LARK NEWS September 2022

Livermore Amateur Radio Klub LARK is an ARRL affiliated club dedicated to Public Service Volunteer Emergency Communications.

Meetings are once a month on the 3rd Saturday 9:30AM

NEW VENUE: City of Livermore Meeting Hall

1016 S. Livermore Ave., Livermore CA 94550

Available live via zoom by invitation only. Visitors Welcome

Editor: Roberto Sadkowski K6KM

BOTA

Bathrooms on the air?

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President's Message

I want to take this time to thank Bernie NJ6W for making the coffee and picking up the refreshments for monthly meetings, it is appreciated by all who attend.

I wanted to let you know that the Events Chairperson (me) is following the upcoming events for 2022, and I have an update: the following events will be happening, the Devil Mountain Run on Sunday, September 18th in Danville, Pacificon SWAP MEET on October 16th. Make sure to sign up on the LARK website for these events for which LARK supports. I encourage you to participate in the monthly Technical Sessions/Meetings that will be on different topics and promising it will be very interesting. Make sure to watch for the schedule of the dates and topics coming out in the Newsletter. I wanted to thank Ron AD6KV and VE Team for continuing to provide a way for hams to get their testing completed.

Ian W6TCP continues to work on enhancing the repeaters for use by all of us so please report any issues to Ian by email.

I encourage you to check in with the LARK Monday, Wednesday (10.10 Windfarms Net), and Thursday night nets, held every week. There are other nets available, and they can be found on the LARK website It is good experience getting on the air. I want to thank Ed Diemer for coordinating the weekly nets. By participating in the nets, you'll hear what is going on in our Ham community We are meeting In-Person at the Livermore City Meeting Hall each month on third Saturday, and we are also offering the meeting on Zoom for those who prefer that way to attend. Wishing you all stay healthy and stay safe.

KG6GEM
(kg6wiu1@comcast.net)

Notes from the Editor

Summer conditions are in full force and the lower bands are very noisy. I noticed that during the NAQP CW weekend. I put 10 hours and made close to 800 QSOs operating from W6SRR.

It was a fun weekend. CW is still my favorite mode. More room to find a frequency to operate on, less QRM, your brain gets a tune-up and still can converse with operators if needed (albeit you'll waste some contest time).

If you have not started yet improving your CW skill or learning CW from scratch, I encourage you to try CWA (CW Academy) from CWOps. It's free and in one of those rare cases, you get a looooooot more than what you pay for.

Finally I managed to make some trips to the Tahoe area (mostly north Tahoe this month) and got to know some very nice areas. Great hikes to peaks higher than 10k feet. Also got to spend some time with fellow SOTA activators as we tend to flock to similar peaks and sometimes we meet up at the peak, or like in my case, I split activations with Gabriel: AJ6X and we did Summit-to-Summits, crossed paths and repeated so we achieved several completes. Completes are peaks where you do both: Chase and activate. Another way to count success.

Some DX in rare locations are popping up. Madagascar was on last couple of weeks, mostly on FT8.

I'm looking forward to Pacificon in October. A great chance to learn in the Antenna Forum, meet fellow operators and learn of new products.

Stay active,

Roberto K6KM

Board of Directors Meeting Minutes

LARK Board Meeting | August 16, 2022 | Minutes

Attendees: George, Bernie, Ryan, Jerry, Roger, Nate, Var, David
Absent: Ian, David, Chris

Call to Order

1. Meeting called to order by George at 7:02 PM.

Treasure's Report – Bernie

1. Club funds are good.

501(c)3 Application – Bernie/Chris

2. Roger: 501(c)(3) progress made on draft of new bylaws to help with 501(c)3 status. Bylaws shared with other members of the Klub for proof reading and possible modifications, additions or deletions

Repeater Update – Nate

1. No complaints heard

Meeting Update/Activities for 2022 – Jerry

1. No new updates on tech meetings
2. Speaker set up August Mesh Networks in the Bay Area, September Gordan West about LA Area Hams and ARES, No meeting in October, November President of USS Hornet Radio Club, December is the Holiday meeting, January Arnold KQ6DI about Coax, and February will be on Sun Spots,
3. Bernie suggested manufacturers might be interested in presenting (EleCraft)
4. De Any ideas can be sent to Jerry

Events – George

1. Devil Mountain Run Sunday 9/18, 12 have signed up, need about 8 more people
2. Pacificon SWAP Meet (10/16) volunteers continuing to sign up but need more volunteers for early and late shifts.
3. Cinderella 2023 is scheduled for Saturday, April 15th, 2023

Membership - Var

1. 175 paid members
2. Membership for 2023 will begin soon

By Laws - Roger

1. Working with Chris on last revisions
2. Copies of the By Laws can requested from the Secretary

LARK Badges

1. Roger's badge would be $22.50 went with $3.75 upgraded to extra strong magnet.

2. Nate did a badge for $8 through InstaCard
3. Bernie said we could buy a badge printer (Badgy) for $500-$600 that comes with enough stock for 100
4. Nate motioned and Var seconded to purchase the Badgy
5. Bernie will handle the purchasing of the Badgy

Adjournment

1. George adjourned the meeting at 8:06 PM.

Minutes submitted by:

_____

Ryan Mahoney (W6RAM)– LARK Secretary

Club Meeting attendance on 8/20/2022 Total of 30 people in the room plus 8 in ZOOM.

Monthly Meeting Minutes

LARK General Meeting | August 20, 2022 | Minutes

Call to Order

1. Meeting called to order by George KG6GEM at 9:32 AM.
2. George started introductions, first of In-Person attendees and then Zoom attendees.
3. 30 In person / 8 on Zoom / 1 guest (38 total)

Treasure's Report – Bernie NJ6W

1. Not a lot of recent bank account activity
2. Purchased badge printer arriving Tuesday 8/23 for cost effective badge production

Activities – Jerry N5KA

1. In September, Gordon West will be presenting via Zoom about how Santa Monica area handles emergency communications.
2. No meeting in October due to Pacificon.

Events – George KG6GEM

1. Patterson Pass Road Race was on August 7, 2022 with no issues.
2. Need more people to assist with Devil Mountain Run in Danville on 9/18
3. Spaces available for Pacificon Volunteers for the Swap Meet.
4. Pacificon Table: still looking for a lead for this, contact George if interested.

Newsletter – Roberto K6KM

1. Deadline is Monday 8/22

Membership – George KG6GEM

1. Reminders for renewing membership will be coming soon so please start renewing now.

Break – George KG6GEM

1. Short break at 0945 to setup presentation
2. Break concluded at 1000

Presentation

1. Rob Rowlands NZ6J Presentation on using AREDEN Mesh networks for emergency communications
2. Presentation concluded at 11:13

Old Business

1. Minutes approved unanimously from previous meeting

VE Sessions – Ron AD6KV

1. Two people taking a test today

ARES – Ron AD6KV

1. Pleasanton ARES beginning to start up
2. Looking for additional people to help with Livermore and Dublin ARES

Klutz Award Nominations

1. Nate N8MOR self-nominated. Nate has broken 7 Raspberry Pi, 3 Baofeng's and an Icom HT due to these items experiencing the downward force of gravity and colliding with the ground, unanimously approved.

Operating

1. Nate N8MOR went four-wheeling and did some simplex hilltop to hilltop

Adjournment

1. George KG6GEM adjourned the meeting at 11:21 AM.

Minutes submitted by:

_____

Ryan Mahoney (W6RAM)– LARK Secretary

Rob NZ6J enlightened LARKers about the latest on Mesh in the Bay Area. He received the LARK Mug in appreciation for his presentation.

Community Events Supported by LARK

Devil Mountain Run - September 18th, 2022

This event takes place in downtown Danville and is a foot race. Each position will be stationary, except for a possible bicycle sweep. Net Control will be in San Ramon Fire Protection District Communications Vehicle CS-131 in downtown Danville. Due to the location of the positions you will be able to perform your function with a handheld radio. The week of the event you will receive all necessary information including assignments. This event is a great chance to get out and use your radio and all levels of experience is welcome. Our prime concern is to provide emergency communications along the race routes. Assignment times are from 0700 hrs until released. Please review the available slots below and click on the button to sign up. Thank you!

LARK Ham Coordinator: George Moorehead kg6wiu1@comcast.net
Devil Mountain Run – Sunday, September 18th, 2022, from 0600-1400 hrs

Sign Up online here:
https://www.signupgenius.com/go/10C0844AEAD28A6FA7-devil1

PACIFICON - October 14-16, 2022
San Ramon Marriott

PACIFICON Swap Meet - Sunday, October 16th, 2022
The Swap Meet is held on Sunday morning at PACIFICON. LARK has hosted this event for the MDARC Radio Ham Club in the past years and have been requested to support the event again.
There are two shifts available:

LARK Ham Coordinator: George Moorehead KG6GEM kg6wiu1@comcast.net

Sign Up online here:
https://www.signupgenius.com/go/10c0844aead28a6fa7-pacificon1

Patterson Pass Road Race - George: KG6GEM

The Patterson Pass Road Race was held on Sunday, August 7th, 2022, in the hills East of Livermore. The heats/races covered many miles which stretched over different elevations. When you combine the length of the course, the winding narrow road with numerous hairpins turns, the heat, and sharing the road with motor traffic, this is a challenging race.

All racers started at Patterson Pass & Midway Roads and finished on Midway Road. We had a total of 191 racers, supported by 21 LARK hams. As usual, we did a very professional job. All major areas and intersections of concern for the race were safely covered for the entire event. From the Race Director Robert "First off you guys were great out there today. We really appreciate your support".

Net Control was located at the Registration area. Net Control this year was using the San Ramon Valley Fire Protection District Comm Unit (CS-131) which was set up in the dirt lot known as the triangle at the corner of Patterson Pass Rd and Midway Rd which was directly across the street from the power plant. The road is narrow, and the roadside strip where we set up was not super wide either, so racers passed within 6 feet of the Net Control station. At Net Control, it's important to always stay alert because when these elite cyclists pass by, they are going very fast, and they appear suddenly. You can't see them coming from a long way off, since the corner they turn before they pass by us is visually obstructed by trees. We had groups of racers

speeding past throughout the event. There were two minor medical incidents that was handled by the EMTs.

A big thank you to all the LARK ham volunteers for helping today. Present were Chris W6CJQ David KG6WIR, Bernie NJ6W, Jerry N5KA, Peter AI6RG, Rand W6TRM, Steve K8YIP, Mark KK6UKU, Ryan W6RAM, Mark N6MIN, Tony KF6JS, Sri KN6INK, Bill AJ6UU, Jeff AD6RH, Alan KM6BRQ, Kim N6LVQ, David K6WOO, Bill N6SGT, Geoffrey KK6SKZ, Tony KK6CPC.

As always, thanks for everyone's cooperation with the last-minute assignment changes and your help for this worthwhile public event. The P.P.R.R. course, although quick, is not easy for the racers and they can use the added safety net which ham radio coverage provides.

George KG6GEM


GMC


Patterson Pass Rd


Patterson Pass Rd
STOP
25

SOTA Marathon in North Tahoe - ROB K6KM

Finally I could find the time to plan an escape to the Tahoe area. There are many high value peaks there and some are not

hard to climb. I reserved a campsite at Alpine Meadows behind the Truckee Airport. It was nice and quiet.

The day coming into Truckee I would tackle Lowell Hill Ridge near Highway 20. This is about a 2 mile drive over very loose rock but manageable. The Tesla had no trouble negotiating the challenge on "Off-Road"

mode. The activation zone is quite large and you don't need to get to the ridge to operate, albeit it's nice to see the view from there. That's not a very visited placed so mosquitoes abound. Afterwards, I

headed to Truckee and hiked the Donner Ridge. That's a nice and easy hike with views 360 degrees. No shade and it was in

the mid 90's. Next day I headed to do the 3 SOTA peaks on Watson Road. First one is the only one I had done before: Watson Peak. You could drive to the peak but about a mile

up it becomes quite bumpy requiring high clearance. I decided to hike the two miles up. Very nice views of Lake Tahoe and it was early enough that it was still cool. After that, Mount Pluto. You could take the gondola to

the peak which requires driving to the ski resort, buying a permit and ultimately would take you to a middle peak in the Summer so more hiking involved. I decided to hike the service road which was partially shaded so it was fine.

The third peak of that day was Goldstar Peak. This is a hidden peak that requires a half mile hike on a proper trail and then

bushwhack your way up to the summit. This place used to be a logging operation so there are lots of dead trees, loose soil and many bushes. It took me awhile to find a clear to make it. On the way back and looking down I found a better approach just 50 yards ahead. Yes, I'm anxious… I should have walked another 50 yards. Talking with Dan AI6XG, I learned that a better way might

be to take the road up on the west side of the trail and bushwhack to the east. Next

time.

For the third day I was targeting Grouse Ridge. This entails a 5 mile drive over not so great a dirt road. I was apprehensive of taking my Tesla through that road and

Ed W1EJ

consulted with Jamie: N6JFD who used to be the SOTA Manager for the Tahoe area for many years. He did not do Grouse Ridge this year so he offered to come along with me and we rode in his Audi. He had 8 inches of clearance and knew the road. The top of Grouse Ridge is gorgeous. 360 degree views with cliffs in all directions. Perfect for low

High Altitude Bathroom Structure

angle take-off. I got spotted in Australia and Samoa. Had a rowdy pile-up and worked 18 QSOs in 10 minutes on 20m. I let Jamie use my station afterwards. To our surprise two more SOTA activators showed up. They drove their Jeep all the way to the top of the ridge. Ed: W1EJ and Joe: AA0BV. We had some nice chats and everybody got busy trying not to interfere with each other.

Date	Summit	Name	Altitude	Points	Activations	Callsign used	QSOs
22 Jul 2022	W6/NS-195	Grouse Ridge	7713 ft	8	49	K6KM	18
21 Jul 2022	W6/NS-138	Mount Pluto	8615 ft	8	48	K6KM	22
21 Jul 2022	W6/NS-147	Mount Watson	8425 ft	8	60	K6KM	20
21 Jul 2022	W6/NS-189	Gold Star Peak	7740 ft	8	67	K6KM	17
20 Jul 2022	W6/NS-181	Donner Ridge	7825 ft	8	83	K6KM	19
20 Jul 2022	W6/NS-306	Lowell Hill Ridge	5801 ft	6	47	K6KM	7

Overall I made 46 points in 3 days.

Finally I reached 1/3 Mountain Goat after more than 3 years of activations. Working the high point peaks pays its dividends.

Yes, I plan to return but currently smoke is coming to the area and to the Tri-Valley too. Not a healthy option to hike.

Elecraft has this year released a new firmware for the KX2. After long characterization of the rig they determined that it can run a lot longer on 10W in CW that they thought possible. Early this year they requested beta testers for a new firmware lowering the threshold where the rig would switch to 5W. I volunteered and ran some tests for them. The firmware is formally released now and I can happily say that I made all 6 activations with the same battery at 10W.

Looking forward to the next SOTA adventure.

Rob K6KM

2nd SOTA Marathon in North Tahoe - ROB K6KM

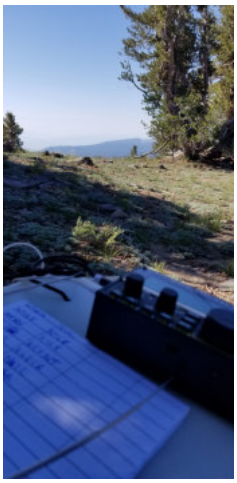
Back to Tahoe for a second round of high valued peaks. This time, AJ6X Gabriel was going to join me at the campground and we would split in order to cover summit-to-summit opportunities.

I stayed in the same campground which seemed to be quite available for this time of the year. First peaks were Lincoln and Signal Hill at the Donner Ski Ranch. Lincoln was a bit longer than I

predicted but a very rewarding hike. Follows mostly the Pacific Crest Trail until getting off trail and following the ridge up to the top where the gondolas are. In all the activations on this trip was contacted by JA stations.

Signal Hill is just a walk on a service road to the towers, nothing to write about. Next day heading to the Nevada part of Tahoe to

the Mount Rose area. First peak was a 10 pointer: Tamarack Peak. I somehow got totally lost and off track. Could not find the trailhead to Tamarack which I later learn does not exist. Ended up hiking unnecessarily long on the PCT, tracking my steps back and climbing two steep ridges off trail to find the barely marked trail to the top. On several parts the trail fades away and you have to wander looking for a possible way up. Luckily, bushwhacking at that altitude is not so bad. Not much manzanita bushes to fight, poison oak, etc… mostly soft ground and plenty of room to negotiate between trees. The peak was very nice and very quiet. I had one of the best activations there. Gabriel: AJ6X who was already on the peak across the highway made an S2S with me on 20m 5W. S9+60. I had to turn down the volume because it was distorting. Later Gabriel went to another peak and I climb the one he was coming down from. We met on the way. By that time the temperature was on the 90's and the sun was cooking. There was a lot of



people at the peak working on the gondola and some towers. One of the workers passed by on an ATV and I begged for his mercy. He let me hop on the ATV and took me to the top. That night it rained a bit and in the morning it was very gloomy. I attempted a peak which failed. A few hundred yards from the trailhead started raining and when I made it back to the car it poured. Went 20 miles away and completed a 6 pointer and headed home. I nice SOTA few days and bunch of points for this OM.

The only incident to comment on was the final epic failure of the logging App: HAMRS. As heard form other people,

finally I got the “all logs erased” love. It was good I email myself the ADIF file after each and every activation so I had them waiting for my in my inbox. However, as seen in the small picture on the upper left, I had to go back to writing the contacts with pen and paper.

It surely is nice to hike up in Tahoe. Can’t wait for the next outing.

Roberto K6KM

3D Printing for Amateur Radio Projects - Dave K6DHL

I can still remember thumbing through the Nov 1958 issue of QST and seeing that four page color ad (back then QST was all black and white) revealing to the world for the first time, the Collins S-Line of ham gear in all its gleaming glory, and thinking to myself, this transcends mere hardware, this is art. Soon everybody was copying the style, and even the color scheme with varying degrees of success, but for us less affluent hams, resigned to building our own equipment, achieving such a professional look was completely beyond our reach, until now.

Back in January I started investigating the current state of 3D printing hardware and software, as well as some of the downloadable projects created by others, and decided that the time was right to jump on the bandwagon. The first decision was, do I build or buy the printer. There are many decent printers that can be had for under $300 but these are generally limited to printing small objects out of undemanding types of plastics whereas my goals were to create larger objects fashioned from exotic materials like nylon, carbon fiber infused plastics and bullet-proof stuff like polycarbonate. Off the shelf printers capable of handling such materials at any large size could easily exceed $3000, which was a bit more than I was willing to invest in the hobby. Another big plus to be had when

building your printer from scratch is the depth of understanding gained in the

process that just can't be acquired by reading a user manual.

In an exchange of emails with Alan Biocca WB6ZQZ, who had just recently given a presentation on 3D printing at the International Hamfest and Convention

down in Visalia, he supported the choice of the Voron family of DIY printers which, while moderate in cost, were very capable machines. The Voron machines occupy a unique niche in the 3D cosmos in that they are not a product but are a library of printed part files and a list of open source specifications which, if followed to the letter, result in what many consider to be, the ideal hobby printer. The most recent incarnation in the ever evolving series of unique designs is the Voron 2.4, which is what I opted to build.

The Voron 2.4 Design Website provides a Configurator which, after ticking the check boxes next to a short list of options, generates a complete bill of materials with hypertext links to suppliers for each part. I went with the 300 mm x 300 mm size rather than the larger size since big printers are, purportedly, more difficult to setup and maintain, but this printer has worked so faultlessly, I now wish I had selected the 350 mm x 350 mm model.

You could order the parts from 50 different venders, but what most people do, including myself, is to order a mostly complete set of parts from one of the many kit suppliers. I bought mine from 3DPrintersBay for $879 which turned out to be a good compromise between cost and quality. At the top of the heap are the LDO kits which, in addition to providing the highest quality components, actually add spare hardware and items not found in the original specification, like LED lighting and cable races but at an elevated cost upwards of $1400. I mentioned that the kits are mostly complete because these kits do not include any of the required 3D printed parts (there's a total of about 183) because the assumption is that you are upgrading from another printer and would be printing the required parts on that printer. Lacking access to another printer, the next best option is to buy the parts through the Voron Print It Forward Program which is a bunch of volunteers scattered throughout the country who will do the job for $100 plus postage. This is a fair price considering the plastic filament (usually ABS) will cost about $40 and you're tying up somebody's printer for 90 hours. On the downside the wait time can be excessive. When I added my name to their queue the estimated time was about 4 months. Yikes,

I could be dead before the parts show up (I only buy ripe bananas). There are numerous other options, some with much shorter turn-around times, but at a higher cost.

I finally went with West3D who delivered the parts in three weeks for $159. Disappointingly, some (about 12) of these parts had layers that were separating rendering them untrustworthy. When I contacted West3D they apologized profusely and moved my name to the top of their queue and I had a complete set of replacement parts a week later (this time from a different printing source). They didn't even ask me to return the old parts and they just took my word as proof of the condition of the defective parts. I could have been pulling a scam to get an extra set of parts to be later sold on EBay. Consider this a ringing endorsement of this particular outfit.

Assembly took about 40 hours which I stretched out to about two weeks because I'm old and lazy and I wanted to avoid project burnout and knee problems caused by standing on concrete too long. Between build sessions I watched Voron Construction tutorials (there are hundreds), some of which walk you through the entire assembly in real time. These "live stream" videos can be slow and tedious but they often reveal nuances glossed over in the assembly manual. Plus it's sort of refreshing to watch somebody else getting really frustrated while making the same mistakes I made.

Some of my favorites were:

My new favorite 3D Printer by Thomas Sanladerer

Building a Voron 2.4 (parts 1-8) by Thomas Sanladerer

Building an Epic DIY 3D Printer: Voron 2.4 with Mods! by Dr. Flo

Voron V2.4r2 LDOmotors kit build – PART 1 by Nero 3D

After tightening the last metric screw and terminating the final cable, the time arrives to address the elephant in the room…SOFTWARE. Here again there are multiple choices to be made but my instinct was to follow the herd, reasoning that the greater the number of users, the greater the available resources. Well, sort of. The primary Voron user community is found on Discord which is the modern equivalent of The Tower of Babel. You can eventually find the information you're looking for but it takes awhile to understand the organization and search philosophy to successfully wend your way through the chaff. Anyway, the consensus was that Klipper is the controller code of choice for the Voron 2.4. The story goes, if you give a group of dedicated Klipper programmers a year-long quarantine in place order, you're likely to end up with some really refined software.

Following the software installation instructions found of the Voron 2.4 Design website everything progressed smoothly

without serious missteps. The Klipper code and MainsailOS (the operating system used on the Raspberry PI) are downloaded from the links provided onto an SD card on your home computer. This card is then inserted into the controller board, in my case the BTT Octopus, and then the Raspberry PI. The code is automatically installed on power up. The Kipper interface provides a configuration editor with which, combined with the instructions on the Voron site, you adjust the controller parameters to match those of your particular printer. And if you get stuck, there's always Discord.

The MainsailOS creates an URL which is accessible from either wifi or wired Ethernet. I located the printer downstairs next to my rack of power amplifiers which already had an Ethernet hub available, so I didn't even bother configuring the wifi port. The printer has a physical user interface display which I almost never use as the browser connection is just so much more convenient to use from my shack upstairs. The only downside to this arrangement is that you really need to keep an eye on that printer when in operation as it does occasionally screw up. This usually occurs when the printed part breaks loose from the bed plate and the printer, blissfully unaware, continues squirting spaghetti into space. So the first enhancement I made was the addition of a Raspberry PI Camera and some LED lighting. Adding this to the code was painless as Klipper already had the hooks in place to support these options, the PI has a dedicated camera port and the controller board has spare connectors for powering things like LED lighting strips. The housings for the camera and LED light strips were downloaded from Thingiverse and printed on my printer. You are probably starting to get a feel for the self-replicating nature of this thing.

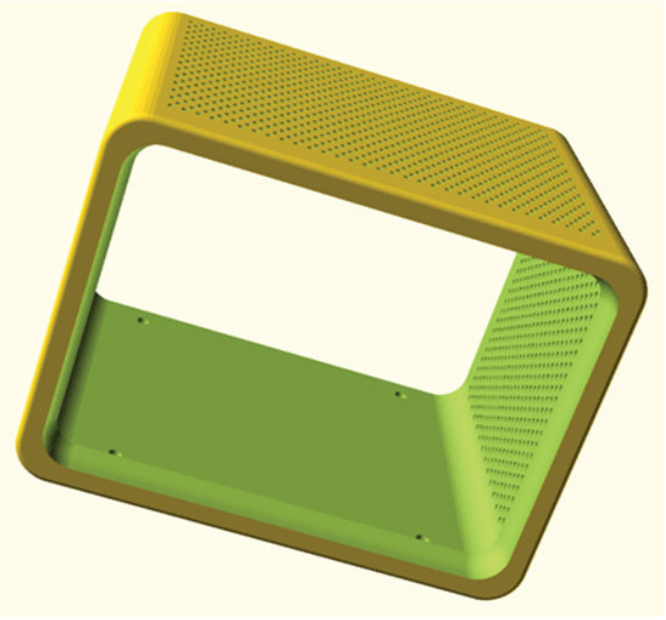
So now I can sit at my computer upstairs, establish a connection to the Klipper Dashboard, bring up a separate connection to the camera, turn on the LED lights and play God.

Pi Cam

"Do or do not. There is no try."

We've covered the firmware that goes into the printer now we need to look at the code that generates the input for the printer. Let's start at the top and work our way down. The code where it all begins is the 3D CAD Program. Here's a good write up on how to choose the one that best meets your needs The Best Free CAD Software of 2022 from the online magazine All3DP, an incredibly useful resource. Many of these editors are geared toward those who wish to create an artistic masterpiece, or failing

that, a bust of Yoda. But most of us in the Ham community are looking for something to create functional components with symmetrical proportions. Way down in this list of choices you will find OpenScad. This is different from the What-You-See-Is-What-You-Get style of drag-and-drop editor in that you write code and then preview the result as you go along. Now I know that some of you, probably most, are saying, "No freaking way am I writing code to create a 3-dimensional object", but hear me out. Here is the code to create the following object:



Notice the resemblance to the Collins S-Line cabinet

```
function Millimeters ( Inches ) = Inches *
25.4 ;

/*
Cabinet outside dimensions in millimeters

When the Cabinet is sitting on the work bench:
Depth is distance from to back
Width is distance from Left to Right
Height is distance from bottom to top
Cabinet is built on its face so...
*/

Depth          = 130; // (z)
Width          = 156; // (x)
Height         = 116; // (y)

Wall_Thick     = 6;
C_Rad          = 10;//Filet radius
Resolution     = 50;//Filet smoothness
Bezel_Radius   = 10;//Inside bezel radius

module Round_Box(L, W, H)
{
   $fn=Resolution;
    hull()
    {
        translate([C_Rad,C_Rad,0]){cylinder(r=C_Rad,L, center = false);}
        translate([W-C_Rad,C_Rad,0]){cylinder(r=C_Rad,L, center = false);}
        translate([C_Rad,H-C_Rad,0]){cylinder(r=C_Rad,L, center = false);}
        translate([W-C_Rad,H-C_Rad,0]){cylinder(r=C_Rad,L, center = false);}
    }
}

module Round_Box_Round_Edges(L, W, H)
```

```
{

    // Rounds the front and back outer edges.
    $fn=Resolution;
    Edge_Radius=2;


    /*
    minkowski transform expands the object in all three directions by the radius
of the sphere.
    translate to offset minkowski expansion
    */
    translate([Edge_Radius, Edge_Radius, Edge_Radius])
    {
        minkowski()
        {
            // Shrink box to offset minkowski expansion
            Round_Box(L-Edge_Radius*2, W-Edge_Radius*2, H-Edge_Radius*2);
            sphere(r=Edge_Radius);
        }
    }
}

module Bezel()
{
// A concave picture frame for front of Cabinet

    Thick = 3.5;
    $fn=Resolution;

   difference()
    {
        translate([Wall_Thick,Wall_Thick]){Round_Box(Bezel_Radius, Width-
Wall_Thick*2+.2, Height-Wall_Thick*2+.2);} // Expand by .2 to insure manifold
        minkowski()
        {
            translate([Thick*2+Bezel_Radius,Thick*2+Bezel_Radius, -
Bezel_Radius+3]){cube([Width-Thick*4-Bezel_Radius*2, Height-Thick*4-
Bezel_Radius*2, Bezel_Radius]);}
            sphere(d=Bezel_Radius*2);
        }
    }
}

module Screw_Hole()
{
   $fn=Resolution;
    Screw_Dia   = Millimeters(.16)+.5; // #8 with 1/2 mm oversize
    rotate([90,0,0])cylinder(d=Screw_Dia,10, $fn=50);
}

module Bottom_Holes()
{
    /*
    This design assumes a pair of aluminum panels, front and rear and a bottom
plate.
    The vertical panels attach to the bottom plate with a pair of 1/2x1/2 inch
aluminum bars, front and rear.
```

```
    The bottom holes are spaced from the front and rear to fall in the center of
the bars for attachment
    of bottom feet with 8-32 screws into holes tapped into the bars.  The bars can
be located either above
    or below the bottom plate.
    */

    Front_Panel_Thickness   = 0.0625; // 1/16-inch panel
    Rear_Panel_Thickness    = 0.125; // 1/8-inch panel
    From_Rear   = Millimeters(Rear_Panel_Thickness+.25);  // panel thickness +
center of 1/2" bar
    From_Front  = Millimeters(Front_Panel_Thickness+.25) + Bezel_Radius;
    From_Side   = C_Rad + Millimeters(.75); // 3/4-inch from the upward curve of
the sides.

    translate([From_Side, Height+2, From_Front])Screw_Hole();
    translate([Width-From_Side, Height+2, From_Front])Screw_Hole();
    translate([From_Side, Height+2, Depth-From_Rear])Screw_Hole();
    translate([Width-From_Side, Height+2, Depth-From_Rear])Screw_Hole();
}

module Shell()
{
    difference()
    {
        Round_Box_Round_Edges(Depth, Width, Height);
        translate([Wall_Thick,Wall_Thick,-2])Round_Box(Depth+4, Width-
Wall_Thick*2, Height-Wall_Thick*2);
    }
}

module Top_Holes()
{
    Cdia = 2;
    Spacing = 4;
    Shift = Spacing / 2; // Stagger alternate rows
    From_Edge = 15;

    for(z =[From_Edge:Spacing*2:Depth-(From_Edge-Spacing)]) for(x
=[C_Rad+5:Spacing:Width-
C_Rad-5])translate([x,Wall_Thick+1,z])rotate([90,0,0])cylinder(d=Cdia,Wall_Thick+2
, $fn=25);
    for(z =[From_Edge+Spacing:Spacing*2:Depth-(From_Edge-Spacing)]) for(x
=[C_Rad+5:Spacing:Width-
C_Rad-5])translate([x+Shift,Wall_Thick+1,z])rotate([90,0,0])cylinder(d=Cdia,Wall_T
hick+2, $fn=25);
}

module Side_Holes()
{
    Cdia = 2;
    Spacing = 4;
    Shift = Spacing / 2; // Stagger alternate rows
    From_Edge = 15;

    for(z =[From_Edge:Spacing*2:Depth-(From_Edge-Spacing)]) for(y
=[C_Rad+5:Spacing:Height-
C_Rad-5])translate([0,y,z])rotate([0,90,0])cylinder(d=Cdia,Width+10, $fn=25);
```

```
    for(z =[From_Edge+Spacing:Spacing*2:Depth-(From_Edge-Spacing)]) for(y
=[C_Rad+5:Spacing:Height-
C_Rad-5])translate([0,y+Shift,z])rotate([0,90,0])cylinder(d=Cdia,Width+10,
$fn=25);
}

module Shell_With_Holes()
{
    difference()
    {
        Shell();
        Top_Holes();
        Side_Holes();
        Bottom_Holes();
    }
}

//////////////////////////// <- Join parts -> ////////////////////////
Shell_With_Holes();
Bezel();
```

Looks a lot like C code, doesn't it. The All3DP article claims that there is a steep learning curve for OpenScad but the entire instruction set fits on a single page, and of that you will likely use only 20%. The notion of using nested transforms to create any object can be a bit intimidating at first but by breaking the code down into modules, a lot of the complexity goes away. Module **Screw_Hole,** for example, creates a single hole rotated such that it pierces the bottom of the box. Module **Bottom_Holes** calls **Screw_Hole** four times translating (shifting in 3 dimensions) the location of the hole each time. For an informative experience, download and install a copy of OpenScad (use the latest version OpenSCAD-2022.06.26 if you have Windows 10 or better) and then download the above SCAD file and double-click on it. You should see the same object, if not hit the preview button (bottom left). The left mouse button allows you to rotate the object, the right allows you to drag the object and the scroll wheel zooms in and out. Change some of the dimensions at the top of the code in the editor window, hit the preview button and view the results (be sure to open the error log window when modifying code). You can comment-out (use "//") sections of code to see the effect. Go to the bottom and comment out the call to "Shell_With_Holes" to view just the bezel. By isolating components you will begin to see how they interact to create the final product. Click on "Help" and "Cheat Sheet" to view the complete language with links to examples. You now have the ability to adapt a very stylish cabinet to suit any project.

To produce a printable file all you have to do is hit the "Render" button (if using the latest version, go to "Edit" then "Preferences" and then "Features" and check "fast-csg" which accelerates the rendering speed by a factor of about 100) and when it completes (this can

take some time because of all of the vent holes) you press the "STL" button creating a Stereo Lithography File (.STL) which is the format used between users who share printed objects. There are repositories of printable objects (Thingiverse mentioned above is one of the largest) that sometimes include the .SCAD file in addition to the .STL file which makes it easy to modify the object to better suit your needs, assuming that you're SCAD savvy. If you have problems with any of the preceding, drop me a line at Dave@Leddon.Net.

Now you don't have to use OpenScad as it is clearly not suited for all applications, i.e. I would hate to use nested transforms to sculpt Yoda. When I asked Alan to recommend the editor with the shallowest learning curve, he suggested TinkerCad, created by AutoDesk with school-aged students in mind. I'm planning on checking out FreeCad, another parametric editor which, in addition to being a drag and drop editor, has the ability to incorporate OpenScad in the design, possibly the best of all possible worlds. Actually, I believe TinkerCad has a similar feature.

Now that we have an STL file we need to slice it. The printer squirts out thin strands of molten filament with the first layer sticking to the print bed and all subsequent layers piled on top of the previous layers. The slicer code defines these layers as well as a bunch of parameters like filament material, nozzle size, temperature, print speed and about a hundred others. For me, getting acceptable slicer settings was the most time consuming part of the whole process as there's a lot of iteration involved. Here's another great write up from All3DP on The 10 Most Important Slicer Settings. My slicer of choice is Cura, again based on herd mentality.

The three major software components, 3D Editor, Slicer, and Printer Control can be linked together such that when the Editor generates a new STL, the Slicer detects this and asks if you want to reload the newer object. When you finish slicing, the code asks if you want to download the Gcode to the printer and, optionally, start the print job. Why yes, of course. A God should not have to work very hard.

I have barely scratched the surface of this emerging technology but I hope that I have presented enough to stir your curiosity. I am astounded by the pace at which 3D printing has evolved, starting with makers working in their garages to industries using 3D printed molds for casting prototype car parts to, most recently, directly printing metal. Time to sell that lathe Gary. There are printers using liquid resin and ultra-violet light to create high resolution objects, although the process is a bit messy and requires some post processing. The latest laboratory curiosity is a resin printer that utilizes focused ultrasonic sound, instead of light, to create objects with sub-micron

resolution. This has interesting medical applications like being able to print, in situ (sound can penetrate flesh), things like the bones of the middle ear or perhaps a stent without surgery. The Navy and NASA are pursuing 3D technology to build replacement parts where needed when the supply chain is thousands, or hundreds of thousands of miles long. Hey buddy, send me that STL file for the nuclear trigger, would ya. This idea of production on demand brings to mind Jean Luc Picard standing in front of the replicator saying, "Tea, Earl Grey, Hot". Science fiction becomes reality.

Next month we'll look at an electronics project which uses printed components.

Dave Leddon

K6DHL

From the LARK CAVE

Above is a picture of crystals I have found in various Swap n Shop

boxes. The two-pin plug ins are 40 MC, 52 MC, 14216.8 KC, 483 KC, 517

KC, 45 MC.

The Orange cans are 100 Hz, 151.4 Hz, 94.8 Hz, They are encoder/decoder

devices.

The round cans are Hallicrafters but have mostly lost their labels, but

one is 151.895 MC, and another says "Channel 30.96 MC, R XTAL 41.6600

MC, T XTAL 2.58 MC. Great opportunity to get some crystals to polish

down to the frequencies you want! Contact Rich kn6hsr@arrl.net for more

info.

--

KN6HSR 145.350 Pl 100 -600

September 2022

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17 LARK Monthly Meeting	18
19	20	21 Ham Breakfast	22	23	24	25
26	27	28	29	29	30	CQP California QSO Party

LARK MON. NIGHT NET ON: 147.120 MHZ + offset, PL 100 AD6KV.
Every Monday 7 PM local time.
Visitors welcome to join in.

Net Control Operator Schedules

Monday Night Net Control Operator Schedule

July

DAY	OP	NAME
04	AD6KV	Ron
11	EOC	
18	AE6D	Ed
25	N5KA	Jerry

August

DAY	OP	NAME
1	WB6ETY	John
8	EOC	
15	WB6AEA	Jon
22	AD6KV	Ron
29	AE6D	Ed

September

DAY	OP	NAME
5	N5KA	Jerry
12	EOC	
19	WB6ETY	John
26	WB6AEA	Jon

EVERYONE is invited to check in to the net. Please contact AE6D ae6d@sbcglobal.net if you need more information or would like to become a Net Control Operator. After the net please call Ed AE6D with the AC/DC statistics or send him the information by email.

Thursday Night Net Control Operator Schedule

7/7/2022	Thursday	Rich/KN6HSR	Jerry/N5KA	Advanced Tech Discussion
7/14/2022	Thursday	David/K6WOO	Peter/AI6RG	New Comer, General Discussion:
7/21/2022	Thursday	Jerry/N5KA	Nate/N8MOR	Study Night: General Exam
7/28/2022	Thursday	Peter/AI6RG	Rich/KN6HSR	Easy Tech Discussion:
8/4/2022	Thursday	Nate/N8MOR	David/K6WOO	General Discussion:
8/11/2022	Thursday	Rich/KN6HSR	Jerry/N5KA	Advanced Tech Discussion
8/18/2022	Thursday	David/K6WOO	Peter/AI6RG	New Comer, General Discussion:
8/25/2022	Thursday	Jerry/N5KA	Nate/N8MOR	Study Night: General Exam
9/1/2022	Thursday	Peter/AI6RG	Rich/KN6HSR	Easy Tech Discussion:
9/8/2022	Thursday	Nate/N8MOR	David/K6WOO	General Discussion
9/15/2022	Thursday	Rich/KN6HSR	Jerry/N5KA	Advanced Tech Discussion
9/22/2022	Thursday	David/K6WOO	Peter/AI6RG	New Comer, General Discussion:
9/29/2022	Thursday	Jerry/N5KA	Nate/N8MOR	Study Night: General Exam

Regularly Scheduled Nets

LARK/LIVERMORE NET	Every MON.	1900 local 147.120+	PL 100
RACES Net 7pm	Every MON.		
Windfarms 10-10 NET	Every WED.	1930 local 28.485	USB
LARK TECH NET	Every THURS.	1930 local 147.120+	PL 100
LLNL Retiree Net	Every FRI 8:30 am	0830 local	7.2630 LSB
SWOT	Every Sun. & Tues.	2000 LOCAL	144.250 USB
THE NOON TIME NET	EVERY DAY	1200-1400 LOCAL	7.2685 LSB & 3970 LSB
RV RADIO NET	MON-FRI	0800-0930 LOCAL	7.2685 LSB

LARK CONTACTS 2022

LARK—LIVERMORE AMATEUR RADIO KLUB P.O. BOX 3190, LIVERMORE, CA 94550-3190. Web: http://www.livermoreARK.org. E-mail list: *livermoreark@groups.io*

GET YOUR HAM LICENSE OR UPGRADE. LARK conducts all levels of license testing (upon request) at the Livermore City Council Chambers following club meetings (3rd Sat. each month). Contact Ron Kane, AD6KV (AD6KV at arrl.net) 2 weeks in advance.

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Web Site	Arnold Harding	KQ6DI		
Newsletter Editor	Roberto Sadkowski	K6KM	rsadkowski@gmail.com	
Membership	Venkatesh Varadha (Var)	KM6TAB	svvenkatesh2786@outlook.com	(925) 961-7703
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RFI	Gary Johnson	NA6O	gwj@me.com	
T-Hunts	Rich Harrington	KN6FW		
Swap n Shop	Richard Combs	KN6HSR	KN6HSR@arrl.net	

Facebook—http://www.facebook.com/LivermoreARK
Twitter link : https://twitter.com/LivermoreARK

Special interests: Mesh Networking. Dave KK6DF http://mesh.sushisoft.com . https://www.youtube.com/user/fanninsushi/videos. View: AREDN!http://www.aredn.org. CERT NEWS: Tracy Hein CERT contact. Email: thein@lpfire.org or (925) 454 -2317 https://community.fema.gov/Register/Register_Program_View?id=a0xt0000000mAuzAAE

Meetings 3rd Wednesdays. Remillard RM 3333 Busch Rd. Pleasanton.

LARK Membership Form

LARK LIVERMORE AMATEUR RADIO KLUB.
P.O. BOX 3190, LIVERMORE, CA 94551-3190
An ARRL Affiliated Club

LARK MEMBERSHIP FORM - Print, fill out, mail in with check.

Circle all that apply: New / Renewing / Family **Today's Date: _____**

NAME: _____

CALL SIGN: _____

ARRL MEMBER? Yes / No

Address: _____

PHONE: ( ) -

UNLISTED? ____YES _____NO

Enter your E-mail here and stay connected: _____ LARK NEWS featuring upcoming club events and articles is available monthly via email. http://www.livermoreark.org/ Access the current and back issues on our website.

ADDITIONAL FAMILY MEMBERS (At the same mailing address, only $2. membership per person)

NAME	
PHONE	
EMAIL	
AARL MEMBER	

ANNUAL DUES #_____ PRIMARY ($20.00) ADDITIONAL MEMBERS # _____ ($2.00 each)

TOTAL: $_____ MAKE CHECKS PAYABLE TO: LARK. Thank You.

Membership is $20.00. per calendar year starting on Jan 1 through Dec. 31. To complete membership by mail: print and fill out this form, include a check payable to LARK, and mail to: LARK Membership Chairman, P.O. Box 3190, Livermore, CA, 94551-3190. Please be sure your complete mailing address, e-mail, and call sign are on your check. Questions? Contact the Membership Team via email: membership@livermoreark.org You may also complete membership application and payment by: Bringing this form filled out and pay by cash or check to either the Membership Chairman or Treasurer at any general meeting. Or: pay with a credit card or PayPal account on the Club's membership page: http://livermoreark.org/membership/membership.html.

Thank you and welcome aboard from LARK and the Membership Team.