



Smoke Signals

Newsletter of Fullerton Radio Club

September 2025

President's Column

My autumn amateur radio to do list.

As most of you know, I have spent much of the past few months away from the "home QTH." During our summer national parks trip, I carried just enough ham gear to be able to do POTA activations from the parks we visited and during our recent trip to Tanzania, I didn't think I would have an opportunity to operate, so carried no ham gear.

After a few weeks of traveling, I usually start making mental lists of what ham radio activities I want to pursue when I return home. Sometimes I even write these ideas down.

Here then, are a few things from my post-summer ham radio to do list...

D-Star. I own two radios that are capable of operating in the D-Star mode. On several occasions, I have dabbled with D-Star, but never to the degree where I have felt proficient with the mode. D-Star will be one of my projects for the near future. HRO Anaheim has 3 D-Star repeaters that are very lightly used. Maybe some of us can give them some exercise.

Packet radio. While non-APRS packet radio is a shadow of its former self, it still exists. It turns out there is a packet node and a packet BBS (remember those?) on Catalina Island. The author of Radiomail, Georges Auberger WH6AZ, has just written an app called Packet Commander that allows an iPhone (or iPad) to connect to a Kenwood TH-d74 or d75 and act as a packet terminal. I'm going to try it out.

Whisper. Some time ago, I purchased a stand-alone Whisper transmitter. I plan to spend some time experimenting with this ultra-efficient mode.

It's always more fun to learn new things (or revisit old things) when others are playing along. If any of these things interest you, please contact me and we can start a mini-SIG!

A Gotham Vertical for the 21st Century

By Joe Moell K0OV

My first antenna as a new Novice was a folded dipole for 15 meters fed with TV twin-lead and stretched a couple of feet above the peak of the roof. It was the middle of the biggest sunspot peak of the twentieth century and the band was full of new stations to work. Unfortunately, my across-the-street neighbor had an old TV set with intermediate frequency of 21 MHz. No matter what channel his family was trying to watch, my signal would wreck the picture. It wasn't a harmonic or front-end overload issue, so there was no filtering fix for it.

Weary of being limited to operating on Sunday mornings when my neighbor was at church, I searched for a simple and effective antenna system for the other HF bands. Every issue of every ham magazine included an ad for vertical antennas by the Gotham Antenna Company of Miami Beach.

The ad was compelling: "A product that is consistently advertised in QST, month after month, year after year has to be good," it stated. "Over 10,000 Gotham antennas have been purchased by QST readers. No radials are required. No guying is needed." There was a long list of DX stations supposedly worked by one customer.

Spending under seventeen dollars (plus railway charges collect) for a complete vertical for all bands from 80 through 6 meters -- what could go wrong?

Eventually a long box arrived. Inside were just three telescoping eight-foot sections of thin-wall aluminum tubing and a 3-inch diameter B&W air-wound coil. No base insulator was provided. The instructions were deceptively simple: Just mount it as high as conveniently possible. Connect the coax shield to one end of the coil. Connect to the base of the vertical radiator to a tap on the coil at a point where the system is resonant on the band of interest. The coax center conductor goes to another tap on the coil selected for best SWR.

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FRC September 3, 2025 Board Meeting Minutes

The monthly FRC Board Meeting was called to order by President Bob Houghton AD6QF at 5:32 pm on Wednesday, September 3, 2025 via Zoom.

Board Members present: Bob Houghton AD6QF, Robert Gimbel KG6WTQ, Ray Rounds K6RAX, Walter Clark, Bart Pulverman WB6WUW, and Larry McDavid W6FUB.

Board members absent: Gene Thorpe KB6CMO.

The August Board Meeting Minutes were reviewed and approved without amendment.

Treasurer's Report:

- New deposits: \$.02 interest
- New expenditures: Ray's reissued AITP check
- Bank balance: \$5794.36 as of August 31 bank statement.

Membership:

- New members: None
- Bob's records show 27 paid members, plus 1 life member as of 9/04/2025.

Old Business:

- There was no old business discussed.

New Business:

- Ray discussed the likely focus for Hillcrest Park on Saturday September 13 at 8am.
- Bob mentioned the upcoming elections, referred the Board to Article VII of the By-Laws, and, after some discussion, the following positions were agreed on:
 - President, Ray Rounds
 - Vice-President, Bob Houghton
 - Secretary, TBD, it was suggested Bob contact Ted Schulman as a candidate.
 - Treasurer/Membership, Gene Thorpe
 - Members at Large, Larry McDavid, Bart Pulverman, Walter Clark, Robert Gimbel
- Bob also suggested with positions filled we might dispense with having a Nominating Committee per the By-Laws.

Additional Discussion Items:

- Robert requested an update on the location for the holiday dinner. The dinner will be at Sizzler in Fullerton.

Meeting was adjourned at 5:48 PM

Submitted by Ray Rounds K6RAX, Secretary

October schedule

Wednesday 10/1/25

5:30 pm Board Mtg (Zoom)

6:30 pm - Dual-mode Net

7:00 pm Zoom

Wednesday 10/8/25

TAG at Walter's

Saturday 10/11/25

8:00 am Hillcrest Park & Lunch

Wednesday 10/15/25

6:30 pm - Dual-mode Net

7:00 pm Zoom

Wednesday 10/22/25

6:30 pm - Dual-mode Net

7:00 pm Zoom

Wednesday 10/29/25

6:30 pm - Dual-mode Net

7:00 pm Zoom

Dad helped me affix the 23 feet of aluminum to the side of the garage with a couple of TV mast brackets, insulated with sheet rubber. The bottom was ten feet off the ground, so I had to stand on a stepladder to adjust the coil taps.

Antenna analyzers and NanoVNAs were unheard of back then. I had a Heathkit antenna bridge and an Eico grid-dip meter, but measurements at the base of the vertical atop the ladder were awkward because the grid-dipper was heavy and required AC power. Tap selection became trial-and-error with SWR measurements in the shack. The optimum tap points were different for each band as well as for the CW and phone segments of 80 and 40 meters. Fortunately the pi network in the Heathkit DX-40 could put power into high SWR, but most of that power was probably just warming the coax.

With no radials, the only counterpoise for this vertical was the outside of the coax shield. That explains how I got a few nips from "RF in the shack." The concrete driveway was right up against the side of the garage, so there was no place to drive a ground rod. It wasn't long before I gave up on the Gotham vertical and put up a fan dipole.

Fast-forward to 2025. WA6OPS and I are working the HF bands from Morningside on 40 through 10 meters with short center-loaded resonant Hustler vertical whips on the patio of our ground-floor apartment. The counterpoise is one set of quarter-wavelength slightly-elevated radials for each band. They extend to the northeast, to aim any directivity toward central and eastern states. Maximum antenna height is

only 14 feet, so it hasn't attracted any negative attention.

To surprise me on our anniversary, April surreptitiously researched HF antennas that she thought would be an improvement. (Eat your hearts out, guys!) This is the ad that she found: "This antenna makes the most of a tight situation! When you have too little space or too much regulation, it offers easy assembly and setup, no ground radials, no tuning or adjustments, and SWR under 1.6:1 from 3.5 MHz to 57 MHz! The Comet CHA-250HD can provide a clear winning advantage to getting out and making QSOs!"

A long box arrived before our anniversary and give me a new project. I already knew a little about this Comet antenna. Former FRC member Vi Barrett W6CBA (SK) had one on the balcony railing of her top floor Morningside apartment. The metal rail was its only counterpoise. During some Santa Ana winds, the top section permanently bent over. Since it was quite close to the building on her narrow balcony, it wasn't a great performer for her, but it was better on some bands than the attic long-wire she had been using.

The CHA-250HD is 23-foot vertical that is designed to work from 80 through 6 meters. How is that different from the Gotham vertical? For starters, the Comet is much more

rugged, with aluminum sections tapering from 1-1/4 inches to 1/2 inch diameter and a sturdy insulated mounting bracket. In the new CHA-250HD, the top five-foot section is a flexible whip that won't stay bent from wind or bird strikes like Vi's antenna did.

ANTENNA BREAKTHROUGH

IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

ALL-BAND VERTICALS

QUALITY MATERIAL
Brand new mill stock aluminum alloy tubing with Aluminate finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION
Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY
Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION
Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE
Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES

Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T1PFGS, W8KYJ, W1W0Z, W20DH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDI, K1MVV, K8HGY, K3JTL, W8QJC, WA2JVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

V40 vertical for 40, 20, 15, 10, 6 meters \$14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters \$16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters \$18.95

ALSO AVAILABLE AT
AIREX RADIO CORP., NEW YORK CITY
CANADA—ON REQUEST

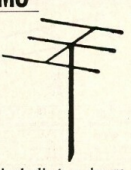
HOW TO ORDER: SEND CHECK OR MONEY ORDER. WE SHIP IMMEDIATELY UPON RECEIPT OF ORDER BY RAILWAY EXPRESS, SHIPPING CHARGES COLLECT.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

BEAMS

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (3/8" of tubing for each 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 kW; 3/8" and 1/2" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

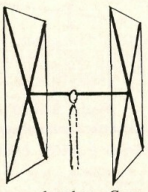
2 EI 20	\$16	7 EI 10	\$32*
3 EI 20	22*	8 EI 10	36*
4 EI 20	22*	4 EI 6	15
2 EI 15	12	5 EI 6	20*
3 EI 15	16	6 EI 6	24*
4 EI 15	25*	7 EI 6	30*
5 EI 15	28*	8 EI 6	28*
4 EI 10	18	9 EI 6	30*
5 EI 10	24*	10 EI 6	32*
6 EI 10	28*	* 20' boom	



QUADS

NEW! NEW! NEW! CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

TWENTY METER CUBICAL QUAD. \$25.00
FIFTEEN METER CUBICAL QUAD. 24.00



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The biggest difference from the Gotham is the matching system. Design details are Comet's trade secret, but some experimenters have attempted to reverse-engineer it. Inside they found two ferrite-core step-up transformers. Infrared measurements suggest that one transformer is for the lower bands and the other for the higher bands. The matching network provides manageable SWR on 80 through 6 meters without adjustment, but it's so lossy that its cover has fins to radiate the heat produced.

A 23-foot vertical reaching to the sky from our patio would not be stealthy. To easily get it out of sight when appropriate, I mounted it on a tilt-up base, as shown in the photo. The DX Engineering Omni-Tilt is made from thick stainless steel and easily handles this seven-pound antenna. I can put it up or down in seconds. The base also holds a USA flag to draw viewers' eyes toward it instead of the tall antenna above.

Just like the Gotham vertical, Comet recommends that the CHA-250HD be mounted as high as possible, preferably on a mast at least 35 feet above ground. The unstated reason for this is that the mast serves as an effective counterpoise. Since I couldn't do that, I decided to utilize my existing set of radials, one per band. They go out from the antenna base to the northeast on the outside of the patio wall, spaced apart on electric fence posts. A hedge conceals them from public view.

I modeled my vertical-and-radials layout in EZNEC for 80 through 6 meters to determine the base impedances and radiation patterns to expect on each band. The results won't fit in Smoke Signals, but I have posted them plus some additional details here:

<http://www.homingin.com/gotham.html>

Would the Comet provide an improvement over my existing short resonant vertical system? Could two ferrite transformers make a decent match to 50 ohm coax over a very wide impedance range without wasting too much power? To find out, I used PSK Reporter and the Reverse Beacon Network as I hunted POTA parks on FT8 and CW.



COMET ANTENNA ON TILT MOUNT

The most popular POTA band is 20 meters, where the Comet's take-off angle is about 22 degrees above the horizon. On an afternoon with a quiet geomagnetic field and solar flux of 180, the Comet got good reports from stations from 750 to 1600 miles away to the north, northeast and east. There were also double-hop hits in Alaska and Japan. By comparison, the Hustler whip received reports from 600 to 2300 miles to the east and also from Hawaii.

Relative performance of the two antennas was similar on 17 meters.

On 15 meters, the Comet was heard from the Midwest to the east coast and in Japan, as was the Hustler. Signal reports on the Hustler were a bit stronger, which I attribute to loss in the matching network of the Comet.

I didn't expect the Comet to be a DX antenna on 12 and 10 meters because its 23-foot vertical element is well over a half wavelength. That makes the major lobe take off at about 50 degrees. But there is another lobe about 4 dB down at 10 degrees elevation. So I was pleasantly surprised that both the Comet and Hustler were spotted in Australia on 10 meters in the afternoon, as well as throughout the eastern third of the USA.

The Comet's best performance compared to the Hustler is on 30 meters, probably because the Comet's vertical element is close to a quarter-wavelength on that band. It got good signal reports out to 1100 miles in the daytime and throughout the

entire continental USA at night. The Comet's worst relative performance is at night on 40 meters where the 31 degree elevation lobe limits skip to about 800 miles. That elevation lobe is down only 3 dB at 65 degrees elevation, so it's good for regional Near Vertical Incidence Skywave (NVIS) QSOs during the day.

I had some misgivings at first, but I'm glad that I tried out the CHA-250HD with resonant radials. No doubt there is significant loss in the matching system, but in just a few weeks I've worked scores of POTA parks plus DX such as Western Samoa, Japan, New Zealand, Korea and Asiatic Russia. Band changing is fast (no stepladder!) and the rig's internal tuner easily handles the 2.2:1 maximum SWR. There's no "RF in the shack." It's non-directional, even though the radials go out in only one direction. None of our neighbors have complained about its appearance so far. My next project will be adding a zig-zag radial for 80 meters.

For those of you in HOA situations, could this modern version of the Gotham vertical on a stealthy tilt-up mount with discreet radials be your answer to getting on the HF bands?

Modern Mouse

By Larry McDavid W6FUB

I just got a new Logitech MX Master 3S mouse for my home computers. It has been a long time since I upgraded my computer mouse and there are specific advantages to this new one I bought at MicroCenter in Tustin (also on Amazon):

1. Multiple Bluetooth connections for up to three different computers. Yes, use one wireless mouse on your desktop with multiple computers.
2. Though I have not yet tried it, the description says it can copy files from one computer to another by click-and-drag!
3. Three-month Li Ion battery charge life and recharge in minutes from a USB Type C source.
4. 8000 dpi high resolution, an advantage if using Photoshop (or, games); works even against clear glass desktop. In fact, I've not found any surface it won't work against.
5. The mouse wheel is selectable between continuous, high-speed, high-inertia spin and step-

wise detent. A button just behind the scroll wheel alternates between the two wheel modes.

6. Separate thumb-accessed scroll wheel for horizontal scroll in Excel, Word, browser and other applications. The effect of this thumb wheel is selectable in various applications; major choices are horizontal scroll and zoom in/out.

7. There are other buttons I likely will never use! With enough use, you might remember what you programmed them all to do; I just ignore them!

I'm finding that needing just one mouse for multiple, side-by-side computers is very convenient.

I have numerous Excel worksheets that are wider than my computer screen. The separate thumb wheel works great to scroll Excel horizontally; that is the default operation.

The free Logitech software allows you to program some functions to do different things in different applications. I really like having that thumb scroll wheel!

The Logitech software shows the remaining battery charge. Even left "ON" for nearly a month, the reported charge life has dropped only to 85%.

Yes, the mouse looks a bit different but it fits my hand well. I was not sure about the thumb rest but it was immediately comfortable. Now my thumb does not drag on my desktop as I move the mouse.

I've used it in place of all my other computer mouse and have not had any problems or compatibility issues; the Bluetooth link immediately paired on three computers.

Key take-away: horizontal scroll thumb wheel is great!



LOGITECH MX MASTER 3S MOUSE

The End of Passwords? A Look at How Passkeys Work

Ray Rounds, K6RAX

In our ongoing series about keeping the internet safe, we've been chatting about the importance of strong passwords and protecting two-factor authentication (2FA). But what if we could ditch passwords altogether?

That's where **passkeys** come in. These are the new password-less authentication standard that's about to shake things up when you log in. Unlike a password, which you have to remember, a passkey is a unique cryptographic credential that lives on your device, super secure with your biometrics (like your face or fingerprint) or your device's PIN. Lots of online services are switching to passkeys and making things even safer—let's check them out.

How Passkeys Work

Passkeys are built on a security technology called **public key cryptography**. When you setup a passkey for an online account, your device instantly makes a pair of mathematically linked keys:

- **A Public Key:** The website gets this key and stores it on its servers. It's public and safe on its own.
- **A Private Key:** Your device keeps this key super securely. It never leaves your device and is the real secret.

When you want to log in and you send your username or email to the service, the website quietly sends a unique "challenge" back to your device. Your device uses its private key to "sign" (or authenticate) this challenge. To do this, you might confirm your identity with your face scan or fingerprint. The website gets the signed challenge and your public key, and instantly checks the signature. This process confirms you're the real deal **without ever sending a password or private key over the internet.**

Can a private key be guessed? Not even with the most advanced super computers trying every possible combination. For the shortest and advanced form of public keys at 256 bit lengths, that works out to:

115,792,089,237,316,195,423,570,985,008,687,907,
853,269,984,665,640,564,039,457584,007,913,129,
639,936

possibilities (whew!). Even with a supercomputer that could check a billion-billion key pairs per second, it would still take billions of years to find the right one. Many keys are 2048, 3072, or 4096-bits long. You have better odds just playing the PowerBall Lottery.

The Major Advantages

Passkeys are a game-changer when it comes to security and ease of use compared to traditional passwords:

- **Phishing-Resistant:** Since your passkey only works with the website that made it, a scammer can't trick you into using it on a fake site. This takes out a common way cyberattacks happen.
- **Immune to Data Breaches:** Your private key is never stored on the website's server, so it can't be stolen in a data breach. Hackers who steal public keys will find them useless.
- **Simpler and More Convenient:** Say goodbye to the headache of maintaining a bunch of complicated passwords! Just a quick biometric scan, and you're in.
- **Replaces 2FA:** The passkey process enhances built-in multi-factor authentication, mixing "something you have" (your device) with "something you are" (your biometrics), so you don't need separate 2FA codes anymore.

What companies are using or rolling out passkeys now? Here's a short list: Apple, Google, Microsoft, Amazon, Adobe, PayPal, 1Password, Discord, X (Twitter), Facebook, Instagram, and WhatsApp. These, in addition to many financial institutions, are actively working to eliminate passwords.

It might take a little while to get used to the password-less future, but as big tech companies jump on the passkey bandwagon, it's a clear sign that we're heading towards a much safer and easier digital world. By switching to this new standard, we can finally leave behind the frustrating and insecure world of passwords.

Let me know via email: [k6rax \(at\) rayrounds.com](mailto:k6rax@rayrounds.com) if this is something you've used.

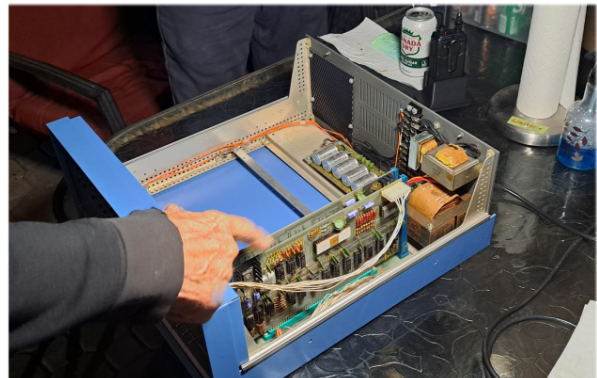


TAG Activity Report for September 2025



Dick Bremer led the pre-meeting discussion. It was on the reticence of Brea City Council to grant permission to put up a ham repeater, which Dick insists the City Council wanted.

John Mock told us of his early experience with home computers. His computer store was the second one in all of Orange County. John's was called Bits and Bytes. The first store was called Computer Mart. They sold Abacus brand counting machines. No wait. It was more like this . . .



The Altair 8800 earned the distinction of being THE computer that started the microcomputer revolution with the January 1975 issue of Popular Electronics front page stating "Build your own computer for \$385 (?)." It's a difficult kit to build. Sixty plus wires have to be individually installed to bring front panel signals to the 100 conductor motherboard. Eight additional

wires connect the front panel to the CPU card. If you want to add to the 4 slot motherboard, you purchased another 4 slot board and wired 100 wires between each! The power supply was woefully inadequate to power needed adapter boards.

Even so, the marketplace blessed it because of pent up demand for personal computing. Me too computers, such as IMSAI, Processor Technology, Vector Graphic, Morrow, Godbout and many others soon followed for the same reason,

The other old-timers at the meeting argued about the kind of feel the switches had. Apparently some were of a higher sophistication.

Dick Bremer has had a long term interest in locks. Here's an example of his collection of keys. There seems to be a story behind each one. One of the most interesting locks he showed this night is one that can remain locked yet with a special key can remove the locking mechanism and replace it with one that requires a different key. He was reminded of this old hobby of his when he had to attend to the lock of repeater station that is actually a part of some city utility building.



Ray Rounds had a story to tell about what at first seemed like a piece of rescued old computer thing. We are talking 8 years old. It was however new to some of us. This little box had an SD card slot, 3G of RAM, loaded Windows 10. There was Bluetooth, sockets for monitor, keyboard and mouse. It was called **Intel Compute Stick**. Ray is going to see if it can be handy for field day where a computer seems to be more a part of the radio than his rig at his home. 8 years old. Have you noticed how useful stuff can be and still be 8 years old, any more. Back in the 80s, 8 years meant obsolescence.

Harish Kumar is studying code for his next step up in ham licensing. He was very enthusiastic about one of the lessons involved with his study; **decibels** in ham radio speak. He wanted us to remember the most important part of “dB for radio” is that it is a way to understand the ratio between two things that could be quite different but use the same units.

Larry McDavid talked about using his new ICOM IC-9700A 2m, 440 and 1.2 GHz all-mode transceiver. He recently wanted to explore 1.2 GHz repeaters and was surprised to find 22 shown as Open Repeaters on the Repeater Book and SCRRBA (the local repeater coordinating body) websites. Testing revealed he could access only three of the 22. A subsequent QSO through one confirmed that, in fact, there are only three now operational; one is operated by the City of Orange Ham Club. His antenna is a 9-foot-tall tri-band Comet GP-98 vertical with 12 colinear elements.

Larry also talked about being a Time Nut with numerous GPS Disciplined Oscillators that output a precise 10 MHz frequency signal and a HP rubidium frequency standard. His favorite clock is a 30-year-old Heathkit “Most Accurate Clock” that uses 7-segment red LEDs to display even tenths of seconds using the 5, 10 and 15 MHz WWV (not WWVB) signals. What impressed all of us was what he said about where the digital time data are hidden in the WWV AM signal. The data are binary encoded using the WWV seconds “tick” tone; that “tick” is actually two slightly different-frequency audio tones, allowing the binary encoding. The Heathkit clock decodes this and, over time, adjusts its internal CPU oscillator so the free-running clock matches the WWV accurate time. The clock even adjusts for HF propagation delay from Boulder, Colorado!



Larry said that in the picture, the top clock is the average of time sent by four different GPS satellites. Actually the generic name for navigation satellites is GNSS. The GPS is the American one, and was the first. When I asked Larry what the difference between the two lower clocks he said “The bottom two are clearly Heathkit GC-1000 Most Accurate (WWV) Clocks. Note the name/model on their front panels.”

Bill Webb brought yet another example of his adventure with 3D printing. In this case it was a 3D structure where the thickness of plastic



corresponded to the light and dark of an image. The darker the part of the image the thicker. That way light behind it would reveal the original image. Of course it improves nothing. It's just something interesting to do. On the left is with light coming from in front off to the right. The picture on the right is with the light on in the box. Not the image is curved, perhaps to make the light box easier to make.