** | **Bob Boughton** |
| **Treasurer** | **KD8NJW** | **Jim Barnhouse** |
| **Board Member** | **KE8CVA** | **Terry Halliwill** |

# Minutes

## *WCARC Meeting*

**October 12, 2020**

**Bob-WB8NQW, presiding**

**Present:** KE8CVA-Terry, WB8NQW-Bob, K8LL-Stan, N1RB-Bob, K4JQL-Michael, W8ALM-Allen, KE8PJM-Russ, KC8PFP-Rex, N8MSU-John, W8PSK-Phil, WD8JWJ-Bill, KC8IFW-Wil, K8DLF-Dallas, WE8TOM-Tom

**Meeting called to order:** at 7:30 with Pledge of Allegiance.

**Minutes:** of August business meeting as published in September CQ Chatter were approved (CVA/IFW).

**Old Business:**

- Bob asked for reports and comments on the operation of the Club repeaters. Bob (RB) reported that although the audio measurements on the VHF/UHF machine have not yet been carried out, audio levels seem to be satisfactory. This will be pursued in the future. The Fusion machine is no longer plagued by shutdown due to the monthly operating system upgrades since the auto-upgrade function was disabled (thanks to LEI for the advice). The APRS machine is also functioning satisfactorily.

***continued on p. 4***

## Net Check Ins

*Oct 13* *Traffic: 0*

*N1RB* *(NCS)*
*WE8TOM*
*K8BBK*
*KE8CVA*
*KG8FH*
*WD8JWJ*
*WB8NQW*
*WD8LEI*
*W8PSK*
*KA8VNG*
*KD8RNO*
*KE8PJM* *(12)*

*Oct 20* *Traffic: 0*

*KG8FH* *(NCS)*
*N1LB*
*KE8CVA*
*KE8PJM*
*KD8NJW*
*WD8JWJ*
*WD8LEI*
*WB8NQW*
*W8PSK*
*WE8TOM*
*KD8RNO*
*N1RB*
*KC8NKC* *(13)*

# Brain Teasers

**1.** What describes the number of times per second that an alternating current makes a complete cycle?

**a.)** pulse rate
**b.)** speed
**c.)** wavelength
**d.)** frequency

**2.** What is the current in a circuit with an applied voltage of 120 volts and a resistance of 80 ohms?

**a.)** 9600 amperes
**b.)** 200 amperes
**c.)** 0.667 amperes
**d.)** 1.5 amperes

**3.** Which of the following is combined with an inductor to make a tuned circuit?

**a.)** resistor
**b.)** Zener diode
**c.)** potentiometer
**d.)** capacitor

# November Contests

The contest lineup for the month of November is given below. Please note that the WARC bands (60, 30, 17 and 12 m) are never open to contesting.

| | | |
|---|---|---|
| **Nov 7-8** | *1200 to 1200 Z* | 160 m to10 m |
| **Ukrainian DX 'test** | | **CW/SSB** |
| **Nov 7-9** | *2100 to 0300 Z* | 160 m to 10 m |
| **ARRL Sweepstakes** | | **CW** |
| **Nov 14-15** | *1200 to 1200 Z* | 160 m to 10 m |
| **OK/OM DX 'test** | | **CW** |
| **Nov 14-15** | *0000 to 2359 Z* | 80 m to 10 m |
| **WAE DX 'test** | | **RTTY** |
| **Nov 21-22** | *1200 to 1200 Z* | 80 m to 10 m |
| **LZ DX 'test** | | **CW/SSB** |
| **Nov 21-23** | *2100 to 0300 Z* | 160 m to 10 m |
| **ARRL Sweepstakes** | | **SSB** |
| **Nov 28-29** | *0000 to 2359 Z* | 160 m to 10 m |
| **CQ WW DX 'test** | | **CW** |

# November Hamfests

**Nov 1 Massillon ARC** Hamfest. Military Air Preservation Society, Green, OH.
**web:** http://w8np.org/hamfest.htm **Masks required**

**Nov 8 Livonia ARRG** Swap n' Shop.
**web:** https://www.dropbox.com/s/66utqgicbs2pxrz/Repeater%20Swap-page-001.jpg?dl=0 . **Masks required**

***Minutes—from p. 1***

- Bob checked with WD8ICP and learned that the project to remove the antennas from the Administration Building roof is presently in limbo. Stay tuned.
- Bob reported that a group consisting of John-N8MSU, Jeff-KG8FH and Bob-N1RB is working on upgrading the APRS digipeater control from a standard PC to the more compact Raspberry Pi. John (MSU) reported on current progress. This will help to alleviate some of the crowding in the repeater racks.
- A report on the foxhunt that took place after the September Breakfast meeting was made by Bob (RB), who played the role of the fox. There were 3 participants, WB8NQW, W8PSK and KE8CVA—-the former found the fox first. This hunt allowed the participants to test out their newly acquired heterodyne attenuators, with excellent results.
- Terry (CVA) demonstrated his home-brew foxhunt antennas—-a 5-element UHF Yagi and a 2-element VHF Yagi.
- Bob brought up the subject of the ARDEN mesh network that is being worked on by a group in the Toledo Club as well as locally. Serendipitously, one of the visitors, Allen-W8ALM, introduced himself as a member of the ARDEN committee of TMARA. He reviewed the progress of the effort in Toledo. The focus is on 2.4 GHz operation and he encouraged anyone with interest to get some of the necessary equipment and participate. Phil (PSK) has already purchased one of the necessary items, and will continue to pursue his involvement with ARDEN. Eric (LEI) mentioned that there is a plan in the works to hopefully link Toledo, Bowling Green and Findlay.

**New Business:**

- Bob once again solicited volunteers for the 2021 officer slate, and received a volunteer (FH). Open slots include: President and Vice President. If no new volunteers are received by December, quasi-strong-arm tactics will be employed /s.
- Bob mentioned the communications he received from the King Midget Car Club regarding their meeting in Bowling Green on August 12/13/14. One idea is to secure a Special Event call sign and demonstrate amateur radio at the event. Bob is pursuing contacts with local interests.
- Eric (LEI) offered a brief report on Wood County ARES status. He thanked all those who participated in the traffic handling exercise initiated by the SEC. Our ARES handlers did a competent job in relaying the test messages that were sent.

**Meeting Adjourned:** at 8:15 (TOM/RB) ■

## WCARC Weekly Net

Tuesdays at *2100* all year

147.18 MHz 67 Hz PL

### Net Control Roster

| | |
|---|---|
| *Nov 10* | *WB8NQW* |
| *Nov 17* | *N1RB* |
| *Nov 24* | *KG8FH* |
| *Dec 1* | *KD8VWU* |
| *Dec 8* | *KD8NJW* |
| *Dec 15* | *WB8NQW* |

## NEXT MEETING

***Breakfast Meeting***

***Saturday, November 7***

**TIME: 9:00 AM**

**PLACE:**

**Frisch's Big Boy**
**N. Main St. & E. Poe Rd.**
**Bowling Green, OH**

## *10 meter Net*

***informal group meets***

***Sunday***

***@ 20:30***

***on 28.335 MHz***

## *Fusion Net*

***Thursday***

***@ 19:30***

***on 442.125 MHz***

***67 Hz PL on analog***

**Informal net**

## Net Check Ins

**Oct 27** **Traffic: 0**

| | |
|---|---|
| N1RB | (NCS) |
| NM8W | |
| K4JQL | |
| K8BBK | |
| KE8CVA | |
| K8DLF | |
| KG8FH | |
| KE8PJM | |
| WD8JWJ | |
| WD8LEI | |
| WB8NQW | |
| W8PSK | |
| WE8TOM | |
| KD8RNO | |
| KA8VNG | |
| WD8PIC | |
| N8MSU | (17) |

**Nov 3** **Traffic: 0**

| | |
|---|---|
| KD8NJW | (NCS) |
| KD8RNO | |
| WD8JWJ | |
| KE8CVA | |
| KG8FH | |
| WD8LEI | |
| WB8NQW | |
| WE8TOM | |
| N1RB | |
| KA8VNG | (10) |

Brain Teaser answers: (T) 1-d, 2-d, 3-d

# Ethernet At 40: From A Napkin Sketch To Multi-Gigabit Links

**From Hackaday by Maya Posch**

September 30th, 1980 is the day when Ethernet was first commercially introduced, making it exactly forty years ago this year. It was first defined in a patent filed by Xerox as a 10 Mb/s networking protocol in 1975, introduced to the market in 1980 and subsequently standardized in 1983 by the IEEE as IEEE 802.3. Over the next thirty-seven years, this standard would see numerous updates and revisions.

Included in the present Ethernet standard are not just the different speed grades from the original 10 Mbit/s to today's maximum 400 Gb/s speeds, but also the countless changes to the core protocol to enable these ever higher data rates, not to mention new applications of Ethernet such as power delivery and backplane routing. The reliability and cost-effectiveness of Ethernet would result in the 1990 10BASE-T Ethernet standard (802.3i-1990) that gradually found itself implemented on desktop PCs.

With Ethernet these days being as present as the presumed luminiferous aether that it was named after, this seems like a good point to look at what made Ethernet so different from other solutions, and what changes it had to undergo to keep up with the demands of an ever-more interconnected world.

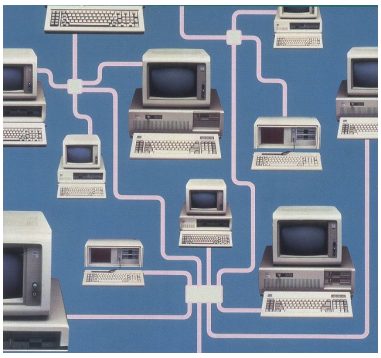
### *The novelty of connecting computers*

These days, most computers and computerized gadgets are little more than expensive paper weights whenever they find themselves disconnected from the global Internet. Back in the 1980s, people were just beginning to catch up on the things one could do with a so-called 'local area network', or LAN. Unlike the 1960s and 1970s era of mainframes and terminal

***continued on p. 7***

***ethernet—from p. 6***

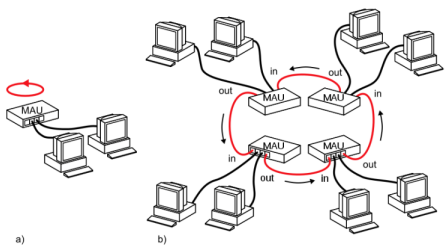
systems, a LAN entailed connecting microcomputers (IBM PCs, workstations, etc.) at for example an office or laboratory. During this transition from sneakernet to Ethernet, office networks would soon involve thousands of nodes, leading to the wonderful centrally managed office network world. With any document available via the network, the world seemed ready for the paperless office. Although that never happened, the ability to communicate and share files via networks (LAN and WAN) has now become a staple of every day life.



**IBM PCs, connected**

### *Passing the token*

What did change was the rapidly changing landscape of commodity network technology. Ethernet's early competition was a loose collection of smaller network protocols. This includes IBM's Token Ring. Although many myths formed about the presumed weaknesses of Ethernet in the 1980s, summarized by this document (PDF) from the 1988 SIGCOMM Symposium, ultimately Ethernet turned out to be more than sufficient.




**The circuitous world of Token Ring configurations**

Token Ring's primary points of presumed superiority were determinism instead of Ethernet's multiple access with collision detection approach (CSMA/CD). This led to the most persistent myth, that Ethernet couldn't sustain saturation beyond 37% of its bandwidth.

For cost reasons, the early years of Ethernet was dominated by dumb hubs instead of smarter switches. This meant that the Ethernet adapters had to sort out the collisions. And as anyone who has used Ethernet hubs probably knows, the surest sign of a busy Ethernet network was to glance over at the 'collision' LED on the hub(s). As Ethernet switches became more affordable, hubs quickly vanished. Because switches establish routes between two distinct nodes instead of relying on CSMA/CD to sort things out, this prevented the whole collision issue that made hubs (and Ethernet along with it) the target of many jokes, and the myth was busted.

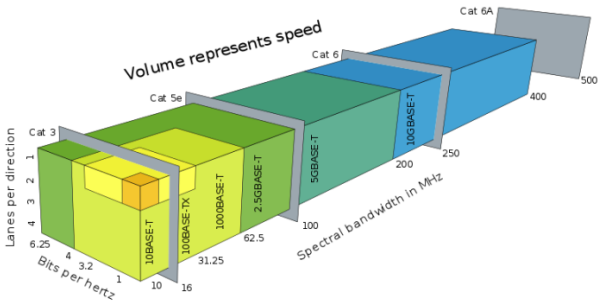
Once Ethernet began to allow for the use of cheaper Cat. 3 (UTP) for 10BASE-T and Cat. 5(e) UTP cables for 100BASE-TX (and related) standards, Ethernet emerged as the dominant networking technology for everything from homes and offices to industrial and automotive applications.

### *A tree of choices*

While the list of standards listed under IEEE 802.3 may seem rather intimidating,

***ethernet—from p. 7***

a more abbreviated list for the average




**The increased spectral bandwidth use of copper wiring by subsequent Ethernet standards**

person can be found on Wikipedia as well. Of these, the ones one most likely has encountered at some point are:

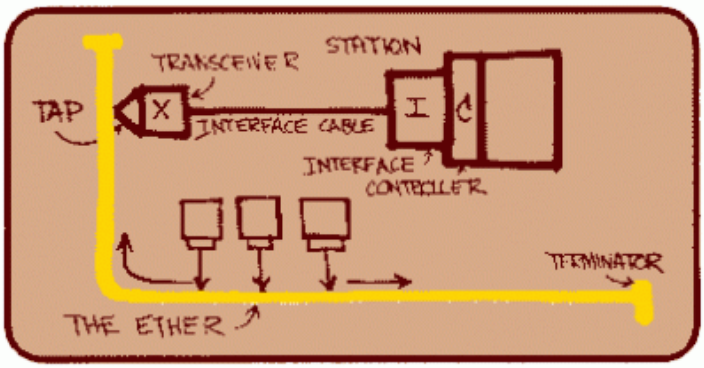
- 10BASE-T (10 Mb, Cat. 3).
- 100BASE-TX (100 Mb, Cat. 5).
- 1000BASE-T (1 Gb, Cat. 5).
- 2.5GBASE-T (2.5 Gb, Cat. 5e).

While the 5GBASE-T and 10GBASE-T standards also have been in use for a few years now, the 25 Gb and 40 Gb versions are definitely reserved for data centers at this point, with the requirement for Cat. 8 cables, and only allowing for runs of up to 36 meters. The remaining standards in the list are primarily aimed at automotive and industrial applications, some of which are fine with 100 Mbit connections.

Still, the time is now slowly arriving where a whole gigabit is no longer enough, as some parts of the world actually have Internet connections that match or exceed this rate. Who knew that at some point a gigabit LAN could become the bottleneck for one's Internet connection?

## *ALOHA*

Back in 1972, a handful of engineers over at Xerox's Palo Alto Research Center (PARC) including Robert "Bob" Metcalfe and David Boggs were assigned the task of creating a LAN technology to provide a way for the Xerox Alto workstation to hook up to the laser




***Metcalfe's first Ethernet sketch***

printer, which had also been developed at Xerox.

This new network technology would have to allow for hundreds of individual computers to connect simultaneously and feed data to the printer quickly enough. During the design process, Metcalfe used his experience with ALOHAnet, a wireless packet data network developed at the University of Hawaii.

The primary concept behind ALOHAnet was the use of a shared medium for client transmissions. In order to accomplish this, a protocol was implemented that could be summed up as 'listen before send', which would

***continued on p. 9***

***ethernet—from p. 8***

***The Xerox 9700, the world's first Ethernet-connected laser printer***

become known as 'carrier sense multiple access' (CSMA). This would not only go on to inspire Ethernet, but also WiFi and many other technologies. In the case of Ethernet the aforementioned CSMA/CD formed an integral part of early Ethernet standards.

Coaxial cabling was used for the common medium, which required the use of the cherished terminators at the end of every cable. Adding additional nodes required the use of taps, allowing for the BNC connector on the Ethernet Network Interface Card to be attached to the bus. This first version of Ethernet is also called 'thicknet' (10BASE5) due to the rather unwieldy 9.5 mm thick coax cables used. A second version (10BASE2) used much thinner coax cables (RG-58A/U) and was therefore affectionately called 'thinnet'.

***The best plot twist***

In the end, it was the use of unshielded, twisted-pair cabling that made Ethernet more attractive than Token Ring. Along with cheaper interface cards, it turned into a no-brainer for people who wanted a LAN at home or the office.

As anyone who has ever installed or managed a 10BASE5 or 10BASE2 network probably knows, interference on the bus, or issues with a tap or AWOL terminator can really ruin a day. Not that figuring out where the token dropped off the Token Ring network is a happy occasion, mind you. Although the common-medium, 'aether' part of Ethernet has long been replaced by networks of switches, I'm sure many IT professionals are much happier with the star architecture.

Thus it is that we come from the sunny islands of Hawaii to the technology that powers our home LANs and data centers. Maybe something else would have come along to do what Ethernet does today, but personally I'm quite happy with how things worked out. I remember the first LAN that got put in place at my house during the late 90s as a kid, first to allow my younger brother and I to share files (i.e. LAN gaming), then later to share the cable internet connection. It allowed me to get up to speed with this world of IPX/SPX, TCP/IP and much more network-related stuff, in addition to the joys of LAN parties and being the system administrator for the entire family. Happy birthday, Ethernet. Here is to another forty innovative, revolutionary years. ■

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