



# Smoke Signals

## Newsletter of Fullerton Radio Club

### September 2019

#### September Meeting Program

The program for the regular meeting this month will be a DVD titled, "*The Spies Who Lost the Battle of Britain: The Story of British Radar and How the Germans Nearly Discovered It.*"

Despite the somewhat confusing title, this DVD is mostly about the Chain Home radar system Britain used to find invading German bomber aircraft at the start of WWII and thereby direct their fighter aircraft.

The Chain Home radar system used low-frequency pulsed broadcast transmitters and huge antennas in many locations. There was a vast infrastructure of (entirely manual, before any computers) plotting boards and command personnel to make the Chain Home system work--and it did work. This was before the development of microwave radar and the klystron microwave tube.

The Chain Home radar system used transmitters pulsed at 25 Hz, half the British electrical mains power system. The Germans flew missions to try to understand the purpose of the large tower antenna arrays but were thwarted by the pulse frequency, which they interpreted as noise from the mains power lines and thus failed to understand the Chain Home system, which German bombers could

easily have demolished. Instead, the Germans decided to not waste resource on the big tower antennas and, many believe, effectively lost the Battle of Britain.

NOTE: Before the showing, we will be asking those in the audience if any of them have a cellphone with unlimited data. (None of us at the TAG meeting who will be at the main meeting do.) We then want to rehearse its use with a laptop and the club projector. Our goal is to show a YouTube at the meeting room. If we can do that, then the next step is to read up on Skype and see if we can show that as well.

#### September 2019 FRC MEETING

**Wednesday, September 18, 2019**

**Chapman Activity Center**

2515 San Carlos Drive, Fullerton  
(Second street east of State College Boulevard off  
Commonwealth)

**Meeting time – 7:00 PM**

Visitors are always welcome

**Dinner before the Meeting:**

Black Bear Diner  
5:00 PM

#### October Board Meeting

**Open to all Club members**

**Black Bear Restaurant**

(1011 N. Harbor Boulevard, Fullerton  
First Wednesday of each month.

**Next Board Meeting**

**Wednesday, October 2, 2019**

QSO and dinner; 6:30 PM

**Meeting: 7:30 PM**

**Fullerton Radio Club**  
**P.O. Box 545, Fullerton, CA 92836-0545**

**Board of Directors**

**President**

Larry McDavid, W6FUB  
Phone: (714) 630-5672  
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**Vice President**

TBD  
(This could be YOU)

**Secretary**

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**Volunteers**

**T-Hunt**

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**Show –and–Tell**

Bring something of interest to the meeting to show and share your story.  
Something old, new, or just of interest to hams.

**Web site: [www.FullertonRadioClub.org](http://www.FullertonRadioClub.org)**

**Board Meeting Minutes**

The September 2019 FRC Board meeting was called to order at 7:30pm by President Larry McDavid W6FUB. Others present: Treasurer Gene Thorpe; KB6CMO; Secretary Linda Endsley KJ6IHB; Board Members Richard Belansky KG6UDD, Walter Clark, Robert Gimbel KG6WTQ; Member: Cheryl Thorpe KE6TZU

Minutes were approved with the change of Checking \$3,929.42; Savings \$2,608.10.

Treasurer's report: Savings - \$3,929.42; Checking - \$2,2608.10

New Business:

Received 2 new membership. 3 Lifetime members

Have 32 paid members.

Wed, Dec 18, 6:30 pm, Christmas dinner will be at the Black Bear

The September general meeting will be a DVD, "The Spies Who Lost the Battle of Britain: The Story of British Radar and How the Germans Nearly Discovered It"

Next board meeting: 2 OCT 2019

Adjourned at 8:00 pm

Submitted by Linda Endsley KJ6IHB

## Feit LED Shop Lights

For several years I have been buying Feit LED shop light fixtures at CostCo and I like them a lot! I now have 25 of these Feit (brand name) fixtures in my garage workshop. They are brighter than the dual-40 Watt fluorescent fixtures, have 4000K light color (same as fluorescent Cool White), do not show LED hot spots, are light weight and use half the energy of the old fluorescent shop lights. CostCo often has them "on sale" at \$19.95, including now. These are very popular and CostCo sells many.

But, you may have fluorescent lights inside your home, likely in a bathroom or kitchen. It is not practical to mount and wire the Feit shop light fixtures in place of the existing fluorescent fixtures (the shop lights are designed to plug into an outlet). So, how do you replace those old fluorescents?

You can buy new, hard-wired LED fixtures, remove the old fixture and install the new one. Lots of work and the fixtures are relatively expensive. There is now an alternative.

There are now LED replacement bulbs that can install in place of the old fluorescent tubes. But, there are quite a few versions and it can be confusing. First, there are LED bulbs that install in place of the old fluorescent tubes with no other change required and which use the existing ballast transformer inside the fluorescent fixture. But, the ballast wastes energy and still gets hot; the LED bulbs may not be as bright. These LED direct-replacement bulbs are easy to install and are available at CostCo branded "Feit," the same manufacturer as my favorite LED shop light. Lowes and Home Depot has them also in various brands.

There is a better way, but it takes a little work. There are now LED replacement bulbs that install in the existing fluorescent fixtures and do not use the ballast. The old ballast can be removed or its wires just cut. These LED replacement bulbs are available in numerous sizes (lengths), equivalent wattages and colors. But, there is a complication: both single-ended terminal versions and double-ended terminal versions are available and you must look carefully to make sure you get what you expect.

Double-Ended LED replacement bulbs use the existing "tombstone" fluorescent sockets (almost certainly the "shunted" type) in your old fixture and connect power from end to opposite end. It is easy to cut the wires from the ballast and, with simple wire nuts, reconnect the wires so that 120 vac is applied across the opposite ends of the LED bulb. You need to remove the metal fixture cover to expose the wiring and ballast but this is easy to do. You need to mark the fixture to show that fluorescent tubes can no longer be used!

There are also Single-Ended LED replacement bulbs. These connect the hot and neutral 120 vac wires across the two pins on just one end of the LED bulb; there are two inactive terminals at the other end to support the bulb in the old

fluorescent "tombstone" sockets. But, in almost every case you must replace the "tombstone" connector at the powered end and change to a "non-shunted" type connector. "Non-shunted" means the two contacts within the "tombstone" connector are not shorted together and are connected individually to two wires. Many of these Single-Ended LED replacement bulbs come supplied with these "non-shunted" tombstone connectors but, if not, the connectors are readily available where you buy the LED replacement bulbs. Lowes has a single-ended LED replacement bulb that comes with non-shunted "tombstone" connectors. Replacing the (often two because the fixture used two fluorescent tubes) "tombstone" connectors is not difficult but it is more work inside the old fixture. The "shunted" connectors at the other end can be used as-is or replaced with "non-shunted" connectors. The ballast is removed or its wires cut. You need to mark the fixture to show that fluorescent tubes can no longer be used!

Frankly, I know of no advantage between either double or single-ended LED replacements but they are different and you must know which you use because the wiring is different.

There is one more LED bulb variable you must consider. Both clear and frosted LED bulbs are available. If your old fluorescent fixture included a diffuser or crinkly panel over the fixture, you should get clear LED replacement bulbs. These will have bright spots at each LED but those bright spots will be diffused by your old fixture. If, however, you can look directly at the LED bulb, you should get frosted bulbs to diffuse the LED bright spots, at some loss of light output. I would not use frosted LED replacement bulbs under a fixture that has its own diffuser as light loss will be higher. These options and all the other options I have discussed are all available in different listings at Amazon. You gotta look carefully!

The LED replacement bulb I prefer is branded "Hyperikon" and is widely available on Amazon in both Single-Ended and Double-Ended versions, in several lengths, equivalent wattages, in at least four different colors and clear or frosted. I can't show all those Amazon listings so you just gotta search on Amazon. Trust me--all the varieties of the Hyperikon LED replacements are available on Amazon. My entire home is standardized on Cool White 4000K color temperature. There are lower K temperature (warmer color) and higher K temperature (bluer, colder color) readily available. I recommend you pick a color temperature and use that choice always.

I choose to use 4000K color bulbs because I've always used "cool white" fluorescent tubes. You may prefer 3000K, 4000K, 5000K or even 6000K color temperature. Confusingly, all these color temperature specs have different color names and different manufacturers use different color names. I take many pictures in my workshop and it is critical that all the light from all the fixtures be the same color so that the camera automatic white balance can work correctly.

If you mix various color LED bulbs or allow sunlight to shine on your photography subject, white balance will suffer and you may not be able to correct it in Photoshop.

All the varieties of the LED replacement bulbs are T8 size, meaning eight eighths or one inch diameter. Most new fluorescent tubes are T8 size but most older fluorescent tubes are T12, meaning twelve eighths or 1-1/2 inch diameter. Regardless of T8 or T12, the end connector pins have the same spacing and the T8 LED bulbs fit either T8 or T12 "tombstone" connectors. The standardized type T8 or T12 tube connector is called a, "G13." Some T8 "tombstone" connectors may be mechanically shorter than T12 "tombstone" connectors because the T8 tubes are smaller in diameter. This is irrelevant because the LED replacement bulbs are all T8 size. If you must buy non-shunted "tombstone" connectors, get the same length as the other end connector or replace both (likely four) connectors so the new bulb is straight in the fixture.

The Hyperikon LED tubes work well and are guaranteed for 45,000 or more hours of operation. I have a local friend who has installed 24 of these Hyperikon tubes in his old fluorescent fixtures in his home and is completely satisfied with the result and had no failures. He says they are brighter than the old fluorescent tubes; he chose 5000K color temperature. Color is just a personal preference.

Here is a web link to the Hyperikon Installation Guide for Double-Ended LED replacement bulbs:

<https://www.hyperikon.com/content/installation/Tube-Double-Ended--Installation-Guide.pdf>.

So, do a little work but save energy, run cooler and be brighter with LED replacements!

Don't put old fluorescent tubes or the fixture ballasts in your landfill waste can! The fluorescent tubes contain mercury. I take my old fluorescent tubes and the ballasts from removed fluorescent fixtures to my HHWCC. However, the HHWCC won't take the entire old fluorescent fixture so you must remove the fluorescent tubes and the ballasts with wiring to take to the HHWCC. That is, your Household Hazardous Waste Collection Center.

Larry W6FUB



Feit LED Lamp

## FIELD TRIP

Orange County Sanitation District Treatment Plant Tour- Tuesday, November 26 at 9 AM

OCSO is committed to providing a valuable educational experience that focuses on learning the importance of wastewater treatment in protecting public health and the environment. To encourage learning, OCSO offers a one-and-a-half hour tour that includes a video overview, discussion of the wastewater treatment process, and a bus tour of our facility.

If you are interested, please email Tom Gaccione at [tsgaccione@yahoo.com](mailto:tsgaccione@yahoo.com)

## New hospital support for south OC

A mutual assistance task force of Mission Viejo ARES/RACES and Laguna Niguel Auxiliary Communications Service has been formed to provide backup emergency communications for south Orange County hospitals. The name of this group is *South Orange Hospital Emergency Amateur Radio Team*, or SOHEART for short.

Dave Gorin KB6BXD is leader of SOHEART, which is beginning a weekly net on Wednesdays at 1900 hours on three linked repeaters:

WR6AAC 224.22 PL151.4

K6QEH 146.97 PL136.5

K6SOA 447.180 PL131.8

If you are interested in helping south OC hospitals in communications failures, you are invited to check into this net to receive more information. Please note that ***this is NOT a continuation of HDSCS***, but a new group that is forming with the mission of supporting south county medical facilities.

73,

Joe Moell K0OV

On behalf of Dave Gorin

## “Elmer” Needed

I recently acquired a vintage scope to help diagnose what's going on in a project I'm working on (that I talked about at the last [TAG] meeting). I've never used a scope before; watching a lot of youtube videos to learn; if any member has a little time to talk me through it I would be very grateful. Maybe through a web session? Basically looking at inputs into a mcu and outputs to the transmitter on a RC car controller.



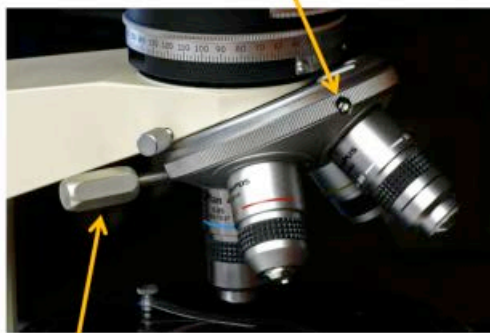
Thanks,

Dave Rugh <dave.rugh@gmail.com>

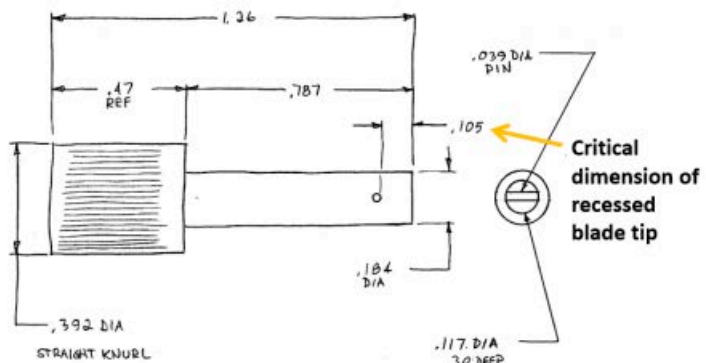
## Activity Reports of the Fullerton Radio Club (Technical Advisory Group) for September 2019

**Larry McDavid** gave us a sample of a presentation he gave to the Microscopy Association. It documented his building 12 tools for he and his microscopy buddies. He showed step by step how he made these tools.

Two adjusting screws for each objective



New tool self-supports in screw c'bore



He spent most of the time on one slide; last one, on his experience putting together a very sturdy work bench. He highly recommends Sam's Club for both the bench and the cabinet the fits under it to one side.

He also told us about his experience in converting his shop and his house to all LEDs. We learned there is a plethora of tube types, diameter, and color temperature. It seems that LEDs have not only replaced every conceivable fluorescent type, but many more besides. For example, in addition to color temperature choice in a T8 fluorescent replacement, you can get it with clear or diffused plastic tube. The clear is a little more efficient but painful to look at (many tiny points that are exceedingly bright) if seen directly.

In the picture below Larry is holding one of two Milwaukee drills. One we learned pulses in torque and the other pulses like a hammer. He led a discussion on converting batteries in drills to something more modern. On the table in front of Larry is Walter and Tom's treat: three ice cream flavors and 7 different toppings to try out. We are indeed an experimental group.



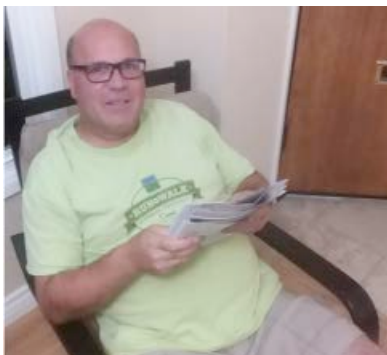


**Dick Palmer** was hoping Bill Webb would be here to talk to him about his Raspberry Pi computer he's holding. For those new to Raspberry Pi, it is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It goes after the same market as Arduino but more like a real PC. <https://www.raspberrypi.org/help/what-is-a-raspberry-pi/> And of course since he's Mr. QRP his first application for it would be a software defined radio. He had in mind a footprint that is much smaller than a lap top. Since his QRP sets are small, he probably doesn't like the idea of the computer being bigger.

Dick is still feeling pretty good about his participation during field day in June. Here it is September; still bragging. It seems that not only did he sweep the L.A. section of field day, his group, called the "Zuni-Loop Mountain Expeditionary Force" won over all Los Angeles County, 20 out of the last 35 years. Their advantage, in addition to skill, of course was 7,000 ft altitude, tree top antennas and transmitters under 5 watts.

**Tom Gaccione** summarized some articles he was reading that he thought would be of interest to us.

- NASA reported that the skills and equipment for measuring accurate (to the mm) distances to planets coupled with atomic clock accuracies that an array of sensors have access to, black holes will be measured with unprecedented accuracy in the near future.
- It's been 8 years since Fukushima and only now are they getting around to making the structure safe enough to dismantle and remove the radioactive waste. Tom says, there's no hope of fixing or even replacing the reactors at that site.
- The recent Ridgcrest earthquake happened with a lot more instruments than the Northridge and they will be making much better sense of the earth's structure in Southern California. Mammoth Lake and Mammoth Mountain are part of a caldera that may not be done erupting. Dick Palmer had a lot to tell us about CO2 being emitted from the ground out there (evidence of seismic activity). In gas form CO2 makes plants thrive but diffusing through the ground poisons the fauna for miles around.
- The kilogram as a standard in France is no longer represented by an object. It is now a combination of physical constants. Planck constant  $h$  to be  $6.626\,070\,15 \times 10^{-34}$  when expressed in the unit J s, which is equal to  $\text{kg m}^2 \text{s}^{-1}$ , where the meter and the second are defined in terms of  $c$  and  $\Delta\nu\text{Cs}$ . Yea sure.



**Dick Bremer** is holding a box of discarded electronic parts Walter is collecting for an artist friend of his who makes science fiction-like abstract art.

Dick told us about an ap that can turn your old phone into a security camera. It was suggested that you somehow make it clear it's an old model, or it will be what is stolen.

**Walter Clark** went on a rant about California making denatured alcohol an illegal substance. He just missed the last gallon sold at McFaddendale hardware by three days. No reason given, no alternative offered. We don't need to be given a reason, to obey; now do we.

After he settled down, he talked about his research on bird flight. It is not on flapping but something much simpler; how is it that a bird while gliding, does not need much of a tail yet can both turn and go up and down. The photo on the left is of his variable sweep airplane. It demonstrates how a bird can control pitch with sweep rather than a tail. This is certainly what is used in landing or other high lift conditions.

The thin fuselage plane in the picture on the right is not research. It is what is called a discuss launched glider. [https://www.youtube.com/watch?v=onFAnlKOM\\_4](https://www.youtube.com/watch?v=onFAnlKOM_4) The thin fuselage is because the speed upon release is quite high and it is the speed which is transformed into altitude, so you don't want to offer any resistance when fast. The electronics are so small, most gliders like the one on the right are made large just for looks.



**Bill Webb** phoned in his report because he's taking a 3D-printing class at Santiago Canyon College on Wednesday nights. The weather station given to him by Larry is up and running at his place in Orange. It is reporting to **Weather Underground** through Weewx running on a Raspberry Pi. Bill had an issue with bad data being recorded if he transmitted on 20 meters at 100 watts. He looped the cable through lots of ferrite RF suppressors and that seems to do the trick. He will need more testing to be sure. Here's a link to the website that is displaying the data from Larry's weather station:

[https://www.wunderground.com/dashboard/pws/KCAORANG21?cm\\_ven=localwx\\_pwsdash](https://www.wunderground.com/dashboard/pws/KCAORANG21?cm_ven=localwx_pwsdash)

The meeting went on until after ten and the most important topic we talked about toward the end was how to use a cellphone in "hotspot" mode to show a video at the meeting room at the Chapman Park Activity Building. Someday we'd like to have speakers like Dennis Kidder speak to us over Skype. We will be experimenting with that at the upcoming meeting.