



# THE VALLEY HAM NEWS

"The Voice of Yuba Sutter Amateur Radio Club"

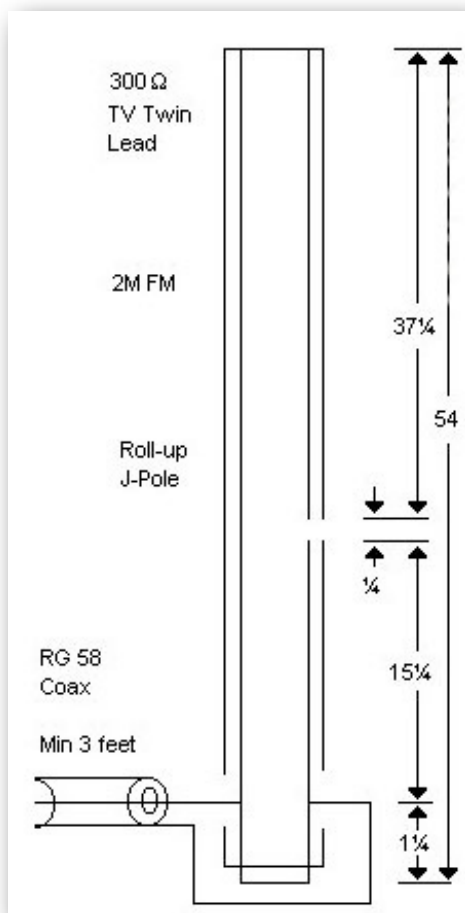
A California Non-Profit Organization

August 2012



## YSARC Breakfast & Antenna Workshop to be held

The YSARC will hold an "Antenna Saturday & Breakfast" on Saturday, August 11, 2012 starting at 8:00 AM. All of this will be held at the American Legion Hall located in the West Linda area. The address for the hall is 5477 Feather River Blvd. From Marysville, head south on Hwy 70 over the E Street Bridge. After crossing the bridge, take the second off ramp (Feather River Blvd). The ramp will take you to the right. follow that road through the stop signs. The road will eventually turn south. Look for the American Legion Hall on your left. If you are still not sure of the directions, you can tune into the 146.085 repeater, and someone will help guide you in.



to place in your "Go-Box" or your emergency supplies. Pictured here are the measurements for the project.

.....de Russell, KB6YAF

The ladies at the hall will start cooking breakfast around 8am in the morning. The cost of the breakfast is \$5.00 per person.

After breakfast, we will start on the antenna project which will once again be the portable roll up 2 m J Pole antennas. The estimated cost of materials for the antenna is also \$5.00 unless you'd like to provide your own supplies. This is a very good antenna

### YSARC

PO Box 1169, Yuba City, CA 95992

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#### VHN Editor and

#### Webmaster

Russell Decker, KB6YAF

#### Repeater Trustee

Dave Gartner, WD6AXM

### MONTHLY ACTIVITIES

1st Wednesday: Club Meeting  
3rd Wednesday: Board Meeting

(Check the minutes for details on the Club and Board Meetings)

All newsletter submissions are due on or before the 4th Wednesday of the month

### UPCOMING EVENTS

- Aug. 1st - Wed. @5:30pm - YSARC Meeting & Dinner at the "2 Bits Café" in Yuba City, CA  
Aug 11th - Sat. @8a-10a - YSARC Breakfast & Antenna Workshop at the American Legion in West Linda, CA  
Aug 15th - Wed. @7:00pm - YSARC Board Meeting - @Herb's QTH  
Aug 25th - Sat. @8:30am - Technician Ham Cram - 715 King Ave - Yuba City Sign up ASAP with Mike, KM6EBY (530) 671-4037

### CLUB ACTIVITIES

- Monday Night Net - (7 PM) - Weekly net w/swap shop (146.085 + PL 127.3)  
Monday Night Net - (8 PM) - Butte Co. ARES Net (146.850 - PL 110.0)  
Tuesday Night Net - (7 PM) - YSARC ARES Net (146.085 + PL 127.3)  
2nd Wednesday - (7 PM) - ARRL Sac Valley Net

# EDITOR'S RAMBLINGS

Summer for this guy is all about staying cool which in many respects is quite an undertaking considering the Sacramento Valley can yield many days of summer temperatures consistently in the upper 90's and climbing well into the triple digits. Keeping cool for me usually involves running the whole house fan in this old 1927 house all night. In the morning, I keep an eye on the digital house temperature readout. When it starts to climb, I turn off the whole house fan and start up a combination of some ceiling fans and floor fans. This process usually is successful unless the morning temps don't drop as low as I'd like to see them. When the inside temps get around 76-78 degrees, I will turn on the small wall mounted A/C unit which will keep the den & ham shack at a comfortable level. Now, this old house is roughly 2,600 sq. ft. but at least half of that is upstairs. Fortunately, the staircase can be closed off with a door, and we usually don't use the front room much, so that leaves around 1000 sq. ft. to cool. If worse comes to worse, I can always turn on "the beast" which is a huge 220v. wall air conditioner that will cool down the house in about 10 minutes with the help of a few fans. All of this is done so as not to send too much of our hard earned money to P.G.&E.

I did take my annual trip north to Arlington, Washington in order to volunteer as an event photographer for the fly-in at the airport. All of this took place between July 4 - 16th. I did know that during that time, temps in the Yuba Sutter area hit a high of 110 degrees. Now that sounds like good timing on my part since temps in the great Northwest was anywhere from 52 - 76! I didn't have too much time to play with the radio, but I did have the HF and VHF antenna up. One night, I turned on the radio that was tuned to 147.060 MHz. All of the sudden, I heard a net start up. I thought I might as well check when and if they open it up for visitors. It was an emergency net much like our ARES net here. I didn't recognize any of the call signs as most of them were '7' calls. Well, I jumped in and signed 'KB6YAF Portable 7'. The net control operator came back and recognized my check in and then asked if I was a Yuba City ham. I proudly responded yes. The NC came back and said "Hi Russ, this is Hugh, but you probably know me as N7OKM" Well, you could have knocked me over with a feather! Many of you 'old timers' recognize that as Hugh MacDonald, N7OKM. He doesn't use that call sign anymore. He changed it to AC7XF. For those of you who don't know Hugh, he used to live in our area (I think Gridley) and was a very active member of the YSARC. He moved many years ago to Bandon, Oregon which is on the coast, north of Brookings. I asked Hugh after the net if he still lived in Bandon. He said he still lives there, but also spends a lot of time in Western Washington. The repeater we were using is just outside of Chehalis, WA. at an altitude of 3,100 ft.

When I returned back to the Sacramento Valley, the temps were back down into the upper 80's, which are still too hot in my estimation. It was good to be back. My step son Derek, his wife Tiffany, and their two kids (ages 2 & 5) are here from Clarksville, Tennessee. We have been having fun showing them a good time out on the boat a couple times. Derek returned last summer from Afghanistan after serving a year's duty with the US Army there. After they leave the Yuba Sutter area in a few days, they will be traveling to Germany where he will be stationed. It will be quite a while until we get to see them again. Derek always brags about the radios in my ham shack and how I talk to people! Maybe some day, he will get the ham radio 'bug' !!

Well, that's about all of my ramblings for now.

73 to all, Russell Decker, KB6YAF

# Build a Utility Power Supply with Parts from Radio Shack

Bryant Julstrom, KCØZNG

Radio Shack has announced increased interest in and support for experimenters and builders, who have lately been called "makers." This is good news, and to encourage both Radio Shack and potential makers, here is a project that (1) is not complicated; (2) is extremely useful; and (3) can be built almost entirely with parts that are available at Radio Shack.

The project is a small, low-voltage DC bench power supply, capable of providing appropriate voltages for a wide range of small-to-medium-scale circuits. The unit has these features:

- Variable output voltage, from about 1V to about 15V.
- Regulated output voltage. Once set, the voltage will remain nearly constant regardless of the load on the supply.
- Voltmeter to indicate the output voltage.
- Maximum current of about 600mA.
- Convenient, small size.

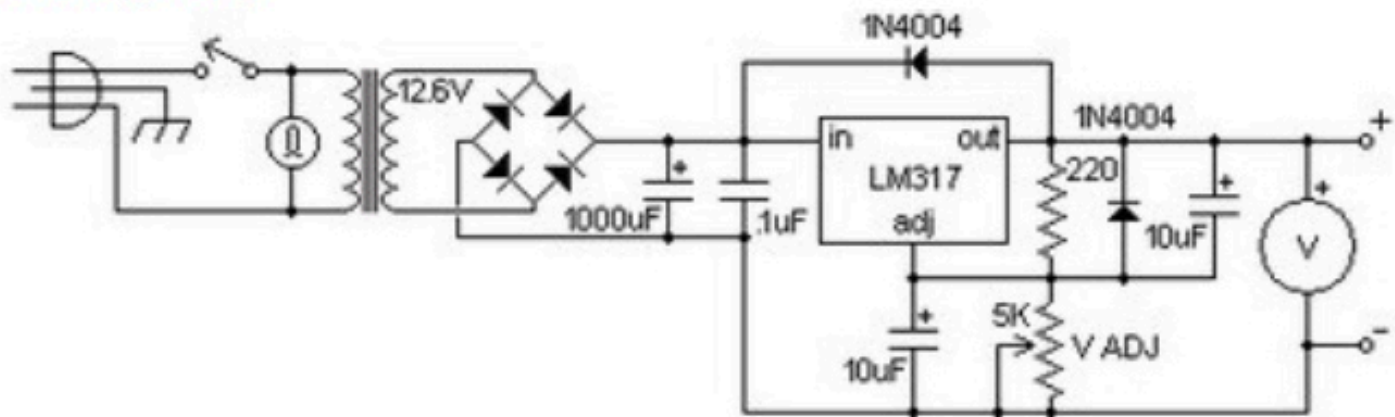
The unit's design is entirely conventional and unoriginal. A transformer provides 12.6VAC; a bridge rectifier converts the transformer's AC output to pulsating DC; a large-value electrolytic capacitor filters the DC; an adjustable regulator sets and maintains the output voltage; a voltmeter measures and reports the output voltage.

About the regulator: There are several ways to maintain a constant voltage from a power supply to its load. Probably the simplest is a linear series regulator, which compares a fraction of the output voltage to a standard voltage, amplifies any difference, and applies that difference to adjust a resistance---provided by an active element like a vacuum tube or transistor---in series with the load.

Early regulators used all discrete parts, but the 1970s saw most of the necessary components encapsulated in integrated circuits. There are many types, but the easiest to use are the "three-terminal" regulators. Many of these are designed to provide particular fixed output voltages, but the LM317, which we use here, is designed for *adjustable* positive supplies.

As its datasheet<sup>1</sup> indicates, there's a lot going on within an LM317. It contains 26 transistors, four Zener diodes, and a good number of resistors. The LM317 comes in a variety of packages. The LM317T occupies a TO-220 package, whose metal tab connects to its center pin. From left to right, as viewed from the front, the IC's pins are the regulator's adjustment connection, output, and input.

The circuit that uses the LM317 is taken directly from the datasheet. Figure 1 shows the circuit of the entire supply, including the regulator. The potentiometer sets the output voltage; moving the slider toward ground increases this voltage. As the LM317's datasheet indicates, the regulator is overbuilt. With an input voltage of at most 15V or so, the protection diodes aren't really necessary.



**Figure 1.** Schematic of the power supply, including the adjustable regulator.

All the electronic parts in Figure 1 are available at Radio Shack. Table 1 lists those parts and their Radio Shack part numbers. Note in particular that Radio Shack carries the major parts: the transformer, the LM317T regulator IC, and the voltmeter.



## Build a Utility Power Supply with Parts from Radio Shack Continued

There are various ways to implement the rectifier, filter, and regulator circuitry. I used a small piece of perf-board to imitate a printed circuit board; this is what perf-board is for. I mounted the parts on one side of the board and formed the connections with the parts' leads and small lengths of solid hook-up wire on the other side. The potentiometer is mounted on the unit's front panel, not on the board. Wires from the board connect to the pot; I recommend stranded wire for these connections, since they will flex during construction and solid wire is more likely to fatigue and break.

It is important to install the LM317T on the edge of the board with the metal tab toward the board's outside. This allows the board to be mounted so that the regulator IC's metal tab can be physically connected to the unit's enclosure and possibly an additional heat sink, to dissipate the heat the IC generates. For example, if the transformer, rectifier, and filter deliver 12V to the regulator, whose output voltage is set to 5V, and the load draws  $500\text{mA} = 0.5\text{A}$ , then the regulator turns  $(12-5) \times 0.5 = 3.5$  watts of power into heat, which must be dumped to the environment.

This leads to the question of the physical arrangement of the supply's parts in a suitable enclosure. The discussion above indicates a metal enclosure, and Radio Shack carries only one of those. It is a versatile and handy unit, but I could not find a way to fit the transformer, the meter, the other front-panel contents (on/off switch, indicator, connectors, and a knob), the circuit board, and a line connection into it in an attractive way, so I turned to a

Ten-Tec enclosure that I had not previously used. This enclosure was just large enough to accommodate everything, with only a little crowding on the front panel. Figure 2 shows the prepared enclosure and the electronic parts before assembly. The rectifier/filter/regulator board is at the left of the bottom row.

Description	Part Number
12.6VCT, 1.2A transformer	273-1352
SPST toggle switch	275-624
120V indicator	272-712
1.4A, 100V bridge rectifier	276-1152
1000uF, 35V electrolytic capacitor	272-1032
.1uF, 50V disc capacitor	272-135
LM317T 1.5A regulator	276-1778
1N4004 rectifiers	276-1103
10uF, 35V electrolytic capacitors (2)	272-1025
5K linear-taper potentiometer	271-1714
220Ω, 1/2W resistor	271-1111
0-15VDC analog panel meter	22-036

**TABLE 1.** The electronic parts of the adjustable, regulated bench supply, all of



**Figure 2.** The parts of the supply, ready for assembly. The circuit board that holds the rectifier, filter, and regulator is at the lower left.



## Build a Utility Power Supply with Parts from Radio Shack Continued

Figure 3 shows the completed supply's front panel. The voltmeter takes up most of it. The pattern that comes with the meter is essential to mounting it square to the enclosure; measure carefully. I used Paint to make a template on my computer, checked the template several times, then taped it to the front panel to guide the drilling. I used a fly cutter, a fair amount of oil, and a lot of patience to cut the large hole; because this makes a mess of the template, cut this hole last. The connectors that deliver the output voltage are spaced exactly  $\frac{3}{4}$  of an inch apart; this is the standard separation for two banana jacks. Rubber feet are useful to avoid scratching your work surface and to keep the supply from moving around.



Figure 3. The completed unit, from the front.

Figure 4 shows the interior of the completed unit. The transformer is mostly hidden behind and below the board that holds the rectifier, filter capacitor, and regulator. That board is mounted on brackets so that the LM317T can be attached with a screw to the back panel and a small heat sink. A mica insulator isolates the regulator from the back panel electrically but not thermally, and small smudges of heat sink compound on both sides of that insulator provide good heat transfer from the LM317 to the enclosure. A shoulder washer insulates the regulator's tab from the screw that attaches it to the panel. (Alternatively, a nylon screw could have been used.) Radio Shack number 276-1373 is a TO-220 mounting kit that includes a mica insulator, a shoulder washer, and associated hardware.



Figure 4. The interior of the completed unit. The circuit board is mounted on the enclosure's back wall so that the LM317T can be in thermal contact with the enclosure.



## Build a Utility Power Supply with Parts from Radio Shack Continued

In addition to the enclosure, the only other parts that cannot be found at Radio Shack are the line-cord connector (for three-wire, computer-style cords) and various bits of hardware: screws and nuts and the right-angle brackets that hold the circuit board. Table 2 lists the additional parts used in the supply that *can* be found at Radio Shack. In many cases, I used parts that I already had rather than buy new ones, so those are not physically identical to their Radio Shack equivalents. For example, Figure 4 shows a miniature 5K pot in place of the full-sized one listed in Table 1.

Description	Part Number
Circuit board	276-149
TO-220 heat sink	276-1363
TO-220 mounting kit	276-1373
Heat sink compound	276-1372
Knob	274-415
Rubber feet	64-2346
Pair of banana jacks	274-662

**Table 2.** Additional parts for the supply that can be found at Radio Shack.

The completed unit, with the transformer specified, can deliver up to 600mA of current from just above 1V to 14V, more if the load is small. Once set, the output voltage is essentially fixed regardless of the load. Even with a significant voltage drop through the regulator and high current, as in the example above, the heat sink barely gets warm to the touch.

Many variations on this theme are possible. A larger 12.6V transformer (for example, 273-1511) will provide higher maximum current, though note that the maximum current through an LM317T is 1.5A, and higher current in general requires a more robust rectifier and a larger heat sink. A 25.2V transformer (273-1366 or 273-1512) and a pair of diodes in a full-wave configuration will provide the same input voltage to the filter and regulator as does the circuit in Figure 2. With a 0-30VDC meter in place of the Radio Shack unit, a 25.2V transformer can directly replace the 12.6V unit in Figure 2, and the supply's maximum output voltage will double, though at lower voltages the regulator will again be required to dissipate more heat.

Radio Shack carries the Velleman line of electronic kits, and one of these (277-022) is an LM317T-based rectifier/filter/regulator that is essentially identical to the circuit used here. The kit provides the convenience of a circuit board and all the parts to put on it. Don't use the board-mounted trim potentiometer; replace it with two wires to a panel-mounted 5K pot that can accommodate a knob.

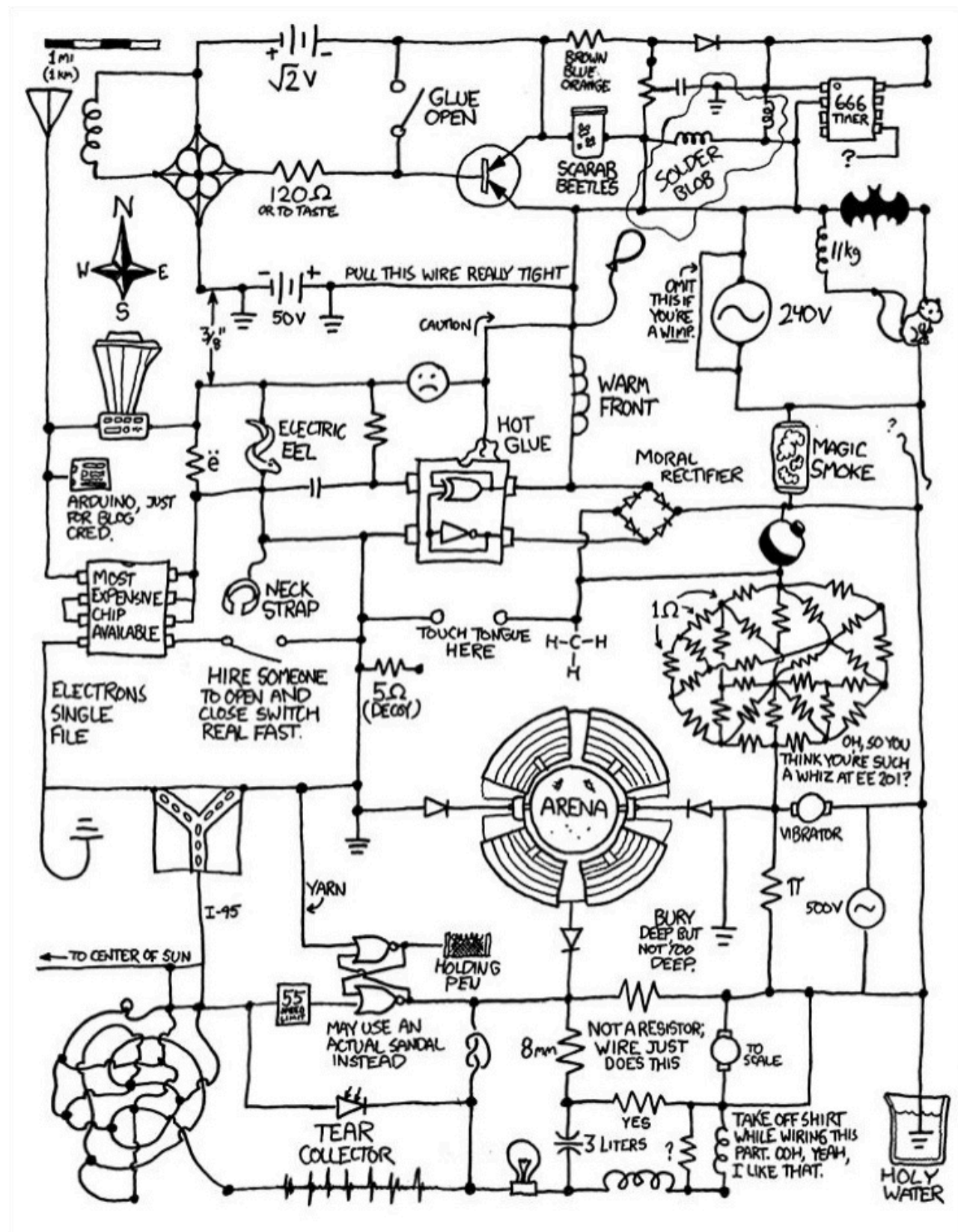
The line cord connector can be replaced with a simple line cord, if you don't mind having the cord permanently attached to the supply. Line the hole for the cord with a grommet (64-3025 is an assortment), and never work on the unit when it is plugged in. Finally, you can buy, re-use, or make any enclosure that holds everything conveniently.

Several of the Radio Shack parts used here come in packages of two or more, or (like the grommets) in assortments, so when you're done, you'll have a collection of extra parts. These are the beginning of your "junk box," a repository of useful stuff that you haven't used yet. Add to this collection at your convenience, and it will help you build more projects, which you can power with your utility bench power supply.

### Footnotes:

<http://www.ti.com/lit/ds/symlink/lm117.pdf>

# Found.....A Funny Schematic !!





The YSARC meeting minutes and treasurer's reports are not available because of no July Board of Director's Meeting being held. Hopefully, we'll have some information for you next month.

## **New Member!!**

We would like to welcome

**Bob Wohlers KJ6JFW (Tech)**

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### **KQ6XA RULE OF THUMB for How To Read HF Propagation Numbers.**

The A index = LOW is GOOD.

1 to 6 is BEST

7 to 9 is OK

11 or more is BAD

SFI index: HIGH is GOOD.

70 NOT GOOD

80 GOOD

90 BETTER

100+ BEST

K index: LOW is GOOD.

0 or 1 is BEST

2 is OK

3 or more is BAD

5 is VERY VERY BAD

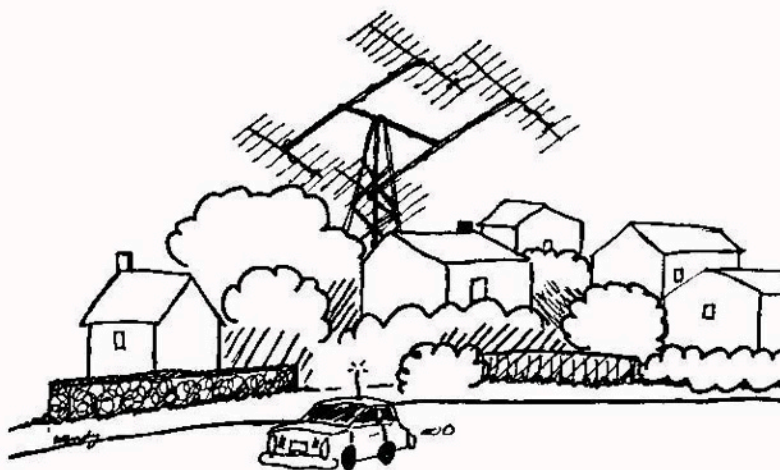
A low "A index" is most important!

For Low Power Portable DX openings

at 10MHz to 30MHz, look for an A index LESS THAN 6.

73---Bonnie KQ6XA

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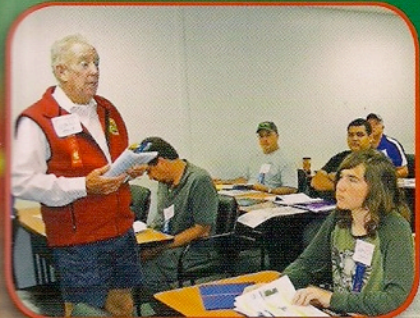


OK Fred, I'm on Maple street  
now which one is your house?



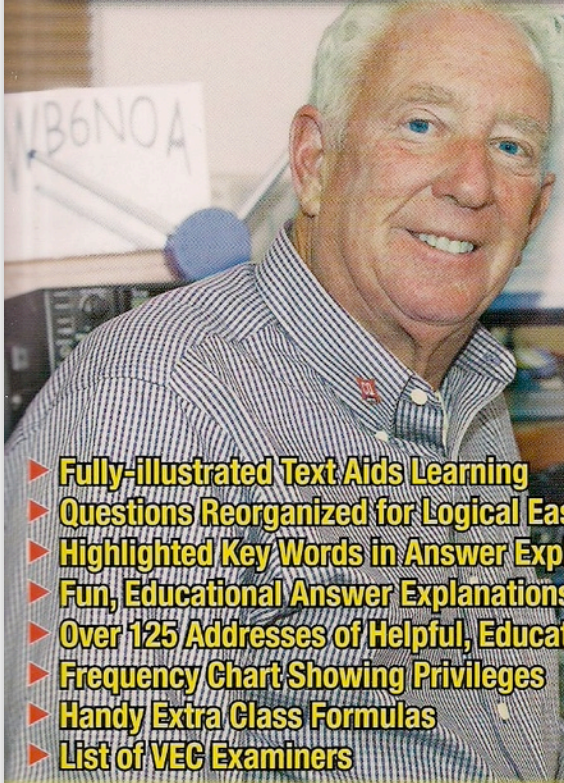
This Editor wishes to thank Gordon West, WB6NOA for using two of my photos for the front cover of his new "Extra Class" License Class Preparation Book. Note the small center photo showing Shari, K6AVW standing next to her VW Bus, and myself at the HF Radio with microphone in hand. I strongly urge you to buy this book if you are planning on an upgrade to Extra Class!! Go to: [www.w5yi.org](http://www.w5yi.org) or call the W5YI Group at 1-800-669-9594.

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