SCCARA-GRAM

Santa Clara County Amateur Radio Association

Volume 27, Number 10 **October 2011**

President's Prose

If you're reading this, you must be reading the SCCARA-GRAM, and that's good. Gary (WB6YRU) puts a lot of effort into putting this newsletter together every month. Wally (KA6YMD) makes sure the electronic version gets posted to the website (www.qsl.net/sccara) and that everyone gets notified when it's available. There are occasional articles written by members, and we could use a lot more of that. If you haven't read the "Packet Pieces" in the September issue, you might want to do so–I got a good laugh from both the "AARP questions and answers" and the "health advice."

Something I haven't seen is any letters to the editor. If you have something on your mind, or some suggested topics, send an email to Gary for publication. Your opinions, gripes and comments would all be welcome. Send your prose to Gary at wb6yru@ix.netcom.com. This is your club, so speak up!

The 46th annual California QSO Party that took place on October 1 and 2 is history by now. I hope you had a chance to participate from home or from the club station.

Start thinking about officers and directors for next year. Nominations take place at the October meeting, with voting in November. I know that John (W6HW) would like to get out of the Treasurer business and most of the rest of us have served at least three terms. Self nominations are encouraged, as well as nominations of other members in SCCARA.

Part V of my multipart article on transmission lines and SWR will appear in this issue of the SCCARA-GRAM, provided Gary can work it in. That is the last and final part.

Don't forget the 2-meter FM net on Monday nights, and the 10-meter SSB net (28.385 MHz USB) on Thursday nights. Anyone who has a license can join in.

73,
Don, AE6PM

New PO Box

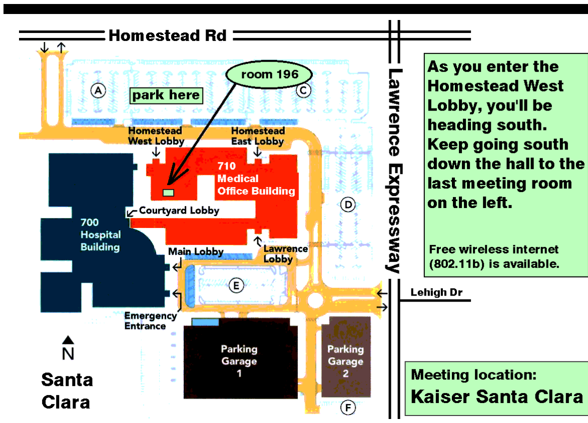
Due to a snafu at the post office, **SCCARA's PO Box number has changed from 6 to 106 and the zip code changed from 95103-0006 to 95103-0106**. We tried to get box 6 back, since the club has had it since WWII, but the PO Supervisor

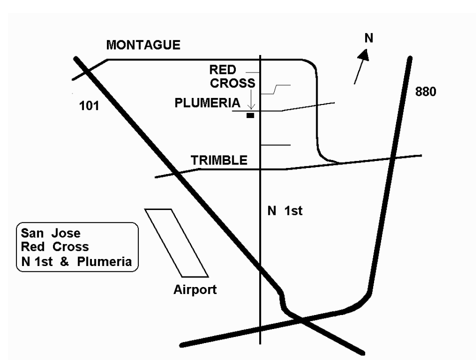
Calendar

10/8 **DeAnza electronic flea market**
10/10 **SCCARA General Meeting**
10/17 **SCCARA Board Meeting**--(San Jose Red Cross, 7:30p, all are welcome)

General Meeting

Day:	Monday, Oct.. 10, 2011
Time:	7:30 PM
Place:	Kaiser Santa Clara, Rm 196
Featuring:	*{to be announced}*





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The deadline for articles is the last Monday of the month.

SCCARA was formed in 1921 and became a non-profit corporation in 1947. SCCARA is an affiliate of the American Radio Relay League (ARRL). The club station is W6UW.

Web page: http://www.qsl.net/sccara.

SCCARA REPEATERS

SCCARA owns and operates two repeaters under the call W6UU:

2 meter:	146.985 -	PL 114.8
70 cm:	442.425 +	PL 107.2

Phone auto-dial and auto-patch is available. The two meter repeater is located at Eagle Rock near Alum Rock Park in the foothills of east San Jose. The 70 cm repeater is located at the Regional Medical Center (formerly Alexian), east of downtown San Jose, north of 280 and 101.

SCCARA NETS

On our two meter repeater: Mondays at 7:30 PM, (not the second Monday--our meeting night). Coordinator: Don Village, K6PBQ. On ten meters, 28.385 MHz USB, Thursdays at 8:00 PM. Net control: Wally Britten, KA6YMD. Visitors welcome.

N0ARY PACKET BBS

SCCARA hosts the packet BBS N0ARY (Mt Umunhum). User ports: 144.93 (1200 baud), 433.37 (9600 baud), telnet sun.n0ary.org (login “bbs”). Sysop: Gary Mitchell, WB6YRU (packet info: www.n0ary.org/ncpa)

TELEPHONE NUMBERS

SCCARA contact Clark KE6KXO:	408 262-9334
ARRL/VEC Silicon Valley VE group, Morris Jones, AD6ZH:	408 507-4698

couldn't help us and the new box 6 owner didn't respond to our two letters requesting to swap boxes.

73, John W6HW, Treasurer

BBS Status

Some of you may have noticed that the N0ARY packet BBS has been unresponsive lately. Well, try it now, it’s running again.

73, Gary WB6YRU

Sweepstakes

SCCARA will operate the sweepstakes contest from our club station at the Red Cross. In November the ARRL has two sessions for sweepstakes. On Saturday Nov. 5 at 2:00pm will operate the CW portion and on Saturday Nov. 19 at 1:00pm we will operate the phone portion. These are great contests to operate as a club activity. So lets all make these fun contests for our club.

73, Don Village K6PBQ

December Meeting

Our annual Christmas meeting will be a luncheon on Saturday December 17 at 12:00 noon. This year our luncheon will be at the Creekside Inn 544 W. Alma Ave, San Jose (one block west of Hwy 87).

This year we will be having a gift exchange. The way it works is that everyone brings a wrapped gift suitable for a man or women costing about $10.00. This type of gift exchange is always a lot of fun to participate in.

Reservations need to be in by Friday Dec. 9th (see sign-up sheet). Talk-in will be on our repeater. W6UU, 146.985-. Why not renew your membership at the same time. Looking forward to seeing all of you there.

73 , Don Village K6PBQ

More on Transmission Lines and SWR

Part V
by Don Steinbach, AE6PM

The first four articles in this series were designed to provide some background definitions and equations as they apply specifically to transmission lines and SWR. There aren’t any scientific breakthroughs there – it’s all based on information that’s been around for years. The remainder of this series will focus on applying this information to real world situations.

Practical Considerations

The effort expended working on an antenna trying to drive the SWR down could often be better spent just making contacts instead. Bear in mind that a 1 dB change in signal level is, by definition, the minimum perceptible change – in other words, the smallest change that your ear can detect. Your receiver S-meter is designed so that a 6 dB change is one S-unit (more or less) or a 4x change in power, so a 3 dB increase or decrease (2x in signal power) is one-half of one S-unit. That's not to say that an extra dB or two wouldn't help to snag that rare station, but let reality and common sense be your guide.

The total loss in dB for a mismatched transmission line is:

$$TMLL = 10 \log \left[(a^2 - |\rho^2|) / (a(1-|\rho^2|))\right]$$

Where:
$a = 10^{ML/10} = 10$ ^ (ML/10)
$|\rho| = (SWR - 1)/(SWR + 1)$
TMLL = Total mismatched line loss
ML = Matched-line loss of the transmission line in dB
SWR = SWR at the load (antenna)

(Ref: ARRL Handbook for Radio Communications, 88th Edition, page 20.5)

The additional transmission line loss for various matched-line loss and SWR at the antenna is shown in Table 1. The format is the same as Table 1 in Part 4, so the two can be used together to relate matched-line loss, SWR at the antenna, SWR at the transmitter, and additional transmission line loss. Adding the matched-line loss to the additional transmission line loss in Table 1 below yields the total transmission line loss. For example, if the matched-line loss is 2 dB and the SWR at the antenna is 4, the additional line loss due to SWR is 1.27 dB and the total transmission line loss is 3.27 dB. Looking back at Table 1 in Part 4, the same 2 dB matched-line loss and SWR at the antenna of 4 shows a SWR of 2.22 at the transmitter. Finally we can see all of the effects of loss in the transmission line.

SWR at antenna	Matched -Line Loss						
	0.5 dB	1 dB	2 dB	3 dB	4 dB	5 dB	6 dB
	Additional Line Loss Due to SWR						
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.5	0.04	0.07	0.11	0.13	0.15	0.16	0.17
2	0.11	0.20	0.32	0.39	0.43	0.46	0.48
2.5	0.20	0.35	0.55	0.68	0.75	0.80	0.83
3	0.29	0.50	0.79	0.97	1.07	1.14	1.18
4	0.48	0.82	1.27	1.53	1.68	1.78	1.84
5	0.66	1.12	1.71	2.04	2.24	2.36	2.43
6	0.84	1.41	2.11	2.50	2.73	2.87	2.95
7	1.02	1.69	2.49	2.93	3.18	3.34	3.43
8	1.19	1.95	2.84	3.32	3.60	3.76	3.86
9	1.35	2.19	3.16	3.68	3.97	4.15	4.26
10	1.51	2.42	3.46	4.01	4.32	4.51	4.62

Table 1 – Additional transmission line loss for various matched-line loss and SWR at the antenna.

Sanity Check

SWR readings can be counterintuitive. Consider the case of a ground-mounted ¼-wave vertical antenna. Here a 50-ohm SWR of 1 isn't necessarily a good thing. You start with the vertical radiator and add a few radials and the feed point impedance is about 50 ohms and the SWR is 1. All is well, or is it? You know that as you add more radials the effect of the lossy ground under the antenna is reduced, the antenna efficiency is improved and the take-off angle becomes lower – all good things. But, as you add more radials, the SWR increases until with 120 radials the SWR is about 1.4 because the feed-point impedance is now about 35 ohms instead of 50 ohms as the antenna configuration approaches its theoretical best (over an infinite ground plane). In this instance, the lowest SWR occurred with the worst-case ground system because the 15-ohm loss in the ground system when added to the 35-ohm radiation resistance of the antenna makes the total feed-point impedance 50 ohms, but 30% of the transmitter power was wasted on the earthworms.

Similarly, the feed point impedance of a half-wave dipole antenna varies with its height above ground and its proximity to other conductors. It ranges from a low of about 10 ohms (over a perfectly conducting ground) or 45 ohms (over average real earth) to a maximum of nearly 100 ohms (Ref: ARRL Handbook for Radio Communications, 88th Edition, page 21.3). So, a SWR of 2 referred to 50 ohms for a half-wave dipole is within normal bounds.

Extremely short antennas, compared to the wavelength, such as car antennas for HF mobile can have very low radiation resistance, on the order of a few ohms, so the SWR referenced to 50 ohms and measured at the antenna feed point will be very high (maybe 10 to 50 or more) and if it isn't, there is reason to believe that there is a large loss somewhere in the system, probably in the ground path.

It's always best to know what you're trying to measure and what to expect in order to avoid reaching erroneous conclusions.

SWR Facts

There are misconceptions about the effects of standing waves on the transmission line. Here are some facts:

1. High SWR doesn't cause interference to other electronic devices because SWR by itself doesn't generate new signals.
2. High SWR doesn't cause the transmission line to radiate.
3. High SWR doesn't cause RF in the shack.
4. High SWR can result in component damage caused by large voltages or currents.
5. High SWR isn't necessarily bad if loss in the transmission line isn't eating up your power.
6. A SWR of 2:1 at the antenna can be cause for concern on VHF and UHF because of the typically high transmission line loss at these frequencies.
7. A SWR of over 3:1 at the antenna on HF is usually not a cause for concern if quality coax 100 feet or less in length is used, since the transmission line loss is usually low.
8. A SWR of 100:1 or more at the antenna on HF is usually not a cause for concern if open-wire transmission line is used because the loss in the transmission line is so low. There may be high voltages present, however.
9. SWR is a measure of reflected power, not lost power.
10. SWR can be measured with simple equipment easily built by the average person.
11. Most solid-state transceivers will begin reducing their output power when the SWR exceeds 2:1.
12. Most automatic antenna tuners can only accommodate a limited range of SWR due to practical voltage and current limitations.
13. Reflections, the very nature of standing waves, can adversely affect signal quality since the receiver will receive the same signal multiple times at ever decreasing amplitudes. This could be an issue with some digital modes, causing intersymbol interference.

The SWR Meter

Since you've read many words about SWR to this point, some insight into how to measure SWR is in order. SWR meters are often seen at swap meets priced at $10 to $25. Older manufacturers include Heath, Knight, Swan, EF Johnson, Calrad and Radio Shack. See Fig. 1 for some examples. You can also build your own.

The basic SWR meter consists of a sampling line (aka directional coupler) that provides a sample of the forward and reflected power from the main transmission line. That and a rf wattmeter to measure the sampled forward and reflected power is all that you need. The parts to build the directional coupler will only cost a couple of dollars. The only problem with this approach is that the rf wattmeter will set you back a few hundred dollars. The solution to the rf wattmeter issue is to convert the rf power measurement to a dc voltage that can be measured with an inexpensive panel meter or a multimeter that you probably already own. This takes two diodes, two resistors and two capacitors for a total cost of less than a dollar.

The sampling line (directional coupler) can be constructed several different ways: (1) two parallel lines in a 3-sided trough approximating a section of coax cable, (2) a section of coaxial cable with a small insulated wire threaded under the cable shield, (3) stripline constructed on a etched circuit board, and (4) a toroidal core – usually ferrite - with a few turns of wire wound on it with the transmission line center conductor passing through it. The latter is the simplest to build mechanically and is widely used. See Figures 2A through 2C for a view of some different construction methods.

Fig.1. Typical SWR Meters Found at Swap Meets.

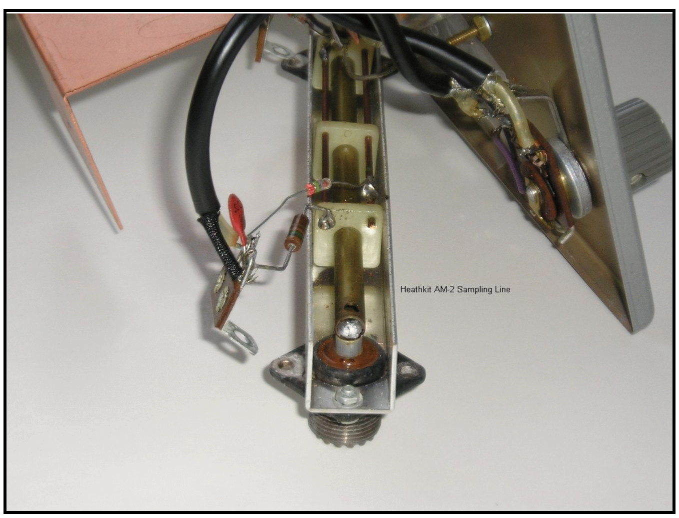

Fig. 2A. The Heathkit AM-2 uses a brass tube center conductor with two parallel sampling lines in a u-shaped trough. See Fig. 3 for the schematic diagram.

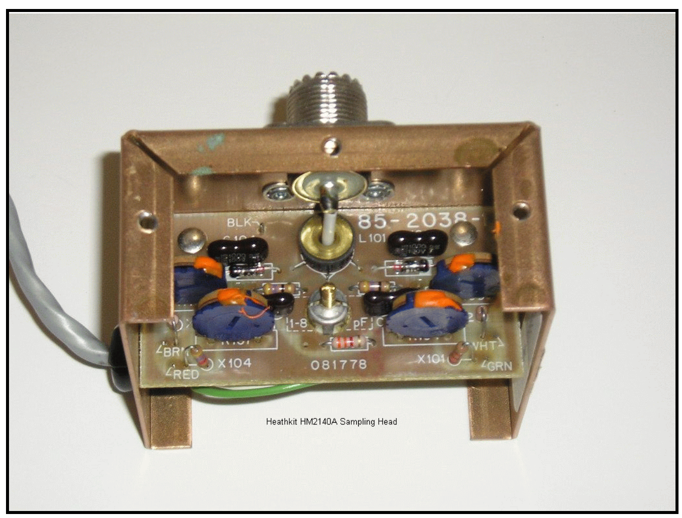

Fig. 2B. The Heathkit HM2140A uses a toroid winding with a single wire through the center as a sampling circuit. See L101 in the photo. The vertical white wire connects the input and output coax connectors and the toroid winding senses the forward and reflected power.

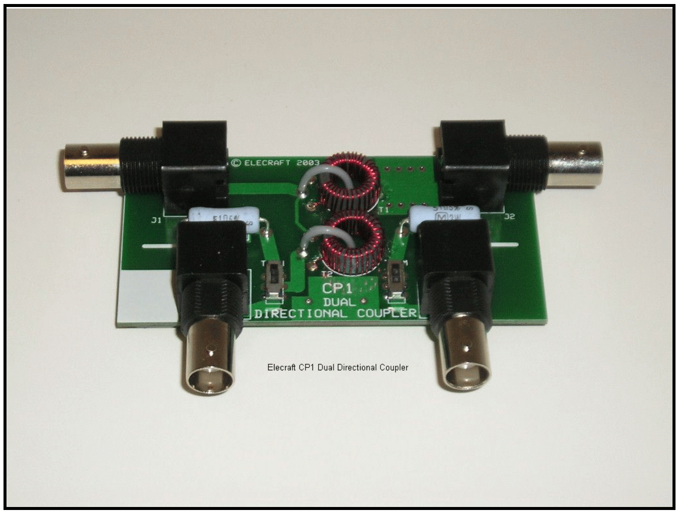

Fig. 2C. The Elecraft CP1 is a true directional coupler with sense windings for the forward and reverse directions. This is available in kit form. See the "Transmission Line Signal Sampling" article in the December 2009 *SCCARA-GRAM* for information on the design of the toroidal transformers.

A typical SWR meter circuit is shown in Figure 3. The SPDT switch selects the dc voltage to the meter from the diodes connected to the two sampling lines, one for the forward (incident) wave and the other for the reflected wave. Some units use two meters, eliminating the switch. The crossed-needle dual-movement single meter approach is also popular, although I find it difficult to read with any accuracy. Regardless of any enhancements or bells and whistles, all SWR meters are based on the concept in Fig. 3.

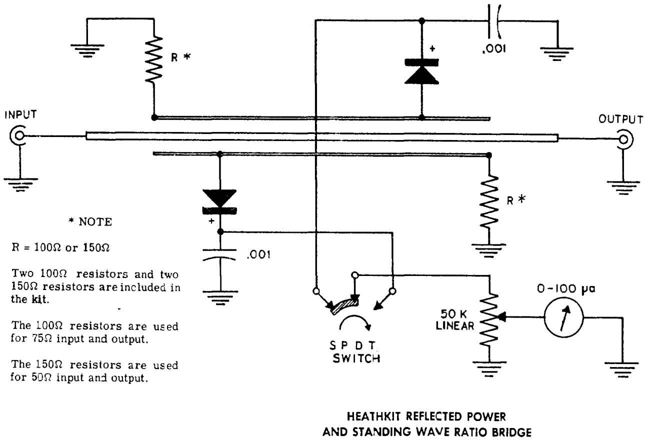

Fig. 3. Schematic diagram of the Heathkit AM-2 SWR meter.

<u>The Antenna Analyzer</u>

The antenna analyzer is a useful instrument for characterizing a transmission line. Many purchasers of an analyzer use it simply to measure the SWR (at the transmitter) of an antenna + transmission line system. This could just as well be accomplished with a $15 flea-market SWR meter (or building one) and using the existing transceiver as a signal source. Many transceivers have SWR meters already built in, so even the $15 could have been saved. Admittedly, the handheld analyzer is conveniently portable and that's certainly one of the reasons that we do what we do.

On the up-side, the analyzer is ideally suited for doing many other tasks, other than simply reporting SWR, if one elects to read the manual. One of those tasks is making measurements to characterize a transmission line by itself, which is the subject of the remainder of this article.

Basically, all analyzers generate a rf waveform to be sent down the transmission line (the incident wave). The returned signal (reflected wave) is analyzed for amplitude and phase as compared to the transmitted (incident) wave and all of the displayed parameters are derived from this information. Simple enough in principal.

The major discriminators between the presently available analyzers have to do with their immunity to strong extraneous signals in the presence of the desired (generated) signal and the accuracy of their computational algorithms and the limitations of their rf detectors. QST has published reviews and comparisons of most, if not all, of the analyzers available to the hobbyist, but that's not part of this article. The more sophisticated analyzers may also be able to 'back out' the effects of the transmission line. The importance of that was illustrated in Figures 1 and 2 of Part 3 of this series.

The AIM4170 analyzer designed by W5BIG and sold by Array Solutions is used for the examples in the remainder of this article. The AIM4170 is a small "black box" that connects to a PC. The test specimen is a 20-foot piece of RG8X coaxial cable with factory-installed PL259 connectors on each end, purchased at a DeAnza swap meet. The analyzer can compute and display a multitude of user specified parameters as shown in Fig. 4.

Figure 4 is a plot of four parameters looking into the open end of my 20' coax cable terminated in a short circuit. The parameters are:
1. Zmag, the magnitude of the impedance (the green trace).
2. Theta, the phase angle of the impedance (the magenta trace).
3. RHO or ρ , the reflection coefficient (the red trace).
4. RT Loss, return loss (the blue trace).

Note that the reflection coefficient (rho, the red trace near the top of the graph) and the return loss (the blue trace just below the horizontal "0" axis) remain fairly constant since they are relatively independent of frequency, but increase slightly as the frequency increases. On the other hand, Zmag, the green trace, and Theta (the magenta trace) are very frequency-dependent. We'll look at those characteristics in more detail shortly. Note also how the plotted data repeats every half-wavelength ($\lambda/2$) as the frequency is varied from 1 to 50 MHz.

Turning off all of the traces except for Zmag and Theta and re-plotting for 1 to 20 MHz results in the impedance-only plots in Fig. 5 (with the far end of the cable short-circuited) and Fig. 6 (with the far end of the cable open-circuited). In both cases the lowest frequency where the phase angle (Theta) is zero is the frequency where the transmission line is ¼ wavelength long ($\lambda/4$) and the next higher frequency where the phase angle is zero is the frequency where the line is ½ wavelength long ($\lambda/2$). The impedance (Zmag) continually changes with frequency, repeating at every $\lambda/2$ frequency.

The input impedance of the cable repeats the terminating (load) impedance at every $\lambda/2$ frequency, and the inverse of the terminating impedance at every $\lambda/4$ frequency.

The cable appears inductive if the phase angle is positive, as it is below 8.97 MHz in Fig. 5, and capacitive if the phase angle is negative as it is from 8.97 MHz to 17.96 MHz in the Figure. At 8.97 MHz the phase angle is zero indicating a resonant condition (since inductive and capacitive reactances cancel) and the magnitude of the impedance (Zmag) is a maximum, which would be infinite if not limited by shunt impedances in the cable and the connectors. The high value of Zmag indicates that this a parallel-resonant circuit and that it is electrically λ/4 long since the measured impedance (very high) is the inverse of the load impedance (a short circuit).

At 17.96 MHz, the cable is an electrical half-wavelength long and repeats the impedance seen at its far end, which is a short circuit or zero ohms. At this frequency the cable is again a resonant circuit (since inductive and capacitive reactances cancel), but series-resonant this time as evidenced by its low (near zero) impedance in series with the load.

In Fig. 5, where the line is terminated in a short circuit, we observed that the λ/4 frequency is 8.97 MHz. Likewise, in Fig. 6 where the line is terminated in an open circuit, the λ/4 frequency is 8.95 MHz. It's much easier to determine these frequencies by finding where the phase angle passes through zero than it is to find the minimum or maximum impedance value (Zmag). The difference between the short- and open-circuit readings is probably due to some reactance in the terminations – possibly slightly inductive in the short circuit and slightly capacitive in the open circuit – and the fact that the analyzer algorithm interpolates between data points (10 kHz in this case). Averaging the two readings yields 8.97 Mhz.

The analysis of Fig. 6 is the same as for Fig. 5 except that the far end is terminated in an open circuit instead of a short circuit. Table 2 summarizes the results of our analysis of the plots in Figs. 5 and 6.

Short sections (stubs) of transmission lines can be used as capacitors or inductors in impedance matching networks, and as traps at the series-resonant frequencies. Looking at Fig. 6, for example, that piece of coax "hanging" off of your main transmission line (as with a T connector) would act as a trap at 8.95 MHz (and odd multiples thereof) where it's almost a short-circuit, but have no effect at twice those frequencies where it's almost an open circuit. Obviously those frequencies don't have any application in the ham bands, but changing the length of this "stub" raises the series-resonant frequency if shortened and lowers it if lengthened. Also, for a given series-resonant frequency, a short-circuited stub needs to be about half as long as an open-circuited stub. My experience based on this 20' test specimen is that there is no difference whether the coax cable stub is coiled up or stretched out in a straight line.

Transmission Line Length	Short-Circuited Line (Fig. 5)	Open-Circuited Line (Fig. 6)
Less than λ/4	Inductive	Capacitive
λ/4	Parallel resonant	Series resonant
Between λ/4 and λ/2	Capacitive	Inductive
λ/2	Series resonant	Parallel resonant

Table 2 - Summary of open- and shorted-circuited transmission line characteristics.

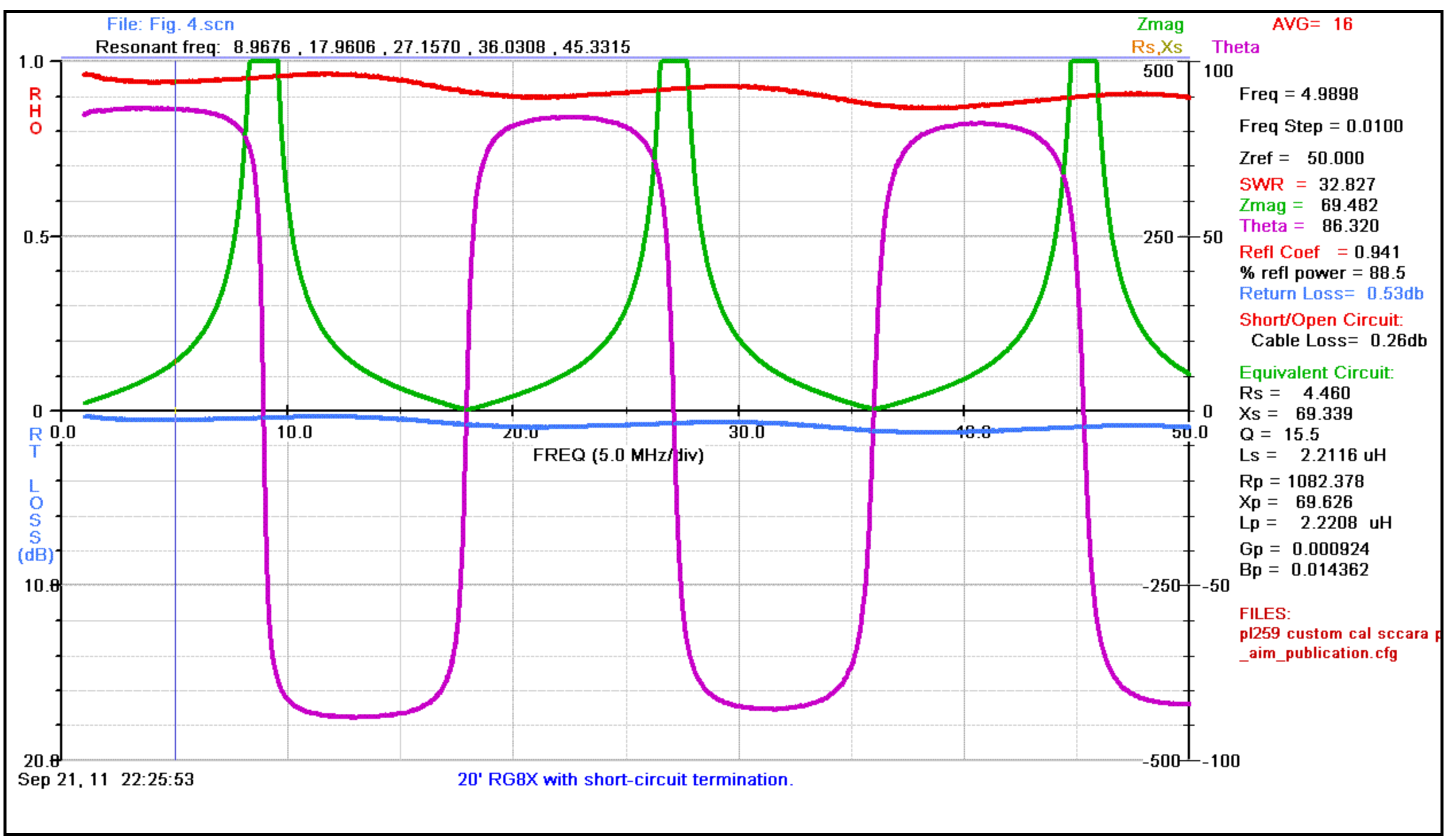

Fig. 4. A graphical display of some measured parameters of a coaxial cable as a function of frequency. See the text.

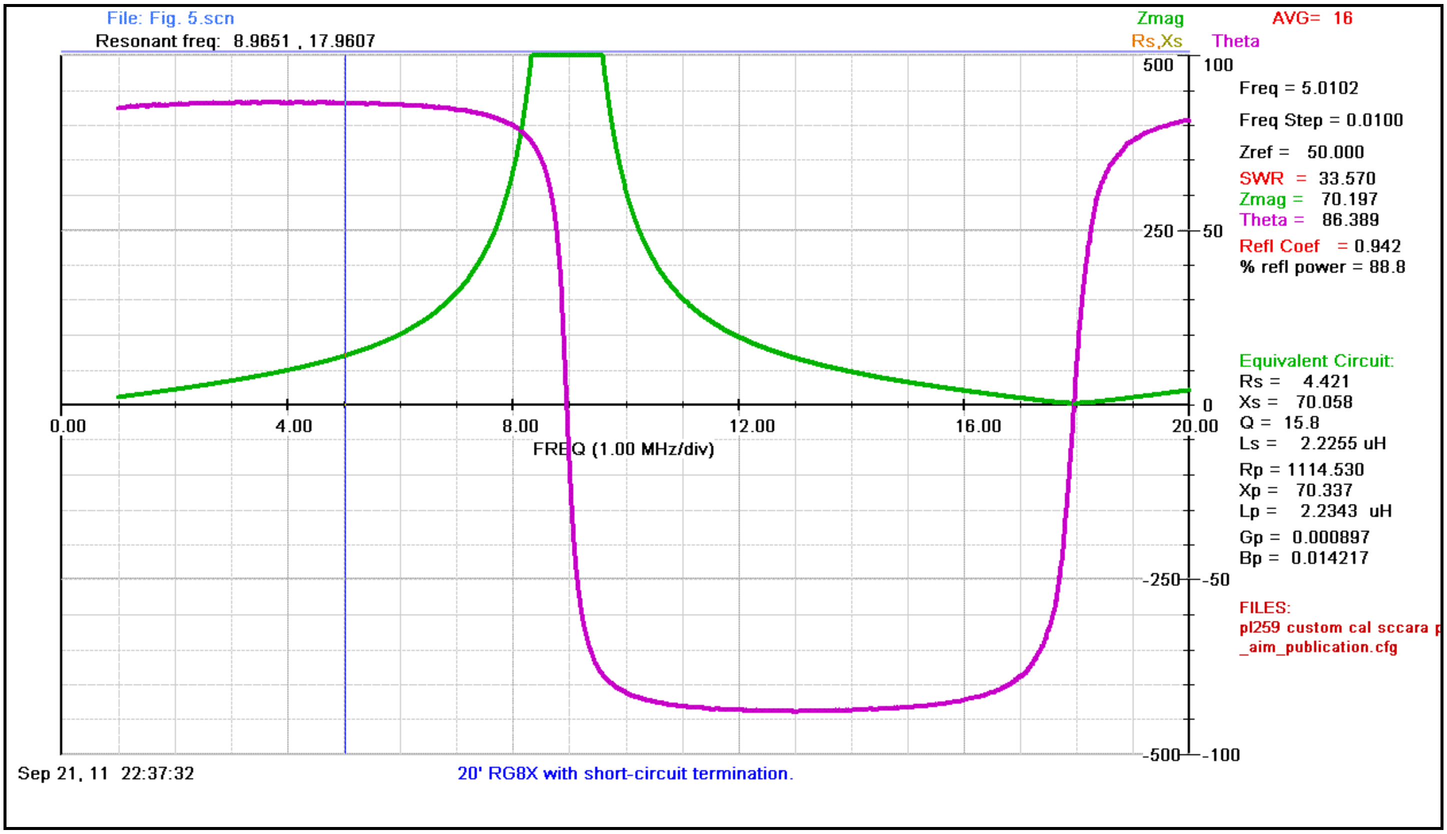

Fig. 5. Expanded view (1 to 20 MHz) of coax cable parameters when terminated in a short circuit.

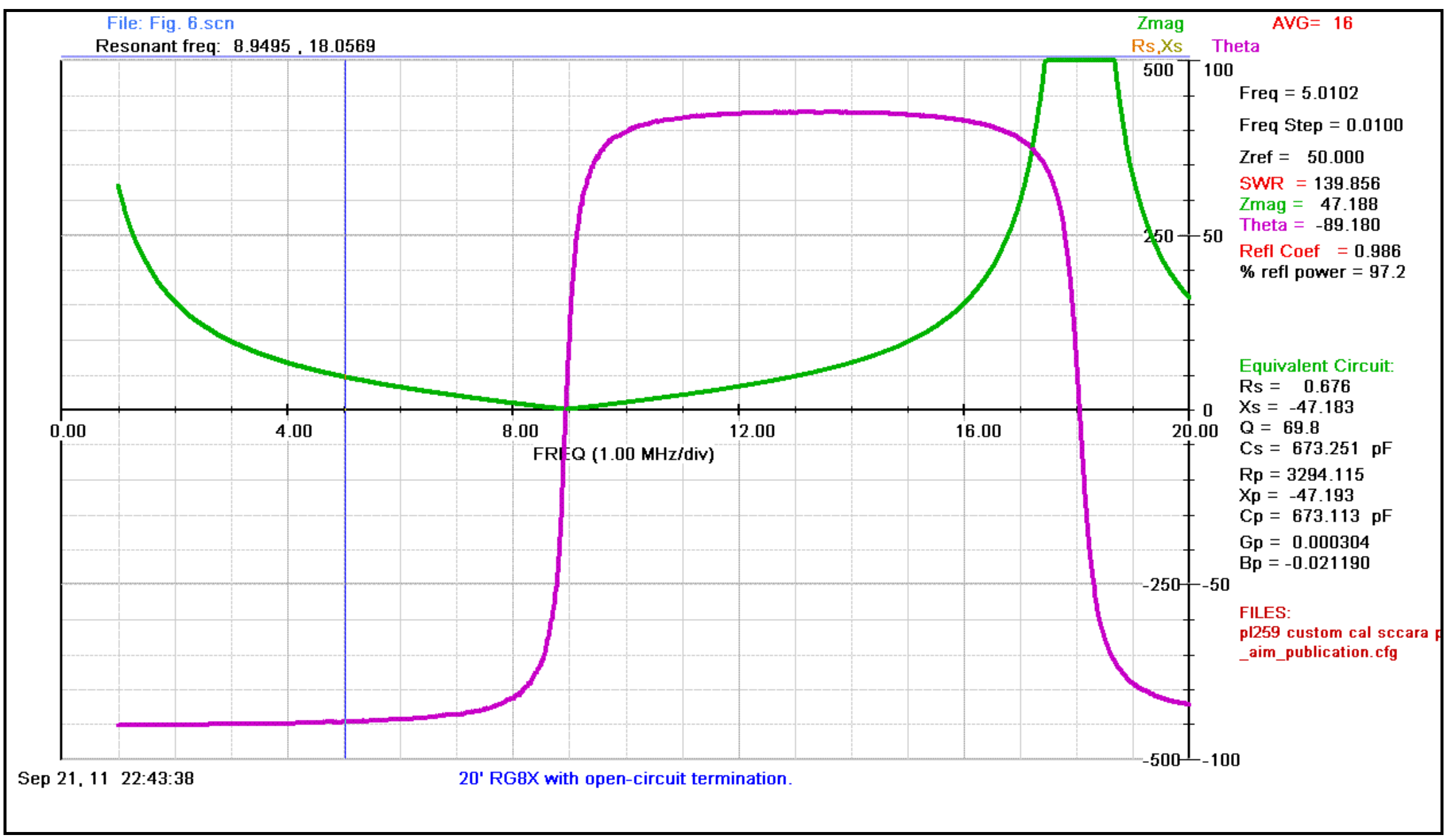

Fig. 6. Expanded view (1 to 20 MHz) of coax cable parameters when terminated in an open circuit.

Characterizing the Coax Cable

Given a length of coax cable of unknown ancestry, what can we learn about it? If the manufacturer and part number are still visible, we can probably find out enough by visiting the manufacturers' web site. If the cable is unidentifiable we can still find out all we need to know: specifically (1) the characteristic impedance, (2) the velocity factor and (3) the loss.

We sometimes need to know the velocity factor with greater accuracy even if the cable is identifiable, especially if the coax will be used as a stub for impedance matching or filtering. The velocity factor can vary considerably from the published value, and also within the same roll of coax. We also might want to know the cable loss around some particular frequency. The published characteristics of some typical transmission lines are shown in Tables 3 and 4.

Transmission Line Type	Velocity Factor	Description
None (vacuum)	1.00	No dielectric loss, no copper loss
600 ohm open wire	0.95-0.99	#12 bare copper, VF varies with spacer material
450 ohm twinlead	0.91	WM CQ 553 (#18 flex)
300 ohm twinlead	0.80	Belden 8225 (#20 flex)
Coax, foam dielectric	0.83	RG-8 Belden 9913F
Coax, foam dielectric	0.82	RG-8X Belden 9258
Coax, solid dielectric	0.66	RG-58A Belden 8259
Coax, solid dielectric	0.66	RG-213 Belden 8267

Table 3 – Nominal Velocity Factors for Common Transmission Lines (ref: ARRL Handbook for Radio Communications, 88th Edition, page 22.48)

Characterizing the Coax Cable: Velocity Factor

The physical length of a transmission line is less than the electrical length because the electromagnetic wave travels slower through the cable than in free space. With the far end of the line open-circuited, vary the frequency of the analyzer until the lowest frequency at which the phase angle is zero is found. This will be the frequency at which the line is 1/4-wavelength long. Repeat the measurement with the line short-circuited and average the two. For the 20' piece of RG8X in this article, we measured 8.95 MHz and 8.97 MHz respectively for an average of 8.96 MHz. An electrical wave in free space travels at 983,569,082 ft/sec.

The wavelength in a physical transmission line becomes:

$\lambda = (983.6/f)VF$

where:
λ = wavelength in feet
f = frequency in MHz
VF = velocity factor

For our 20' cable with a $\lambda/4$ frequency of 8.96 MHz
VF = 20 x (8.97 x 4)/983.6 = 0.73

Transmission Line Type	Matched Loss (dB/100')			Description
	10M	100M	1000M	
None (vacuum)	N/A	N/A	N/A	No dielectric loss, no copper loss
600 ohm open wire	0.06	0.2	Not used	#12 bare copper, VF varies with spacer material
450 ohm twinlead	0.2	0.7	2.9	WM CQ 553 (#18 flex)
300 ohm twinlead	0.2	1.1	4.8	Belden 8225 (#20 flex)
Coax foam dielectric	0.6	1.5	4.8	RG-8 Belden 9913F
Coax foam dielectric	0.9	3.2	11.2	RG-8X Belden 9258
Coax solid dielectric	1.5	5.4	22.8	RG-58A Belden 8259
Coax, solid dielectric	0.6	2.1	8.0	RG-213 Belden 8267

Table 4 – Nominal Matched Loss for Common Transmission Lines at 10 MHz, 100 MHz and 1000 MHz (ref: ARRL Handbook for Radio Communications, 88th Edition, page 22.48)

Characterizing the Coax Cable: Characteristic Impedance

The simplest method is to terminate the transmission line with a known resistance and measure the SWR over a wide range of frequencies (e.g., 3 to 30 MHz).

SWR = Zo/R or R/Zo
Note: The smaller quantity is always used in the denominator so the SWR will be greater than or equal to 1.

Zo = R x SWR or R/SWR

Where:
R = the resistance of the termination
Zo = the characteristic impedance of the transmission line

Characterizing the Coax Cable: Loss

The simplest method is to use an analyzer to measure the return loss (RL) with the far end of the line open-circuited and again with the far end short-circuited at the frequency of interest. Add the two values obtained and divide by 2 to obtain the average value of the RL

The transmission line loss in dB = RL/2 (assuming the analyzer reports the RL as the total measured loss in dB from the analyzer to the termination and back).

A second method is to measure the SWR at the frequency of interest.
The transmission line loss in dB = 10 log [(SWR + 1)/(SWR – 1)].

A third method, described on page 6 of the Autek Research Instructions for the Vector RX Antenna Analyst Model VA1, is to either open-circuit or short-circuit the transmission line and find the minimum Zmag nearest the frequency of interest. The transmission line loss (matched line loss) at that frequency is:

ML (dB) = 8.69 x minimum Zmag / Transmission line characteristic impedance.

The End

This concludes this series of articles. If you have any comments, corrections or questions, feel free to contact me at ae6pm@arrl.net or send them to the Editor (Gary, WB6YRU) for publication. The original Word version of these articles can be downloaded from http://ae6pm.com/SCCARA-GRAM_Articles/. There is an underscore between SCCARA-GRAM and Articles.

Don – AE6PM

Meeting Minutes

General Meeting, Sept. 12, 2011

Kaiser Hospital 710 Lawrence Expy., Santa Clara, CA. 95051

Don Steinbach, AE6PM, called the meeting to order at 1935. There were 24 members and guests present.

Announcements: Station open at the Red Cross for California QSO Party October 1-2. Station open at the Red Cross September 24 (last Saturday of the month). AMSAT October 4-7. Pacificon October 14-16. Nomination of Officers and Directors in October; election in November.

Business Items: Wally (KA6YMD) reported that the names of the current Officers and Directors are posted on the website at http://www.qsl.net/sccara/clubinfo.htm. Officers serve for a term of one year and Directors serve for two years. The term for each Director is included on the website.

Program: The remainder of the meeting was a presentation by Kristen McIntyre (K6WX). Kristen has developed an application to send and receive PSK-31 using the Apple iPad, and her presentation explained how the project evolved. The group learned something about the inner workings and complexity of PSK-31 and gained some insight into the multitude of problems that the software engineer can encounter. The presentation was well received and had something of interest for all levels of individual expertise.

The meeting adjourned at 2152 hrs.

Don Steinbach, AE6PM, President

Board Meeting, Aug. 15, 2011

Red Cross Building, 2731 N 1st St, San Jose CA Status: Unreviewed

The SCCARA Board Meeting was called to order by Don AE6PM at 1942 hrs.

Attendance: President: Don Steinbach, AE6PM; Vice President: Fred Townsend, AE6QL; Treasurer John Altieri, W6HW; Trustee Don Village, K6PBQ; Directors: Lou Steirer, WA6QYS; Wally Britten, KA6YMD; Gary Mitchell, WB6YRU; Gregg Lane, KF6FNAP.
Absent: Secretary Viki Moldenhauer, KI6WDS; Director John Glass, NU6P;
Visitors: Gwen Steirer, KF6OTD; Clark Murphy, KE6KXO.

Announcements: Don AE6PM announced that the SCCARA-GRAM inputs are due to Gary no later than September 26.

Treasurer's Report: Checking = $3788.75; savings = $3847.30; cash = $187.85 for a total of $7823.90.

Secretary's Report: Minutes of August meetings were reviewed. There were no additions or corrections.

Vice President: The program for the next General meeting hasn't been determined. Possibly homebrew night.

Business Items:

- An alternate site for the W6UU 2-meter repeater has been identified and visited by several members. Lou (WA6QYS) made a motion, seconded by Gregg (KF6FNA), to move ahead with the purchase of a Kenwood TKR-750 or equivalent repeater. Lou made the point that this discussion has been going on for months now with no closure. It was also pointed out by Gary (WB6YRU), Gregg (KF6FNA) and others we have almost everything else we need (mast, antenna, duplexer, controller and cabinet are all available at no cost). Fred (AE6QL) felt that we should spec the system as if for bids and see if the vendor could supply a duplexer and circulator, instead of using our duplexer and not adding a circulator. Fred agreed to return with specifications and cost at the next Board meeting. Lou withdrew his motion.

- Lou (WA6QYS) and Gregg (KF6FNA) finished painting the Club storage lockers at Clarks (KE6KXO) QTH. Additional expenses of $24 were incurred for pest control. Fred (AE6QL) moved and Don (K6PBQ) seconded that the Club reimburse Lou/Gregg $24. Motion passed unanimously.

- John (W6HW) confirmed that the Club donated $80 to AMSAT.

- Lou (WA6QYS) and Gregg (KF6FNA) stated that there were no additional expenses for the August picnic.

- The possibility of selling the 'old' generator that failed on Field Day was discussed. Fred (AE6QL) made a motion, seconded by Lou (WA6QYS), to sell the generator as-is. Motion passed unanimously.

- The possibility of purchasing a new generator, a Honda EU2000i, was discussed. Fred (AE6QL) moved to authorize funds to purchase the generator. The motion was seconded by Lou (WA6QYS) and was passed unanimously. Clark (K6KXO) agreed to check pricing and local availability.

- Our new PO Box number is 106.

The meeting was adjourned at 2035 hrs.

Don Steinbach (AE6PM), President.

Packet Pieces

Downloaded from the BBS packet network:

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Date: 24 Sep 2010 15:21
From: W1GMF@W1GMF
To: HUMOR@USA
Subject: Parenting

Being a parent changes everything. But being a parent also changes with each baby. Here are some of the ways having a second and third child is different from having your first.

Your Clothes

1st baby: You begin wearing maternity clothes as soon as your OB/GYN confirms your pregnancy.

2nd baby: You wear your regular clothes for as long as possible.

3rd baby: Your maternity clothes ARE your regular clothes.

Preparing for the Birth

1st baby: You practice your breathing religiously.

2nd baby: You don't bother practicing because you remember that last time, breathing didn't do a thing.

3rd baby: You ask for an epidural in your 8th month.

The Layette

1st baby: You pre-wash your newborn's clothes, color-coordinate them, and fold them neatly in the baby's little bureau.

2nd baby: You check to make sure that the clothes are clean and discard only the ones with the darkest stains.

3rd baby: Boys can wear pink, can't they?

Worries

1st baby: At the first sign of distress - a whimper or a frown--you pick up the baby.

2nd baby: You pick the baby up when her wails threaten to wake your firstborn.

3rd baby: You teach your 3-year-old how to rewind the mechanical swing.

Pacifier

1st baby: If the pacifier falls on the floor, you put it away until you can go home and wash and boil it.

2nd baby: When the pacifier falls on the floor, you squirt it off with some juice from the baby's bottle.

3rd baby: You wipe it off on your shirt and pop it back in.

Diapering

1st baby: You change your baby's diapers every hour, whether they need it or not.

2nd baby: You change their diaper every 2 to 3 hours, if needed.

3rd baby: You try to change their diaper before others start to complain about the smell or you see it sagging to their knees.

Activities

1st baby: You take your infant to Baby Gymnastics, BabySwing, and Baby Story Hour.

2nd baby: You take your infant to Baby Gymnastics.

3rd baby: You take your infant to the supermarket and the dry cleaner.

Going Out

1st baby: The first time you leave your baby with a sitter, you call home 5 times.

2nd baby: Just before you walk out the door, you remember to leave a number where you can be reached.

3rd baby: You leave instructions for the sitter to call only if she sees blood.

At Home

1st baby: You spend a good bit of every day just gazing at the baby.

2nd baby: You spend a bit of everyday watching to be sure your older child isn't squeezing, poking, or hitting the baby.

3rd baby: You spend a little bit of every day hiding from the children.

Swallowing Coins

1st child: when first child swallows a coin, you rush the child to the hospital and demand x-rays.

2nd child: when 2nd child swallows a coin, you carefully watch for the coin to pass.

3rd child: when the 3rd child swallows a coin you deduct it from his allowance!

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Date: 24 Sep 2010 15:19
From: W1GMF@W1GMF
To: HUMOR@USA
Subject: It might be the light.

Deep In the back woods of Tennessee, a hillbilly's wife went into labor in the middle of the night, the doctor was called out to assist in the delivery. Since there was no electricity, the doctor handed the father-to-be a lantern and said, "Here. You hold this high so I can see what I am doing." Soon, a baby boy was brought into the world.

Whoa there, said the doctor, "Don't be in such a rush to put that lantern down. I think there's another one coming." Sure enough, within minutes he had delivered a baby girl. "Hold that lantern up, don't set it down there's another one!" said the doctor.

Within a few minutes he had delivered a third baby.

"No, don't be in a hurry to put down that lantern, it seems there's yet another one coming!" cried the doctor.

The redneck scratched his head in bewilderment and asked the doctor, "You reckon it might be the light that's attractin' 'em?"

Need Help?

Amateurs have a long history of helping each other. An experienced amateur who helps another is traditionally called an "Elmer." If you have a question or problem, you are encouraged to ask one of SCCARA's Elmers. Below is a list of topics including who to contact for each.

If you consider yourself to be reasonably competent in at least one area of amateur radio and would be willing help others, please fill out an Elmer form from the club secretary.

Antennas, feed-lines, tuners: WB6EMR, W6JPP, K6PBQ, WB6YRU
Lightning protection, grounding: WB6YRU
Station set-up, equipment: K6PBQ, W6JPP
TVI/RFI: WB6YRU
Homebrew projects, construction: KD6FJI, WB6YRU
Computers: older IBM PC: WB6YRU
Packet Network (BBS, forwarding): WB6YRU
Code operating and installations: WB6EMR, K6PBQ
DX (long distance/propagation): WB6EMR
Emergency operating/preparedness: WA6QYS
HF operating techniques (SSB, CW): WB6EMR, K6PBQ
Legal/FCC rules: WB6YRU
SCCARA (club inner workings): K6PBQ, WB6YRU, WA6QYS
EchoLink: KK6MX

WB6EMR, James D. Armstrong, Jr.,
evening & msg: (408) 945-1202

KD6FJI, Lloyd DeVaughns,
(408) 225-6769 e-mail: kd6fji@arrl.net

KK6MX, Don Apte, (408) 629-0725
e-mail: kk6mx@aol.com

W6JPP, John Parks, (408) 309-8709
e-mail: w6jpp@arrl.net

K6PBQ, Don Village, (408) 263-2789
e-mail: donvillage7@yahoo.com

WA6QYS, Lou Steirer, (408) 241-7999
e-mail: wa6qys@arrl.net

WB6YRU, Gary Mitchell, (408) 269-2924
packet: home BBS NOARY
e-mail: wb6yru@ix.netcom.com

Newsletter Notes

Please note: the club PO BOX is now 106, and the zip+4 is now 95103-0106.

A big **THANK YOU** to Don AE6PM for his great series on antennas and transmission lines, which concludes in this issue.

I strongly believe this is the kind of thing that makes the *SCCARA-GRAM* most valuable–technical articles from our own members that inform the rest of us about some aspect of amateur radio.

Hopefully this encourages others to contribute. Please keep in mind that Don is an engineer, but you don't have to be that sophisticated or well informed to write an article for the *SCCARA-GRAM*. If you've done or learned something of interest to the rest of us, please tell us about it. Ideas and opinions are welcome too. Remember: this is *your* newsletter, it's just another way of talking to your fellow club members.

73, Gary WB6YRU, editor

December Meeting Luncheon Sign-up

For the annual December meeting luncheon, sign me up for the following lunch(es) at $28.00 ea...

_____Coulette Steak _____Chicken Marsala _____Salmon

Name:__________________________________ Call sign:_________________ Total for lunch(es): $________

Give this form (or copy) with payment to the treasurer or Mail to SCCARA PO Box 106 San Jose CA 95103-0106

SCCARA
Santa **C**lara **C**ounty **A**mateur **R**adio **A**ssociation
PO Box 106
SAN JOSE CA 95103-0106

Affiliate of the ARRL,
American Radio Relay League

FIRST CLASS

ADDRESS SERVICE REQUESTED

SCCARA Membership Form for 2012

If none of your info has changed, fill in name and call only

Name: ____________________ Call: __________ Class: E A G T N

Address: ______________________________ Licensed since (yr): ________

City: ____________________ State: ____ Zip: ______ - ____ Licence Expiration Date (mo/yr): ________

Telephone: ( ) ______________ ☐ New Member ☐ Renewal
☐ I'm also a member of the ARRL

E-mail: ______________________________

Memberships begin January 1 and expire December 31.
If renewing: annual membership dues (base rate) are: $20 Individual, $25 Family, $10 Student (under 18)
For new members:
- If joining in January: base rate
- If joining in February through October: base rate x (11 - month) x 10% (e.g. for June, that would be: base rate x 50%)
- If joining in November or December: free for November and December if paying the base rate for the following year

$ ________ **Dues payment** for: ☐ individual ☐ family ☐ student

For family memberships (at the same address), please include a separate form for each family member.

I want the newsletter by: ☐ U.S. Mail ☐ internet (make sure your e-mail address is legible and correct)

Give this completed form (or copy) with payment to the Secretary or Treasurer at any meeting or mail to the club address. Rev. 6/16/2008